MINISTRY OF EDUCATION

GEOGRAPHY

For Senior High Schools

TEACHER MANUAL



YEAR THREE

NATIONAL COUNCIL FOR CURRICULUM & ASSESSMENT OF MINISTRY OF EDUCATION

MINISTRY OF EDUCATION



REPUBLIC OF GHANA

GEOGRAPHY

For Senior High Schools

Teacher Manual

Year Three

NaCCA NATIONAL COUNCIL FOR CURRICULUM & ASSESSMENT OF MINISTRY OF EDUCATION

GEOGRAPHY TEACHER MANUAL

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INTRODUCTION FOR THE YEAR THREE TEACHER MANUAL

The National Council for Curriculum and Assessment (NaCCA) has developed the third and final set of curriculum materials to support the implementation of the new Senior High School curriculum.

This Year Three Teacher Manual for covers all aspects of the content, pedagogy, teaching and learning resources and assessment required to effectively support learners in their final year of Senior High School. All the necessary information for the Student Assessment Portal has been included in the Year Three Teacher Manual to simplify the development of weekly learning plans, meaning that teachers have a single reference document.

The Year Three Teacher Manual has two main objectives:

- To support learners to consolidate and deepen their understanding of the content, pedagogy, and assessment across all three years of the new Senior High School curriculum in preparation for the West Africa Senior Secondary Certificate Examination (WASSCE).
- To equip teachers with the tools and resources needed to deliver revision-focused, assessment-led lessons that build on the knowledge learners have acquired from Year One to Year Three.

In this third year, teachers will be supporting learners to prepare for the WASSCE. Each section of the Teacher Manual is therefore structured around the highest Depth of Knowledge (DoK) levels, allowing learners to build progressively on knowledge acquired from Year One to Year Three. For each week, learning tasks and pedagogy are built around the assessment, ensuring that classroom activities directly prepare learners for the demands of the examination. Two sets of sample examination papers are also provided; one administered by Week 12 as a first semester practice examination, and one by Week 20 as a mock examination, to gauge learners' competencies and identify areas requiring remediation.

To further support teachers in delivering Year Three, NaCCA, working with the Ghana Education Service, has developed a subject specific App for each subject.

The Year Three PLC sessions have been revised in response to findings from the 2025 annual evaluation survey. The survey confirmed that teachers have made strong progress in lesson planning, use of varied instructional methods, ICT integration and modes of assessment. To address the identified gap in explaining concepts clearly using examples familiar to learners, each PLC session now includes a dedicated Content Exploration segment. This ten-minute segment brings the subject group together to work through one challenging problem or concept from the week's Teacher Manual content, not to plan how to teach it, but to ensure that every teacher in the group fully understands it.

The PLC sessions in Year Three also place particular emphasis on connecting the week's content to equivalent topics taught in Years One and Two. Teachers are encouraged to note the recap weeks signposted throughout the Teacher Manual and to use the App to explore how content across all three years links together.

As in previous years, teachers are expected to integrate National Values, Gender Equality and Social Inclusion (GESI), Social and Emotional Learning (SEL), and 21st-century skills into their learning activities, assessment tasks, and rubrics and mark schemes. The subject-specific App will support teachers in doing this throughout the year.

Ghana Education Service acknowledges the dedication of the teachers who have implemented the new curriculum across Years One and Two and recognises that Year Three represents both the culmination of that effort and a critical moment for learners. The Year Three Teacher Manual and its accompanying resources have been developed to ensure that every learner, regardless of background, ability, or school context, is fully prepared to demonstrate what they know and can do in the WASSCE and to progress confidently to further studies, the world of work, and adult life.

ACKNOWLEDGEMENTS

Special thanks to Professor Samuel Ofori Bekoe, Director-General of the National Council for Curriculum and Assessment (NaCCA) and all who contributed to the successful writing of the Teacher Manuals for the new Senior High School (SHS) curriculum.

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SECTION 1: FLUVIAL GEOMORPHOLOGY AND MASS WASTING

STRAND: THE EARTH AND ITS NEIGHBOURHOOD

Sub-Strand: The Earth and Its Features

Learning Outcome: *With your knowledge on the characteristics of mountains, discuss the development of river channels and associated landforms and their importance with reference to Ghana*

Content Standard: *Demonstrate knowledge and understanding of river channels and associated landforms*

STRAND: THE EARTH AND ITS NEIGHBOURHOOD

Sub-Strand: Rocks, Weathering, Soil and Mass Wasting

Learning Outcome: *Examine the factors, types and effects of mass wasting*

Content Standard: *Demonstrate knowledge of mass wasting as a geomorphic process*

INTRODUCTION AND SECTION SUMMARY

This section explores the dynamic processes that shape river channels and the resulting landforms, emphasising their formation, characteristics, and evolution. It further examines the socio-economic significance of river landforms in Ghana, highlighting how they contribute to livelihoods, agriculture, transportation, and tourism. Additionally, the section delves into mass wasting processes, analysing the various types, underlying factors, and the resulting socio-economic and environmental impacts. By comprehensively addressing these focal areas, the section aims to provide a holistic understanding of how fluvial and slope processes influence the landscape and human activities.

The weeks and the indicators covered by the section are:

Week 1

1. Describe the development of river channels and associated landforms
2. Examine the importance of river landforms to the socio-economic development in Ghana

Week 2: Discuss mass wasting and the factors that influence it

Week 3

1. Examine the types of mass wasting
2. Discuss the socio-economic and environmental effects of mass wasting

The section on "Fluvial Geomorphology and Mass Wasting" in this Year 3 TM builds upon and continues from the strands and sub-strands introduced in Year 1 and Year 2. Specifically, it relates to "The Earth and Its Neighbourhood" strand, focusing on "The Earth and Its Features" and "Rocks, Weathering, Soil, and Mass Wasting." In Year 1, students begin by understanding rocks, weathering processes, and their significance (1.1.2.LO.1). This foundational knowledge is expanded in Year 2 with a deeper exploration of mass wasting, including factors, types, and effects (2.1.2.LO.1). The learning indicators for Year 3, such as describing the development of river channels and examining the socio-economic impacts of river landforms, further develop these concepts, providing a comprehensive understanding of geomorphic processes and their implications in Ghana.

SUMMARY OF Pedagogical Exemplars

Over the three-week period, a variety of learner-centred and inclusive teaching approaches will be used to help learners develop a deep understanding of river landforms and mass wasting processes. The lessons begin with exploratory learning, where learners independently research key concepts to build background knowledge. Through talk-for-learning strategies such as questioning, brainstorming, and think-pair-share, learners engage in meaningful discussions that cater to diverse learning needs. Project-based learning allows learners to apply their knowledge by identifying river landforms using digital tools like Google Earth and reporting their findings. Digital learning supports visual engagement through videos and images, enhancing learners' understanding of mass wasting. Finally, collaborative learning encourages group research and presentations on the socio-economic and environmental effects of these processes. These pedagogical strategies are carefully designed to be culturally and gender responsive, promoting inclusive participation and active learning throughout the section.

ASSESSMENT SUMMARY

Indicators	DOK Level	Assessment Strategy and/or Mode
Week 1 Describe the development of river channels and associated landforms Examine the importance of river landforms to the socio-economic development in Ghana	4	Key Assessments (Individual class/ homework) 5 short answer questions with a marking scheme. 5 essay questions with discussion/ analysis/case study and evaluation sections with a detailed marking scheme showing structure and marks allocation
Week 2 Discuss mass wasting and the factors that influence it	3	Key Assessment (Individual class/ homework) 3 short answer questions with a marking scheme. 1 essay question with discussion sections with a detailed marking scheme showing structure and marks allocation

Week 3 Examine the types of mass wasting	3	Key Assessment (Individual class/ homework) 3 short answer questions with marking scheme. 2 essay questions with explanation and discussion sections with a detailed marking scheme showing structure and marks allocation
Discuss the socio-economic and environmental effects of mass wasting		

Y3 RECAP: Rivers/Landforms/Socio-economic Importance	
Year/Focal Areas	**Activities/Tasks – can be in groups or pairs or individual**
Year 1 Major Relief and Drainage Features of Ghana	1. Define "relief" and relate it to geographical features. 2. Define "drainage" and discuss its significance in geography. 3. Explore how relief influences drainage in Ghana. 4. Identify and discuss the major relief features of Ghana. 5. Locate major rivers on a map of Ghana. 6. Discuss the social and economic importance of Ghana's rivers. 7. Explore the socio-economic and environmental challenges posed by Ghana's rivers and justify these challenges through cause-and-effect analysis.
Year 2 Relief/Drainage in West Africa	1. Contrast the relief and drainage of Ghana with those of West Africa. 2. Identify major drainage basins and relief features in West Africa.
Year 2 Managing Floods in Ghana	1. Summarise the causes of flooding in Ghana. 2. Discuss river and relief features that make areas prone to flooding.
Year 2 Mountains	1. Identify physical features found in mountains such as slopes, cliffs, and valleys. 2. Discuss how these features impact the course and flow of rivers.

WEEK 1

Learning Indicators

1. *Describe the development of river channels and associated landforms*
2. *Examine the importance of river landforms to the socio-economic development in Ghana*

Focal Area 1: River Channels and Associated Landforms

Introduction

A river is defined as a natural watercourse, typically a large and flowing body of water, which moves continuously in a defined channel from its source to its mouth. The starting point of a river is called its source. This source is a spring (e.g., the Thames, England); a region of steady rainwater running off the surface (e.g. the Zaire, Africa); melt waters from glaciers (e.g. the Rhone, France) or lakes (e.g. the Nile, Africa). The mouth of a river is the point where a river flows into a larger body of water such as another river, a lake, a sea or an ocean. It typically marks the end point of the river's course.



Figure 1.1: *The source of the White Nile (Lake Victoria) and the Blue Nile (Lake Tana) and its mouth (the Mediterranean Sea)*

Terminologies Associated with Rivers

1. **Riverbed:** The riverbed is the bottom of the river channel -ground over which a river flows.
2. **The banks of a river:** The banks are the sides of the river channel that contain the water, like natural walls on either side. They are usually made of soil, rocks, or other materials.
3. **The depth of a river:** This is the vertical distance from the surface of the river to the riverbed.
4. **The width of a river channel:** This refers to the horizontal distance across the river channel, that is, from one side of the river channel to the other side.

5. As the river flows, it is often joined by smaller rivers or streams called **tributaries.** The point where a tributary joins a main river is called **a confluence.** From **Figure 1.1,** Khartoum can be said to be a **confluence town** because it sited at the meeting point of the While and the Blue Nile.
6. The entire area covered by a river and its tributaries is called **a river basin** or **the catchment area.**
7. A highland that separates one river system from another is called a **watershed**, **water divide**, or **water parting**.
8. The **load** of a river refers to material like sand, silt, pebbles, and clay that the river carries along its channel as it flows downstream. These particles can settle at the bottom or be picked up by the river and moved downstream.
9. The **velocity** of a river is how fast or slow the river is moving , usually measured in metres per second.
10. The volume of water flowing through a river channel per unit time is known as the **discharge. Discharge of a river is calculated = area of cross-section × velocity.**

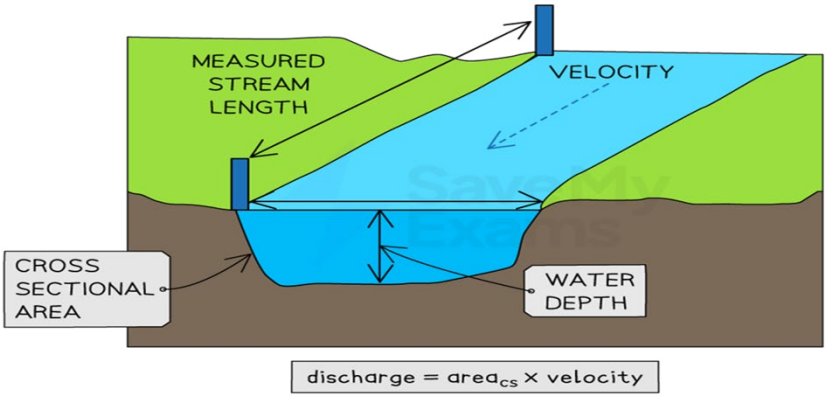


Figure. 1.2: *River discharge*

11. **Laminar** flow occurs when a river moves in smooth, parallel layers with minimal mixing between them. On the other hand, **turbulent** flow occurs when the movement of water is chaotic, with swirling eddies and irregular patterns.

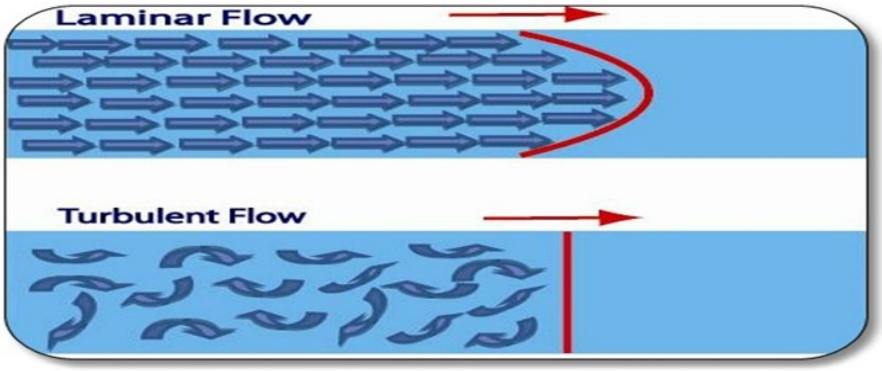


Figure. 1.3: *Laminar and Turbulent Flow (Simple diagram)*



Figure 1.4: *Laminar flow*



Figure 1.5: *Turbulent flow*

FLUVIAL/RIVER PROCESSES

Rivers shape the landscape through three main processes: erosion, transportation, and deposition.

1. RIVER EROSION (WEARING AWAY OF THE RIVERBED AND BANKS)

Rivers erode material through four main processes:

a. **Hydraulic action:** The process whereby the sheer power of moving water dislodges and removes loose material, such as sediment, soil, or rock fragments, from the riverbed and banks.

b. **Abrasion (Corrasion):** The process whereby the river uses its load like sand, gravel, and/or pebbles as a tool to erode or wear down the riverbed and banks.

c. **Attrition:** The process whereby the load (rocks and pebbles) carried by the river collide and break into smaller, smoother pieces.

d. **Solution (Corrosion):** The process whereby water dissolves soluble minerals, such as halite, gypsum, calcite, and dolomite, from the riverbed and banks.

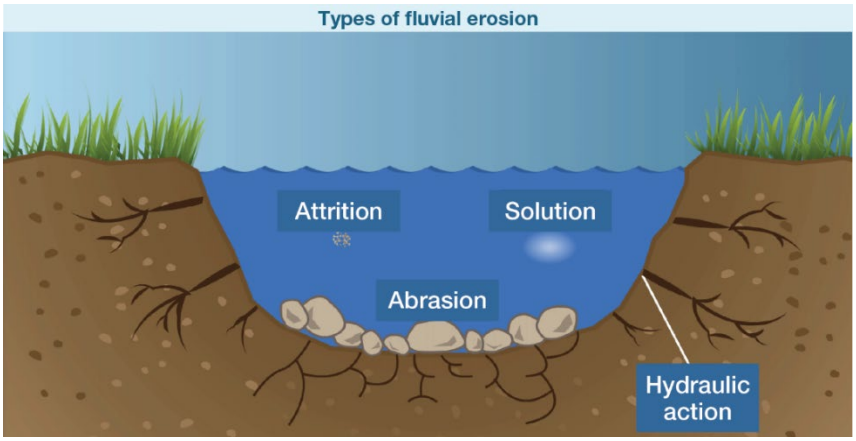


Figure 1.6: *Processes of river erosion (cross-sectional diagram)*

2. TRANSPORTATION (MOVEMENT OF ERODED MATERIAL)

All materials that the river carries along, or transports is called load.

River transport materials in four main ways:

a. **Traction:** The process in which load, such as large rocks and boulders, roll along or drag on the riverbed.

b. **Saltation:** The process in which load, such as small pebbles, bounce along the riverbed.

c. **Suspension:** The process in which fine and lightweight particles (such as silt and clay) are carried along by the flowing water without settling on the riverbed.

d. **Solution:** The process by which load, such as dissolved minerals, is transported invisibly within the water. E.g. rock salt.

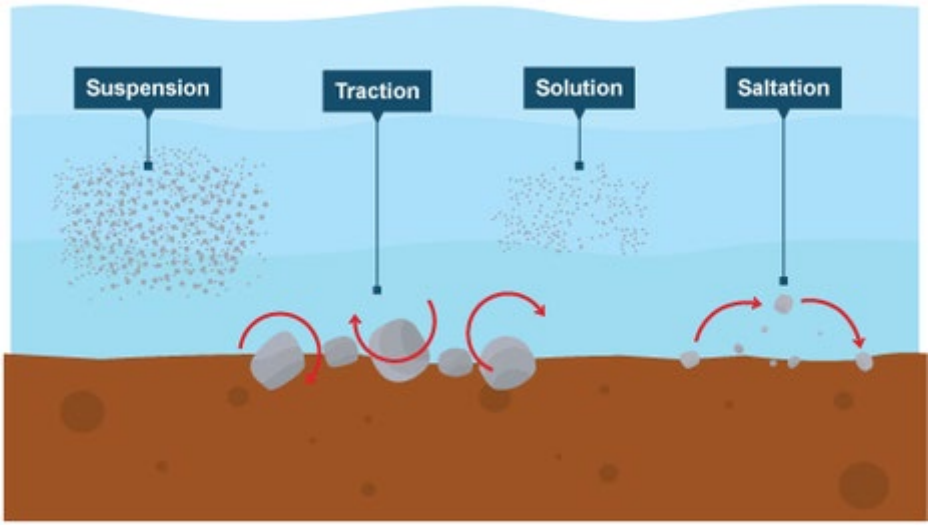


Figure. 1.7: *River transportation processes*

3. RIVER DEPOSITION (DROPPING OF MATERIALS)

River deposition occurs when a river loses energy and cannot carry its load, thereby dropping it. This happens when:

a. The river is entering a lake or sea.

b. The river flows over a flatter gradient.

c. The valley of the river widens/broadens

d. The discharge decreases (e.g., during dry seasons).

e. The river enters a meandering section, causing loss of speed.

Deposition leads to the formation of landforms such as deltas, floodplains, and levees.

The Nature of Sorting of Load in River Deposition

Sorting of river load during deposition refers to how different-sized sediments are arranged based on their weight and the river's energy. This occurs because a river's ability to carry materials depends on its velocity and energy. As the river slows down, it drops its load in a specific order:

a. Largest and Heaviest Particles (Boulders and Cobbles) are deposited first when the river slows down, usually in the upper course or at the base of a steep slope.

b. Medium-Sized Particles (Sand and Gravel) are deposited in the middle course when the river slows further, often forming sandbanks and bars.

c. Smallest and Lightest Particles (Silt and Clay) are deposited last, usually in the lower course or in deltas, where the river meets a lake or sea.

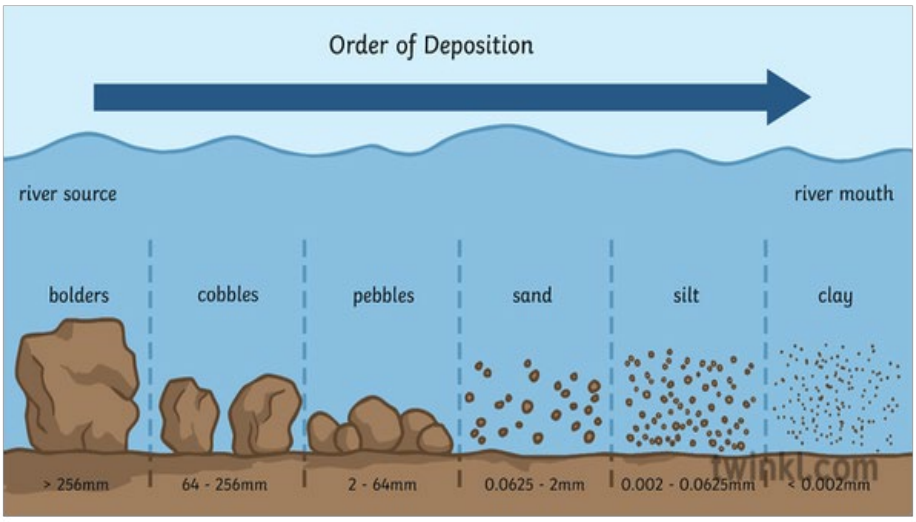


Figure. 1.8: *Order of river deposition*

LONG PROFILE OF A RIVER

a. The long profile of a river is a graphical representation of its gradient (slope) from the source to the mouth.
b. It is usually concave in shape
c. Erosion of the riverbed is called degrading while deposition of the river bed is aggrading.
d. It shows how a river changes along its course and is divided into three main sections: the upper course, the middle course and the lower course.

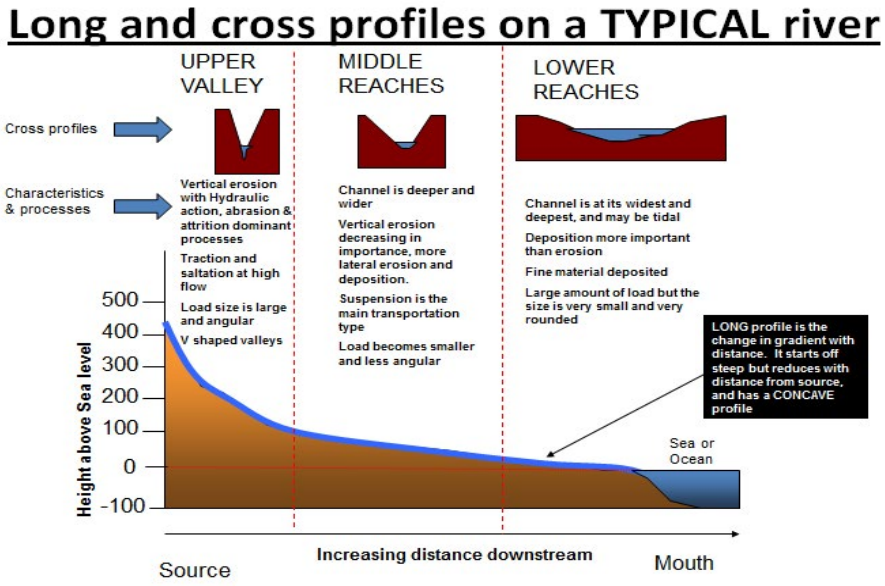


Figure. 1.9: *Long and cross profile of a river channel*

STAGES IN THE DEVELOPMENT OF A RIVER CHANNEL

1. **UPPER COURSE (YOUTHFUL/TORRENT STAGE)**
    a. Found near the source (mountains/hills).
    b. Steep gradient with a fast-flowing river.
    c. Vertical erosion dominates.

d. Headward erosion may occur
e. Load consists of large, angular boulders transported mainly by traction
f. Features include V-shaped valleys, interlocking spurs, waterfalls and rapids, and gorges

2. **MIDDLE COURSE (MATURITY/VALLEY STAGE)**
   a. Gradient decreases, and the river becomes wider and deeper.
   b. Lateral erosion (sideways erosion) dominates, widening the valley.
   c. Has a U-shaped valley
   d. Load consists of smaller, smoother sediments, transported mainly by suspension and saltation.
   e. Prominent features include meanders and oxbow lakes.
3. **LOWER COURSE (OLD AGE/PLAIN STAGE)**
   a. Near the mouth (where the river enters a lake, sea, or ocean).
   b. Gentler gradient
   c. River is wide, deep, and slow-moving.
   d. Deposition dominates due to reduced energy.
   e. Load consists of fine silt and clay, transported mainly by suspension and solution.
   f. Features include floodplains, levees (raised riverbanks) and deltas.

CROSS PROFILE OF A RIVER

a. The cross profile of a river refers to the shape of the river valley and channel when viewed from the side, perpendicular to the river's flow.
b. It changes along the river's course and is divided into three main sections: the upper course, the middle course and the lower course.

RIVER EROSIONAL LANDFORMS

1. **V-Shaped Valley**
   Characteristics/appearance
   a. Steep, narrow valley with a "V" shape when viewed from the side.
   b. Deep valley walls with little space for a wide river channel.
   c. Valley sides are usually covered with loose rock and vegetation.
   d. Found in the upper course of a river where vertical erosion is dominant.

   Mode of formation
   a. Rivers in their upper course erode vertically through hydraulic action and abrasion.
   b. The fast-flowing water cuts deep into the riverbed, creating a steep valley.
   c. Weathering and mass movement cause valley sides to collapse, forming the characteristic "V" shape.
   d. The process continues over time, deepening and shaping the valley further.

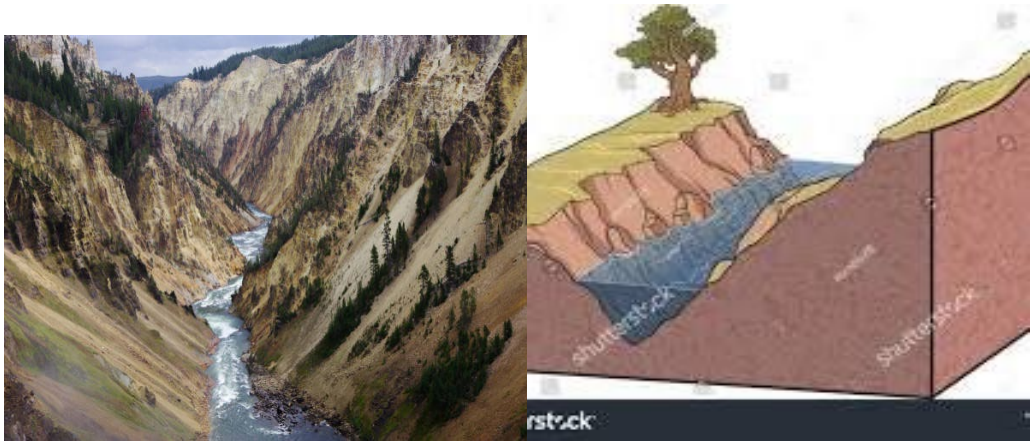


Figure 1.10: *V-shaped valley (real picture on left and 3-D diagram on right)*

2. **Interlocking Spurs**

   Characteristics/appearance

   a. Series of zigzag or overlapping ridges extending into a river valley.
   b. The river winds around these spurs in a snake-like pattern.
   c. Spurs appear to "interlock" when viewed from above or the side.
   d. Common in the upper course of a river where the river lacks energy to cut through hard rock.

   Mode of formation

   a. In the upper course, rivers lack the energy to erode through hard rock obstacles.
   b. Instead, they wind around resistant rock formations, creating a zigzag path.
   c. Hydraulic action and abrasion erode the softer rock, deepening the valley.
   d. Over time, the spurs (ridges) appear to interlock as the river weaves through them.



Figure 1.11: *Interlocking spurs (real picture on left and 3-D diagram on right)*

3. **Potholes**

   Characteristics/appearance

   a. Circular or bowl-shaped depressions in the riverbed.
   b. Often filled with pebbles that swirl and deepen the holes.
   c. Can vary in size from a few centimetres to several metres wide.
   d. Found in fast-flowing rivers, especially in the upper course.

Mode of formation

a. Potholes form in riverbeds where pebbles and rocks swirl in circular currents creating vertical eddies.

b. Hydraulic action forces water into cracks, loosening rock particles.

c. Abrasion occurs as trapped pebbles **grind** into the riverbed, deepening the holes as potholes.

d. Over time, multiple potholes can join to form larger pools in the riverbed.

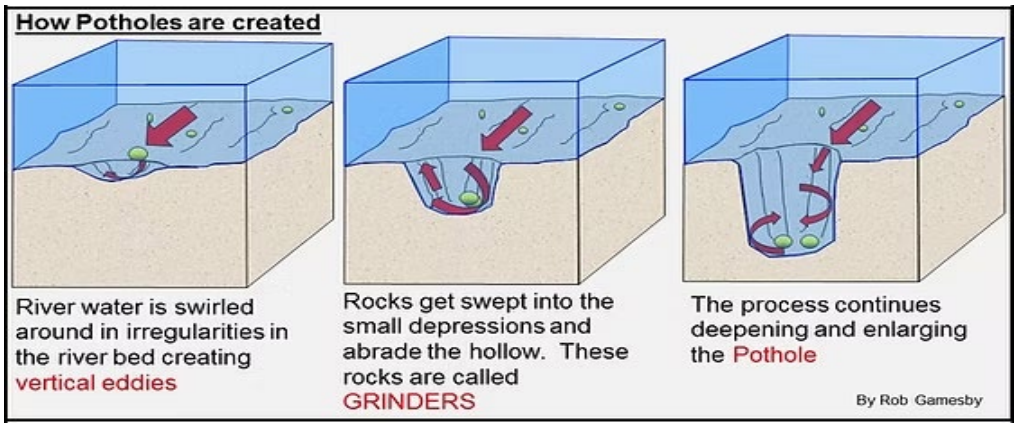


Figure 1.12: *Formation of potholes*



Figure 1.13: *Exposed potholes in the riverbed*

4. **Waterfall**

Characteristics/appearance

a. A steep drop where water plunges from a higher to a lower level.

b. Often has a plunge pool at the base due to hydraulic action and abrasion.

c. Hard rock on top forms a ledge, with softer rock eroded underneath.

d. Spray and mist are common features due to the force of falling water.

Mode of formation

a. Water flows over a layer of resistant rock with softer rock beneath.

b. Hydraulic action and abrasion erode the softer rock faster, creating an undercut.

c. The hard rock collapses due to a lack of support, causing the waterfall to retreat upstream.

d. This process repeats, leaving a plunge pool at the waterfall's base.

Conditions necessary for the formation of a waterfall

a. There must be layers of hard rock overlying softer rock.

b. The underlying softer rock must be exposed downstream

c. The softer rock erodes faster than the harder rock, creating a drop.

d. A steep section in the riverbed is required for the water to plunge down.

e. There must be enough water flow and energy to erode the soft rock beneath the hard rock.

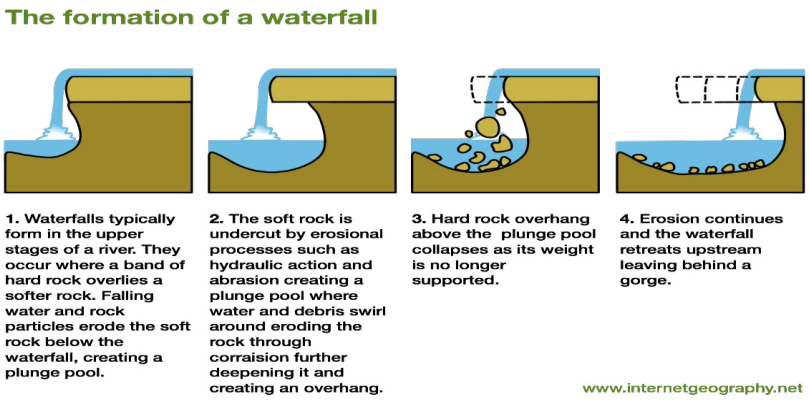


Figure. 1.14: *Formational process of waterfall*

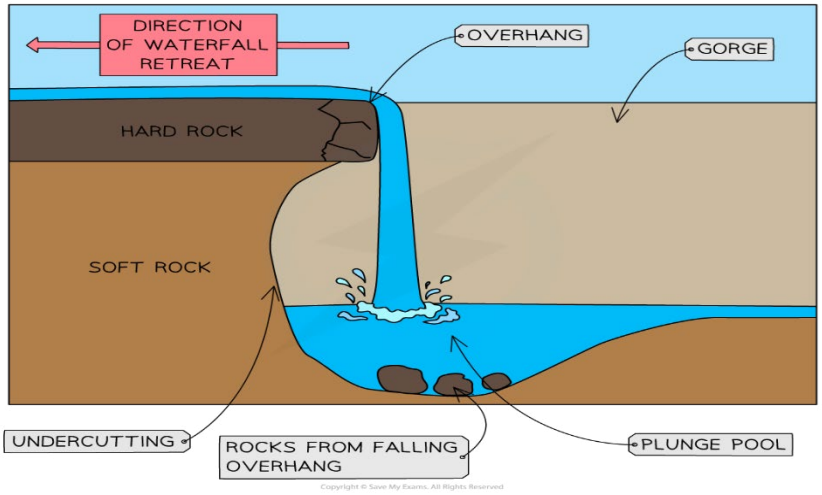


Figure. 1.15: *Waterfall with plunge pool*

5. **Gorge**

Characteristics/appearance

a. A deep, narrow, and steep-sided valley carved by continuous river erosion.

b. Often formed where a waterfall retreats upstream.

c. River flows swiftly at the bottom of the gorge.

d. Walls may be bare rock or rugged cliffs, with little vegetation.

Mode of formation

a. As a waterfall retreats due to continuous undercutting and collapse, a steep-sided valley forms known as gorge.

b. Vertical erosion by hydraulic action and abrasion deepens the channel.

c. The steep, narrow valley shape remains as the river continues cutting downward.

d. Over time, gorges can extend for long distances as waterfalls keep retreating.

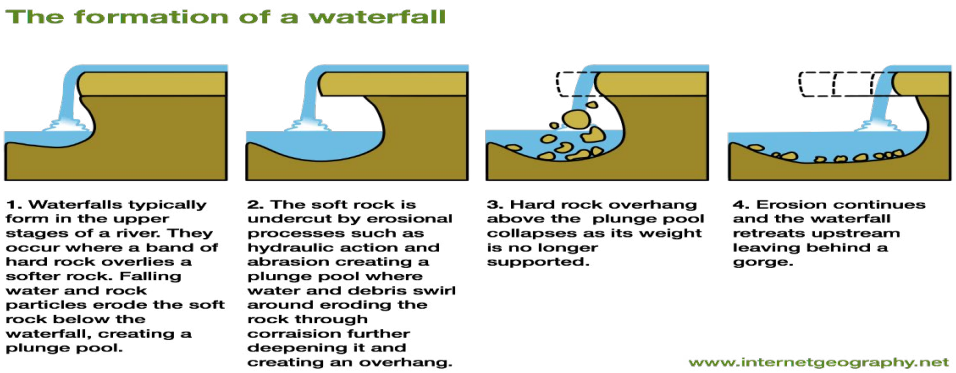


Figure. 1.16: *Formational process of gorge*

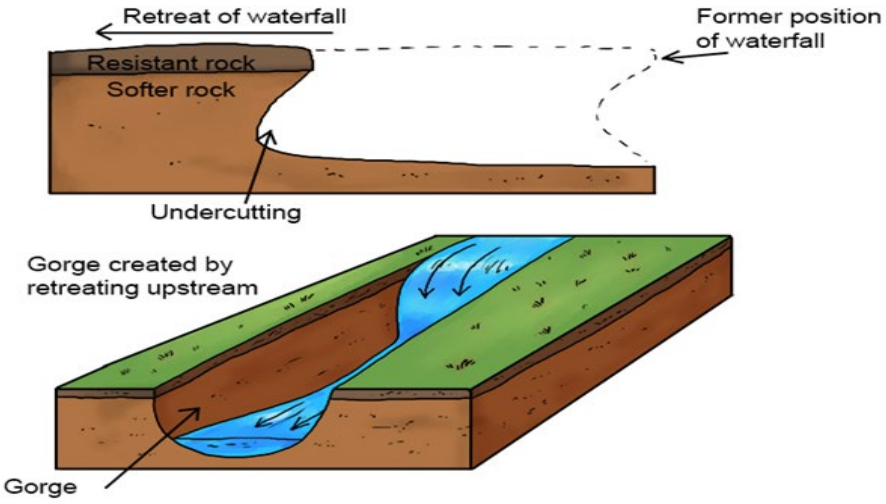


Figure. 1.17: *Cross-sectional and 3-D aerial view of gorge*

6. **Rapids**

Characteristics/appearance

a. A section of the river where the water is rough and turbulent.

b. The riverbed is uneven due to alternating bands of hard and soft rock.

c. Water appears foamy and white due to increased turbulence.

d. Found in the upper and middle courses of a river.

Mode of formation

a. Rapids form where alternating bands of hard and soft rock exist in a riverbed.

b. The softer rock erodes faster due to hydraulic action and abrasion, creating uneven surfaces.

c. The river's turbulence increases as water flows over the irregular riverbed.

d. This leads to a rough, fast-flowing section of water known as rapids.

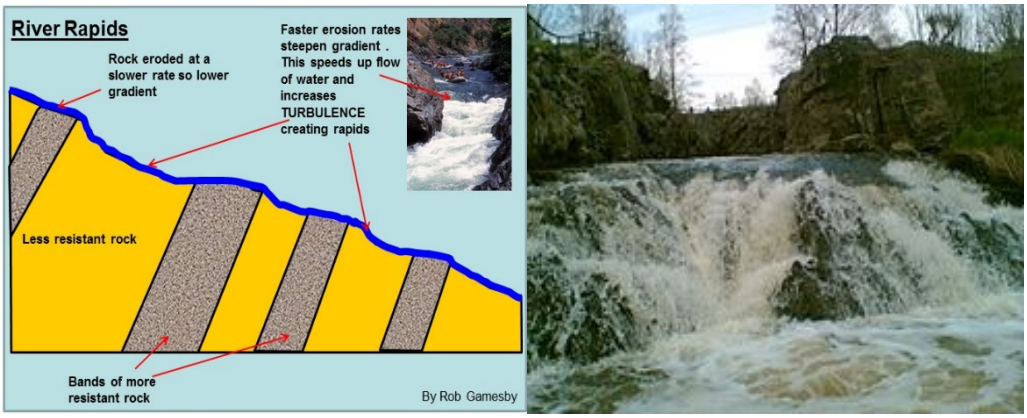


Figure.1.18: *Formation of rapids (cross-sectional diagram on left and real image on right)*

7. **Meander**

Characteristics/appearance

a. Curved or S-shaped bends in a river's path.

b. Erosion occurs on the outer bank (cut bank) where the water flows faster.

c. Deposition occurs on the inner bank (point bar) where the water flows slower.

d. Found in the middle course of a river but becomes more pronounced at the lower course of a river, where the river has more energy to meander.

e. Can form oxbow lakes when the river cuts off a meander from its main flow.

Mode of formation

a. A river in the middle or lower course begins to flow across a relatively flat landscape.

b. Variations in the riverbed cause the water to flow more quickly on one side, leading to initial curves or bends.

c. On the outside of the curve, the water flows faster and exerts more force.

d. This causes erosion through hydraulic action and abrasion, cutting into the bank and deepening the channel.

e. On the inside of the curve, the water flows more slowly, leading to the deposition of sediments (sand, silt, etc.).

f. As the process of erosion on the outer bank and deposition on the inner bank continues, the bend becomes more pronounced as meanders.

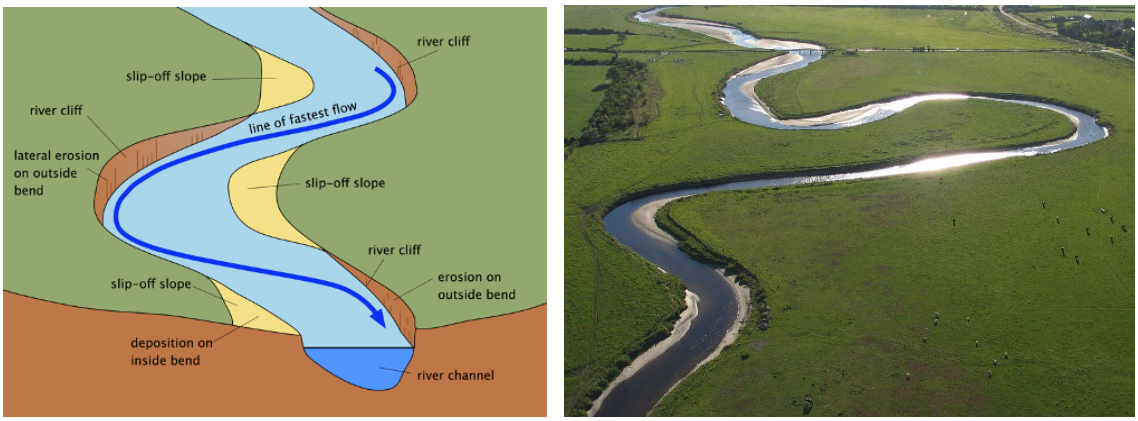


Figure.1.19: *Meader formation*

8. **River Cliff (Bluff)**

Characteristics/appearance

i. A steep, vertical bank found on the outer bend of a meander.

ii. River erosion due to strong water flow.

iii. Exposes layers of soil and rock on the riverbank.

iv. Often collapses over time due to undercutting and weathering.

Mode of formation

i. River cliffs form on the outer bends of meanders where erosion is strongest.

ii. Hydraulic action weakens the riverbank by forcing water into cracks.

iii. Abrasion further wears away the bank as fast-moving water carries sediment.

iv. This creates a steep, vertical slope known as a river cliff or bluff.

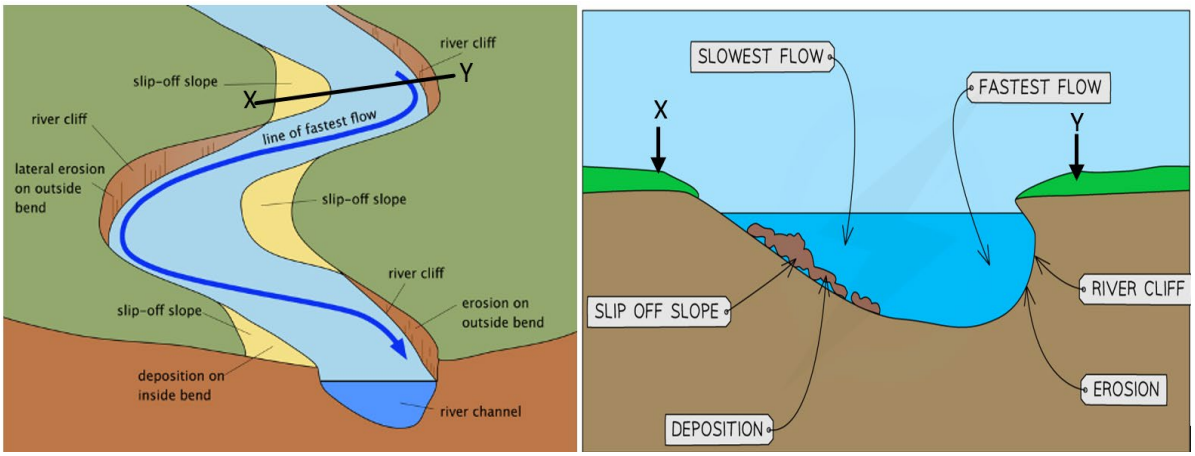


Figure. 1.20: *Cross-sectional view showing slip-off slope and river cliff at meander bend*

9. **River Capture**

River capture (also known as stream piracy) is a process where one river or stream (powerful river) captures the flow of another river (weaker river), diverting its water into its own channel.

Conditions Necessary for the Formation of River Capture

i. There must be significant relief rainfall that favours the more stronger and powerful river, enhancing its erosive strength.

ii. Two adjacent consequent rivers must flow parallel to each other.

iii. A watershed or water divide must separate the two rivers.

iv. One of the rivers must have greater erosive power than the other.

v. The valley of the stronger and powerful river must be deeper compared to the valley of the weaker river.

vi. The stronger and powerful river must exert greater headward erosion, advancing further upstream.

vii. The rocks at the headwaters of the stronger and powerful river should be less resistant to erosion.

viii. The more stronger and powerful river must erode through the divide more rapidly than the weaker river.

Formation of River Capture

a. River capture begins with the presence of two rivers flowing through adjacent valleys, separated by a watershed. One river (A) is more powerful than the other (B), primarily because river (A) flows over a steeper gradient and at a lower elevation.

b. The stronger river (A) can erode its valley more quickly and extend its channel by headward erosion. Over time, it cuts through the water divide and redirects the headwaters of the less powerful river (B) into its own valley.

c. As a result, the capturing river (A) becomes even more powerful, as its water volume increases with the added flow from river (B). The point where the capture occurs is marked by a sharp bend, known as the **elbow of capture**.

d. Below this point, the remains of the diverted river (B) are found. This river flows for a while but eventually dries up and is referred to as a **misfit river**.

e. A dry valley, called a **wind gap**, is formed between the elbow of capture and the misfit river. Examples of river capture include the capture of River Tano by the River Volta and the capture of Yemetu by Ogunpa (Nigeria) and the capture of the Mansi by Offin and Tano by Volta.

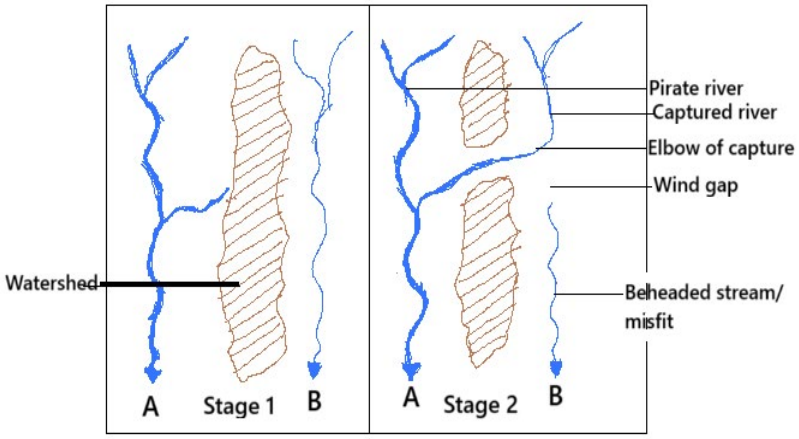


Figure.1.21: *Stages of river capture*

RIVER DEPOSITIONAL LANDFORMS

1. Point Bars (Slip-Off Slopes)

Characteristics/Appearance

a. Gentle, sloping landforms found on the inner bend of meanders.

b. Made up of sand, silt, and gravel deposited by slower-flowing water.

c. Curved in shape, following the shape of the meander.

d. Often have a crescent or hook-like appearance.

Mode of Formation

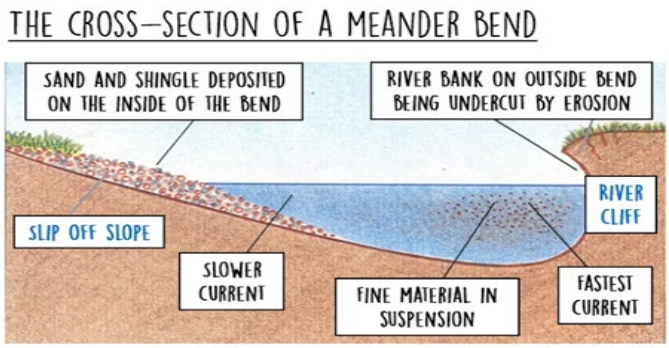
a. Form as water slows down on the inner bank of a meander.

b. The slower water loses energy, leading to sediment deposition.

c. Over time, the point bar builds up as more sediments are deposited.

d. Heavier and larger particles, such as gravel and coarse sand are deposited near the riverbank, closest to the river's edge.

e. Finer materials like silt and clay are deposited farther away from the riverbank.



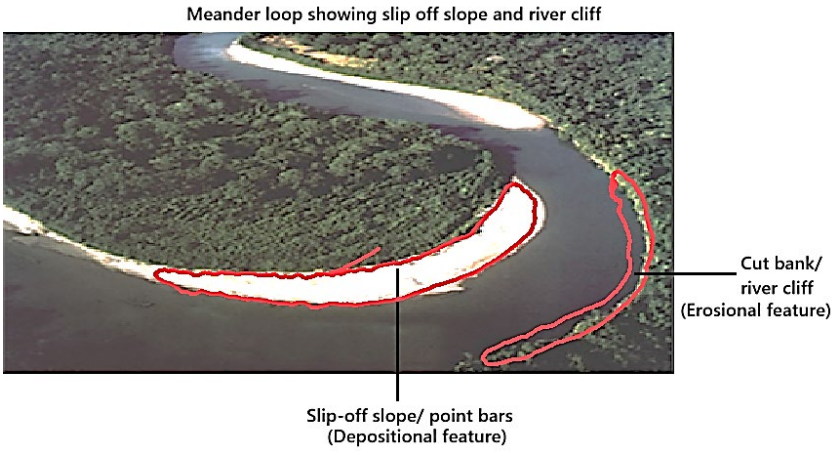


Figure.1.22: *Real image showing aerial view of slip-off slope/point bars*

2. Oxbow Lakes

Characteristics/Appearance

a. U-shaped or crescent-shaped lake formed by an abandoned meander.
b. Often isolated from the main river.
c. Can vary in size, from small to large bodies of water.
d. Found in areas where meanders have been cut off.

Mode of Formation

a. A meander becomes increasingly curved due to erosion.
b. The river eventually cuts across the narrow neck of the meander.
c. Deposition seals off the meander, forming an oxbow lake.

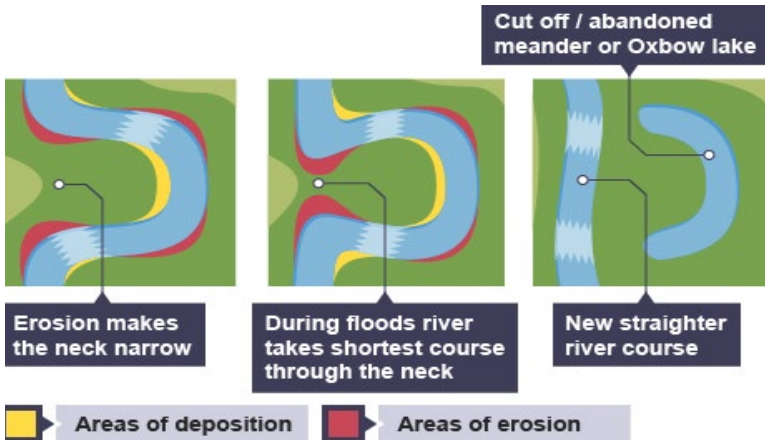




Figure 1.23: *Formation of oxbow lake*

3. Floodplains

Characteristics/Appearance

a. Flat, low-lying land adjacent to a river.

b. Typically covered with fertile soil, often with silt and clay.

c. Can be wide or narrow depending on the river.

d. May contain small lakes, ponds, or wetlands.

Mode of Formation

a. Formed by repeated flooding, where rivers overflow their banks.

b. During floods, sediment is deposited on the side of the river.

c. Over time, this creates a broad, flat area of fertile land.

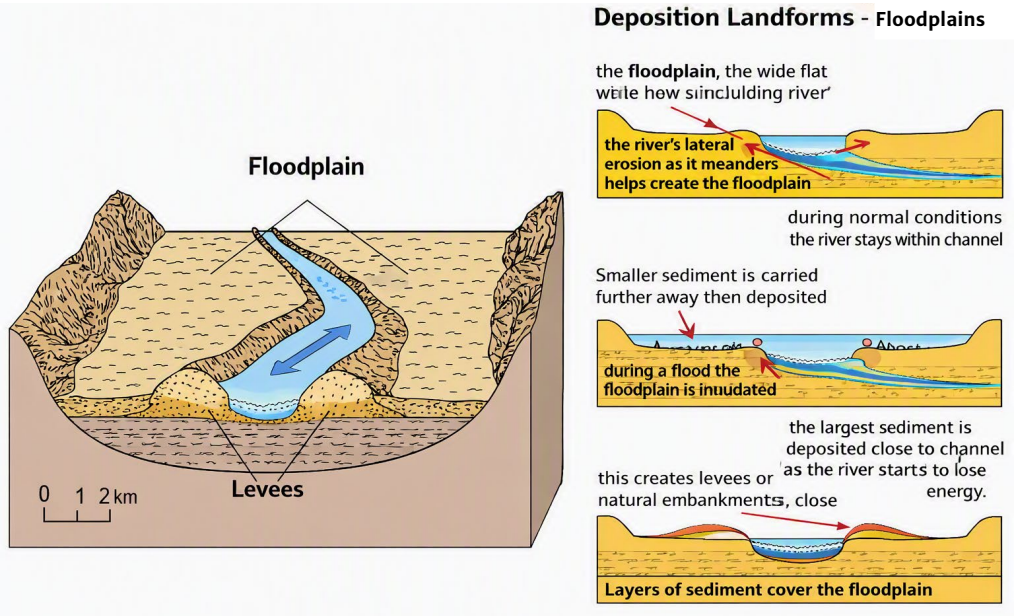


Figure. 1.24: *Formation of floodplains and levees*

4. Levees

Characteristics/Appearance

a. Raised banks or ridges formed along river channels.

b. Typically found on both sides of a river.

c. Can be steep or gentle, depending on the level of sediment deposition.

d. May vary in height, with some reaching several metres.

Mode of Formation

a. Formed during flood events when rivers overflow.

b. As water slows down on the riverbank, heavier sediments are deposited closest to the river called a levee.

c. Over time, repeated flooding builds up raised ridges along the river.

5. **Braided Rivers/Channels**

Characteristics/Appearance

a. A network of interwoven channels separated by bars of sand, gravel, or rocks.

b. The channels are often shallow and wide.

c. The river looks like a "braid" of multiple smaller channels.

d. Found in areas with high sediment load and fluctuating water flow.

Mode of Formation

a. Occurs when a river carries a large amount of sediment.

b. The river splits into multiple channels that frequently shift.

c. The sediment load and fluctuating flow create bars that separate the channels.



Figure 1.25: *Formation of braided channels*

6. Deltas

Characteristics/Appearance

- A landform formed at the mouth of a river, where it meets a standing body of water (lake, sea, or ocean).
- Characterised by distributary channels and areas of sediment deposition.

- Can have different shapes, such as triangular, fan-like, or finger-like.

Mode of Formation

- Formed when a river slows down as it enters a standing body of water.
- Sediments carried by the river are deposited, creating new land.
- Over time, the river divides into multiple smaller channels, forming a delta.

a. **Arcuate Delta**

i. **Characteristics/Appearance**: Fan-shaped with many distributaries, often forming a rounded or arch-like shape.

ii. **Example**: Nile Delta.

iii. **Mode of Formation**: Formed when the river mouth splits into numerous channels, depositing sediment in a fan shape.

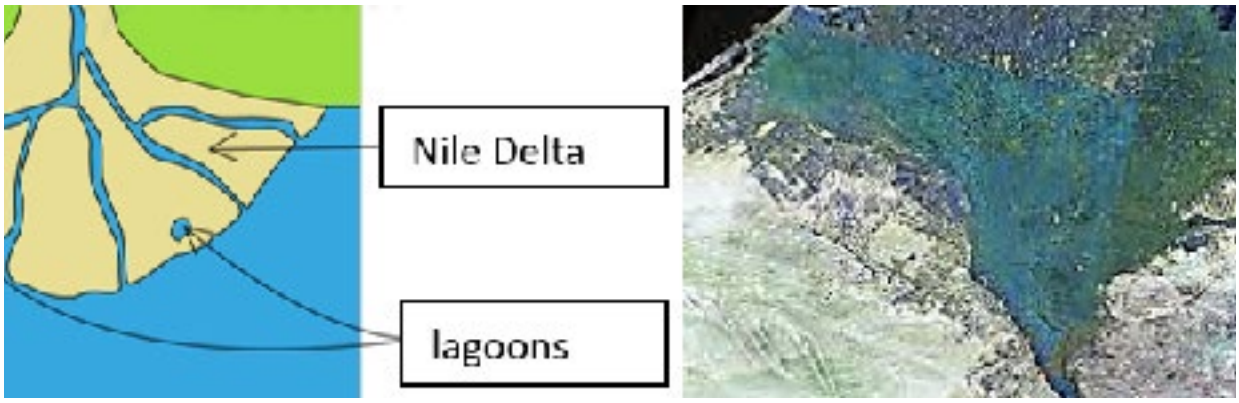


Figure 1.26: *The Nile Delta*

b**. Bird's Foot Delta**

i. **Characteristics/Appearance**: Shaped like a bird's foot, with many long, thin channels extending into the water.

ii. **Example**: Mississippi Delta.

iii. **Mode of Formation**: Formed when a river deposits sediment in a way that creates a branching, finger-like shape.



Figure 1.27: *Mississippi Delta*

c. **Cuspate Delta**

i. **Characteristics/Appearance**: Triangular or pointed in shape, with a clear separation of channels.

ii. **Example**: Tiber Delta.

iii. **Mode of Formation**: Formed when the river splits into fewer channels, creating a pointed delta.

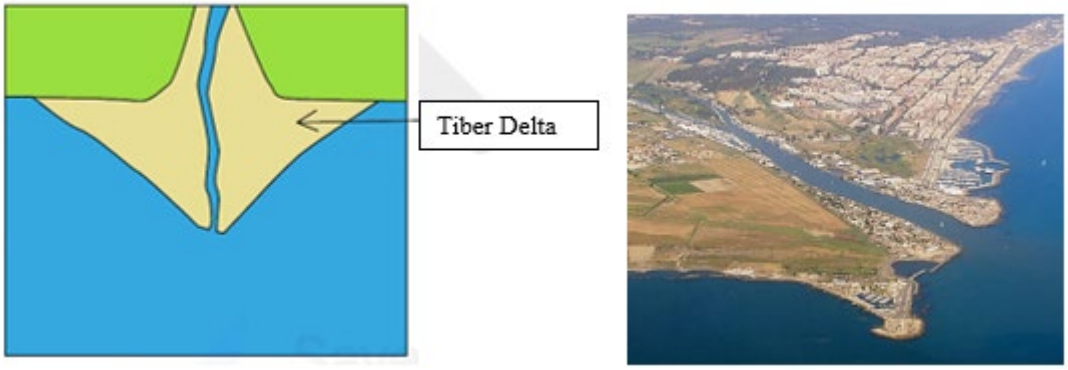


Figure 1.28: *Tiber Delta*

d. **Estuarine Deposits/Delta**

i. **Characteristics/Appearance**: Muddy or sandy deposits found in the mixing zone of fresh and saltwater.

ii. **Example**: Volta Estuary

iii. **Mode of Formation**: Formed when sediment is deposited in the estuary where river water meets the sea, with sediment carried in by the river and the tides.

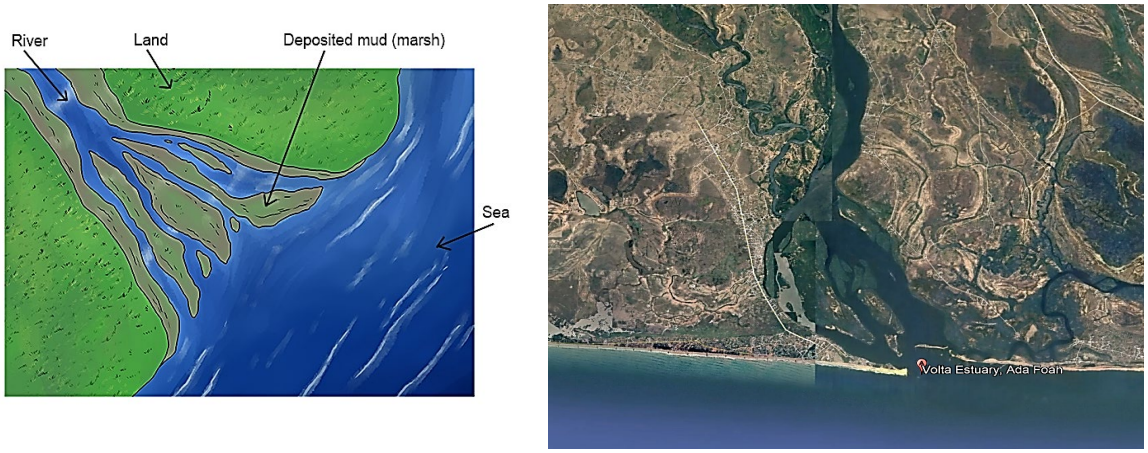


Figure 1.29: *The Volta estuary*

Similarities between arcuate delta and bird's foot delta

a. They are found at the lower course of a river

b. They are depositional landforms at the lower course of a river

c. They are formed at the entry of a river into the sea

d. They are found in areas with high tidal ranges
e. The river's mouth forming the delta is perpendicular to the coastline
f. They are made up of coarse and fine materials
g. They have multiple distributary channels branch out from the main river
h. They form a network of waterways
i. They have sediment lopes that extend into the sea
j. Both constantly change in shape due to sediment deposition

RIVER REJUVENATION

River rejuvenation refers to the renewed ability of a river to erode its channel due to an increase in its potential energy.

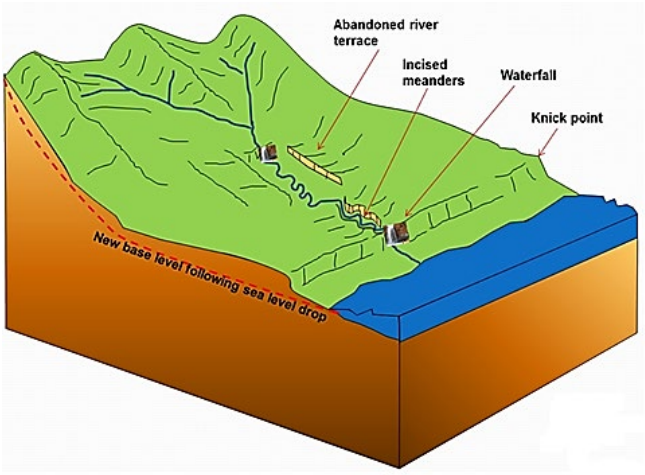


Figure 1.30: *River rejuvenation*

Causes of River Rejuvenation

a. **Tectonic Uplift**: Uplift of land raises the river's gradient, increasing velocity and erosive power.
b. **Drop in Sea Level**: Lowering of the base level forces the river to cut deeper into its valley.
c. **Increased Discharge**: Higher water volume, often due to climate change or glacial melting, enhances erosion.
d. **Change in Load**: A decrease in sediment supply allows the river to focus on vertical erosion rather than deposition.

Effects and Features of Rejuvenation

a. **Incised Meanders**: Previously formed meanders become entrenched due to vertical erosion.
b. **Knickpoints**: Sudden changes in gradient, often forming waterfalls or rapids.
c. **Terraces**: Step-like landforms on valley sides, indicating former floodplain levels.
d. **Gorges and Valleys**: Deepening of river valleys due to increased erosion.

Learning Tasks

1. Researching Erosional & Depositional Landforms of Rivers
    a. Select one river erosional landform and one river depositional landform
    b. Use a reliable source (atlas, textbook, or approved website) to find:
        i. How each landform is formed
        ii. Where it commonly occurs
    c. On a single A4 sheet or digital document, draw a simple side-view sketch of each landform.
    d. Use two different colours (or highlighters) to emphasise the agent of change (that is erosion or deposition)
    e. Label key features
2. Talk It, Sketch It, Show It: Erosional and depositional landforms of rivers
    a. Work in inclusive pairs (mixed abilities and backgrounds). Ensure that everyone has an equal opportunity to contribute.
    b. Take turns asking and answering the following guiding questions:
        i. What is river erosion? What are the processes of river erosion?
        ii. What are two landforms created by river erosion?
        iii. What is river transportation?
        iv. What are the processes of river transportation?
        v. What is river deposition?
        vi. What are two landforms formed by river deposition?
    c. Based on your discussion, write a short script (about 5 lines) where one person explains how one erosional and one depositional landform is formed, and the other asks clarifying questions.
    d. Together with your pair, sketch one erosional and one depositional landform discussed. Label them clearly and briefly describe how each is formed under the sketch.
    e. Pairs will briefly present their sketch and explain their landforms to the whole class.
    f. Focus on being clear, respectful, and supporting each other during the presentation.

Pedagogical Exemplars

Exploratory Learning

Research on the formation of erosional and depositional landforms.

1. Provide clear research questions and scaffolded instructions tailored to learners' abilities.
2. Group learners by mixed abilities and encourage peer collaboration and support.

3. Offer multiple research formats (videos, texts, infographics) to cater to different learning styles and literacy levels.
4. Assign roles in group work (e.g., researcher, presenter, summariser) based on learners' strengths and preferences.
5. Use guiding templates or graphic organisers to help lower-ability learners organise information.
6. Encourage higher-order thinking by challenging advanced learners with deeper inquiry tasks.
7. Ensure inclusive resources that reflect diverse contexts and avoid cultural bias.
8. Offer flexible timelines and check-ins to reduce anxiety and build confidence.
9. Foster a supportive environment that promotes active listening, empathy, and respect for all contributions.
10. Celebrate effort and progress to boost self-esteem and social-emotional development.

Talk-for-Learning

Using questions and answer technique, explain the formation of erosional and depositional landforms of rivers.

1. Use open-ended and scaffolded questions to cater to different intellectual levels.
2. Encourage think-pair-share to allow all learners time to process and verbalise ideas.
3. Pose varied questions, from simple recall to higher-order thinking, to engage all learners.
4. Create a safe, inclusive space where all voices are valued and respected.
5. Use visual aids and models to support understanding for visual or lower-literacy learners.
6. Allow multilingual learners to express ideas in their preferred language before translating.
7. Encourage active listening and respectful turn-taking to build social-emotional skills.
8. Support learners with speech or language difficulties through prompts and sentence starters.
9. Assign discussion roles based on learners' strengths (e.g., questioner, summariser).
10. Provide feedback that focuses on effort, contribution, and collaborative spirit.

Focal Area 2: Significance of Fluvial Landforms

Introduction

Ghana's rivers and associated landforms have been pivotal in its development. The Southwestern River System (Bia, Tano, Ankobra, Pra) covers 22%, vital for the wetter, forested regions. The Coastal River System (Ochi-Nakwa, Densu, etc.), though smaller (8%), supplies water to urban centres like Accra.

Lake Volta, the world's largest artificial lake, generates 912 megawatts of hydropower, supports transportation and irrigation, and sustains fishing. Lake Bosumtwi, a natural lake in the Ashanti region, supports local fishing and tourism. The Volta River Delta, where the river meets the Atlantic Ocean, is a low-lying area prone to flooding and erosion.

The floodplains, especially along the White and Black Volta, have fertile soils used for agriculture. However, they are susceptible to flooding, affecting both rural and urban areas. River valleys like the Afram and Oti (extensions of Lake Volta) influence local ecosystems and livelihoods. The Birim River

valley is Ghana's diamond-producing hub, while the Offin River valley is known for historical gold production.

Notable waterfalls in Ghana include the Wli Falls in the Volta Region, the Boti Falls in the Eastern Region and the Kintampo Falls in the Bono East. These waterfalls serve as major tourist attractions and hold cultural significance.

Positive effects of fluvial landforms to the socio-economic development of Ghana

1. **Transportation and Trade**

   The Akosombo Gorge facilitates the use of ferries to carry people, crops, and goods between northern and southern Ghana. This connects hard-to-reach areas, making it easier to trade in goods such as food items and timber.

2. **Farming and Food Security**

   The floodplains, like those along the White Volta, have fertile soil from flood deposits, perfect for growing crops like cowpeas, onions, and tomatoes after floods. River valleys, such as the Accra Plains, have rich soil for farming food and cash crops, supporting farmers' livelihoods. Lake Volta and other rivers support fishing, providing food and income for communities.

3. **Electricity Generation**

   The Akosombo Gorge hosts the Akosombo Dams on the Volta River which produces hydroelectric power for homes, schools, and businesses thereby helping Ghana's socio-economic development.

4. **Tourism and Jobs**

   Waterfalls, like Wli Falls, Boti Falls, and Kintampo Falls, attract tourists who pay for tours, food, and hotels. Lake Volta offers boat rides and scenic views, bringing visitors. Tourism creates jobs for guides, drivers, and local businesses.

5. **Mineral Resources**

   River valleys, like the Birim River valley (known for diamonds) and the Offin River valley (known for gold), have valuable minerals. Mining these resources creates jobs and brings money to Ghana through exports.

Negative Socio-Economic Effects and Challenges of Ghana's River Landforms

1. **Flooding**

   Flooding is a major issue, especially during the rainy season on flood plains. It destroys homes, roads, farms, and disrupts transportation and business activities.

2. **Water-Borne Diseases**

   Rivers and lakes can become unsafe when they are polluted. Poor sanitation and floods can spread diseases such as cholera, typhoid, and diarrhoea. Illegal mining adds harmful chemicals like mercury to river water, making it dangerous to drink or use. Clean water and good sanitation are needed to protect health.

3. **Environmental Damage**

   Illegal mining (galamsey) and farming along rivers damage the environment. These activities pollute water, destroy forests, and cause soil erosion. The rivers become muddy, less useful, and aquatic life suffers. Soil erosion also reduces farmland quality and increases river siltation.

4. **Coastal Erosion and Saltwater Intrusion**

   In the Volta Delta, the coastline is washing away due to less sediment flowing from the river, especially after the construction of dams. Saltwater is moving inland, damaging farms and polluting freshwater. This threatens farming and fishing in the area.

5. **Displacement from Dam Construction**

   Building dams like Akosombo and Bui has forced many people to move. Around 78,000 people were displaced for the construction of Lake Volta, and over 2,500 for the Bui Dam. Though some were resettled, many faced problems like losing their homes, land, and way of life. These moves often affect their social and economic well-being.

Learning Task

River Landforms Discovery Report

1. Work in inclusive groups (mixed gender, ability, and background). Ensure every member has a voice and a role (e.g., researcher, recorder, presenter, illustrator).
2. Use the Google Earth App, digital mapping tool, or field trip observations to identify at least three river landforms (e.g., meanders, deltas, waterfalls, floodplains).
3. Pin or mark locations where these landforms are visible. Take screenshots or sketches as evidence.
4. For each landform:
   a. Record its name and location (preferably geographic coordinates).
   b. Describe how it was likely formed (erosion or deposition).
   c. Include a real-world example of a similar landform in your community or region.
5. Compile a Group Report to include:
   a. A cover page with title, group names, and date.
   b. A brief introduction explaining what river landforms are and the purpose of the task.
   c. Three sections, one for each landform:
      i. Name and location
      ii. Sketch/screenshot
      iii. Formation process (in your own words)
      iv. Example from another location (optional but encouraged)
6. A short conclusion on what the group has learned.
7. Groups will submit the report and share one landform in a short in-class presentation.
8. Use respectful, inclusive language and ensure each team member contributes.

Pedagogical Exemplars

Project-based learning

Write a report to include river landforms identified on Google Earth App or other digital sources or during the field trip.

1. Offer varying entry points and task complexities to cater to diverse intellectual abilities. Simplify tasks for basic learners while challenging advanced learners with in-depth analysis.
2. Supply scaffolding materials like graphic organisers, vocabulary lists, and guiding questions to support all learners.
3. Arrange learners in mixed-ability groups to promote peer support and collaborative learning, ensuring inclusivity.
4. Designate roles within groups (e.g., researcher, recorder, presenter) to ensure participation and responsibility for all members.
5. Leverage digital tools such as Google Earth to engage learners visually and interactively in identifying and analysing river landforms.
6. Foster a supportive environment by encouraging respect, active listening, and valuing diverse perspectives during group discussions.

   Conduct formative assessments through observations and provide timely, specific feedback to guide learner progress.
7. Clearly communicate the outcomes and evidence required for the project, helping learners understand the goals and expectations.
8. Allow flexibility in how learners present their findings, such as through reports, presentations, or creative projects, to accommodate diverse talents and expressions.

Key Assessment Level 3: Individual Class Exercise

Short Answer Type Questions

1. Explain how river channels change from their upper course to their lower course.
2. Compare and contrast the socio-economic benefits and challenges of river landforms in Ghana.
3. Outline the processes involved in the formation of a delta and describe how different types of deltas are formed.
4. Discuss the impact of river rejuvenation on river landforms and surrounding landscapes.
5. Describe the formation and characteristics of a meander and explain how an oxbow lake may form from a meander.

Essay Type Questions

1. Ghana's major rivers, such as the Volta, Pra, Ankobra, and Tano, play an important role in national development. Using examples, outline FIVE ways in which these rivers contribute to Ghana's economic growth and livelihood opportunities.

   [Total 15 marks] (**DoK L3**)
2. Evaluate five challenges posed by River Volta to the local communities nearby

   [Total 20 marks] **(DoK 4)**

3. In a local community, a river serves as a source of water for irrigation and domestic use. During the wet season, the river overflows its banks, while in the dry season, its volume decreases.
   a. Evaluate, in four ways, how seasonal changes negatively affect the community's domestic water supply and irrigational activities. [12 marks]
   b. Propose four strategies that can be adopted to mitigate any negative impacts identified. [8 marks]

   [Total 20 marks] **(DoK 4)**

4. a. Outline the processes involved in the development of a river channel from youth through maturity to old age. (8 marks)
   b. Relate the processes outlined in part (a) to one or more river landforms. (12 marks)

   [Total 20 marks] **(DoK 3)**

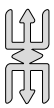
5. Critically evaluate the impact of river landforms on human activities and settlement patterns in Ghana. Discuss both positive and negative impacts.

   [Total 15 marks] **(DoK 4).**

PLC Session 1

45 minutes | **Planning & Reviewing the Learning Plan**

1. Begin the session by recapping lessons from the previous year/session/week, focusing on how learning was applied.
2. Use your subject specific app to explore the content before planning. Ask the app to
   a. explain the week's concepts in a practical way that will make it easier for learners to understand
   b. identify two or three common misconceptions learners may have on the week's content and how to address them using contexts familiar to Ghanaian learners. (NTS 3a, 3g and 3m).
3. Use your subject specific app to plan your lesson. Ask the app to
   a. suggest the most effective method for teaching the week's concepts to learners with diverse backgrounds.
   b. suggest learning activities, differentiation and essential questions based on the method of teaching (NTS 3a-3q)
   c. review your prepared learning plan and address any challenging issues you may have identified in your subject area (NTS 3a-3c).



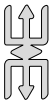
Note

- *Take note of the recap topics linked to Years 1 and 2 while preparing for your lesson.*
- *Refer to the Values Learning Community Handbook and link the values for the week in your lesson to ensure that learners are applying what they learn.*

4. Plan the week's key assessment with your app
   a. The key assessment for the week is ***individual class exercise***. Chat with your app to plan this assessment, indicating what you and your learners will do before, during and after the class exercise (NTS 3k-3q).

10 minutes **Content Exploration**

5. As a subject group, select one problem or idea/term in the week's content that is challenging (not a routine procedural question, but one that requires conceptual understanding) and then
   a. use the app, ask it to solve the problem step by step and explain the reasoning behind each step (you may be assisted by a teacher who is strong in the content area)
   b. all teachers in the group work through a similar problem individually for 3–4 minutes
   c. the group then works through the problem together step by step
   d. highlight the most common errors made at each step and discuss (NTS 1c, 1e, 2c, 2e, 3e-3j).



Note

- *This part is not just about 'How do I teach this?' but how do I teach it for learners to understand?*
- *If the group still shares the same content gap, use the app: ask it to solve the problem step by step and explain the reasoning behind each step.*
- *Problems/ideas discussed should be sourced from the Teacher Manual content, not invented separately. This keeps the content exploration directly connected to what teachers will deliver.*

30 minutes **Enactment**

6. Enact a teaching activity based on your learning plan (NTS la-1b, 1e-lg, 2c, 2e, 2f, 3c-3j and 3o).
   a. Colleagues observe with specific attention to clarity of concept explanation, use of familiar Ghanaian examples and how misconceptions are handled if they arise.
   b. After the enactment, ask for structured feedback from the group
      i. was the concept explained in a way that a learner with no prior knowledge could follow?
      ii. were the examples grounded in contexts familiar to Ghanaian learners?
      iii. did any misconceptions surface and if so, how were they addressed?

5 minutes **Reflection**

7. Reflect and share your views on the session. One thing that worked well, what did not work well and what you will do differently. (NTS 1a, 1b).
8. Identify a critical friend to observe and provide feedback on your lesson in relation to the PLC Session conducted (NTS 1f, 1g).
9. Remember to
   a. transfer your chats into your learning planner template.
   b. read your Teacher Manual and related Learner Material in preparation for the next session. Take note of the recap weeks, which are linked to Years 1 and 2 (NTS 3a).
   c. integrate National Values, GESI, SEL, and 21st century skills into your learning activities, assessment tasks, and rubrics/mark schemes.

WEEK 2

Learning Indicator: *Discuss mass wasting and the factors that influence it*

Focal Area: Mass Wasting

Introduction

Mass wasting is the downslope movement of rock, soil, and debris under the direct influence of gravity, occurring without the primary aid of a transporting medium such as water, ice, or wind. It can also be defined as a structural phenomenon that involves the bulk transfer of earth materials downslope, resulting in landscape modification and potentially causing socio-economic and environmental impacts to human settlements and ecosystems.



Figure. 2.1: *Incidence of mass wasting at Peduase road to Oyarifa*

Factors Influencing Mass Wasting

1. **Slope Angle (Gradient):** Steeper slopes increase the gravitational force acting on materials, making them more prone to sliding or falling. The angle of repose (the maximum angle of 45 degrees at which loose material remains stable) varies by material type. Exceeding this angle, often due to natural processes or human activity (e.g., road cuts), triggers mass wasting. For example, a steep mountain slope is more likely to experience rockfalls than a gentle hillside.
2. **Material Composition and Properties:** The type, size, and cohesion of materials on a slope affect stability. Cohesive materials (e.g., clay-rich soils) may hold together better but can fail dramatically when saturated. Loose, unconsolidated materials (e.g., sand, gravel) have lower cohesion and are more susceptible to sliding. Fractured or layered rocks (e.g., shale or slate) are weaker along bedding planes or joints, increasing the likelihood of failure. For instance, a slope with loose, dry sand may collapse easily compared to one with compact clay.
3. **Water Content:** Water is a critical factor that can both stabilise and destabilise slopes. Water serves as a lubricant to reduce friction between particles, promoting sliding (e.g., in mudflows). Excess water in soil or rock pores increases pressure, reducing the shear strength of the material. Heavy rainfall or snowmelt can saturate soils, triggering landslides or debris flows. Freeze-thaw cycles: Water freezing in cracks expands and weakens rock, leading to rockfalls. A slope may remain stable until heavy rain saturates it, causing a landslide.

4. **Vegetation**: Vegetation can stabilise or destabilise slopes depending on its presence and type. Plant roots bind soil, increasing cohesion and reducing erosion. Trees can anchor slopes. Removal of vegetation (e.g., deforestation, wildfires, slash -and-burn farming) reduces root strength, making slopes more susceptible to mass wasting. Heavy vegetation can add weight to a slope. A forested hillside is less prone to landslides than one stripped of trees after logging.
5. **External Triggers**: Sudden events can initiate mass wasting on otherwise stable slopes. Seismic shaking reduces friction and triggers landslides, rockfalls, or avalanches. Eruptions or lahars (volcanic mudflows) can mobilise large volumes of material. Excavation, blasting, or overloading slopes with structures can destabilise them. An earthquake in a mountainous region can cause widespread rockslides.
6. **Climate and Weather**: Climate controls water availability and temperature fluctuations, which affect slope stability. Frequent rainfall or snowmelt increases water content, promoting mass wasting. In arid climates, rare but intense storms can trigger debris flows. Freeze-thaw cycles in cold climates weaken slopes, while monsoon seasons in tropical areas trigger landslides. Coastal cliffs in rainy regions are prone to slumping due to constant water infiltration.
7. **Weathering:** Over time, weathering weakens slope materials, making them more susceptible to mass wasting. Physical weathering breaks down rock into smaller, less stable fragments. Chemical weathering alters minerals, reducing rock strength (e.g., dissolving limestone). Gradual buildup of loose debris on slopes increases the likelihood of failure. A granite cliff weakened by years of freeze-thaw cycles may eventually produce rockfalls.

Learning Tasks

Mass Wasting; Watch and Observe

1. Watch the video clips and view images showing different types of mass wasting (e.g., landslides, rockfalls, mudflows).
2. As you watch, jot down:
    i. What happened during the event
    ii. What might have caused it (e.g., rainfall, slope, human activity)
    iii. The type of mass wasting shown
3. In inclusive pairs, discuss:
    a. One key observation you made
    b. How people and the environment were affected
4. Write 3–4 sentences explaining:
    a. One type of mass wasting
    b. Its cause and one effect you observed in the video or image
5. Share your written observation with your group. Listen respectfully as others share theirs.

"What Makes the Slope Move?"

1. In small, inclusive groups, brainstorm the meaning of mass wasting and list what you think causes it (e.g., rain, earthquakes, human activity). Everyone must contribute at least one idea.

2. Group your ideas under headings like: Natural Factors, Human Activities, and Slope Conditions.
3. As a group, write a simple definition of mass wasting in your own words.
4. Choose two key factors and explain how each one influences mass wasting.
5. Nominate a speaker to briefly sh*are your group's definition and one factor with the class.*

Pedagogical Exemplars

Digital learning

Watch videos and pictures on mass wasting. Learners share their observations

1. Provide videos and pictures with varying complexity levels, ensuring that content is accessible for learners with different intellectual abilities. Include subtitles or simplified explanations for foundational learners.
2. Offer guiding questions or observation sheets to focus students' attention on key aspects of mass wasting, helping to scaffold their understanding.
3. Encourage all learners to share their observations in a supportive environment, valuing diverse perspectives and ensuring everyone feels heard.
4. Utilise digital platforms that allow for interactive engagement, such as pause-and-discuss features or annotation tools, to enhance understanding.
5. Foster an emotionally supportive atmosphere by encouraging respectful listening and empathy during discussions, and acknowledging the emotions evoked by the content.
6. Guide discussions by asking probing questions to deepen learners' understanding and encourage critical thinking related to mass wasting.
7. Provide constructive feedback on learners' observations and encourage self-reflection to enhance their learning experience.
8. Allow learners to share their observations through various formats, such as verbal discussions, written reflections, or digital presentations, catering to different expression styles.
9. Supply additional resources, like vocabulary lists or diagrams, to aid comprehension and accommodate varying levels of prior knowledge.

Talk for learning

Using brainstorming define and account for the factors influencing mass wasting.

1. Provide templates to help learners organise their ideas during brainstorming. Adjust these organisers to accommodate different intellectual abilities and ensure effective structuring of thoughts.
2. Offer resources such as reference books, diagrams, and online materials at varying proficiency levels to support diverse learners.
3. Facilitate small group discussions by posing probing questions and encouraging participation from all members, ensuring every contribution is valued and respected.
4. Form mixed-ability groups to promote peer learning and inclusivity, allowing learners from diverse backgrounds to share and build on each other's ideas.

5. Conduct formative assessments to monitor progress, providing specific feedback tailored to individual needs and areas for improvement.
6. Use structured methods like think-pair-share to manage classroom discussions, encouraging all learners to express their ideas and reflections.
7. Create a supportive atmosphere by fostering empathy, active listening, and respect for diverse viewpoints during discussions.
8. Use questions that encourage critical thinking and exploration of the factors influencing mass wasting, promoting deeper understanding and discussion.
9. Encourage learners to reflect on their learning experiences and the importance of collaboration through guided discussions and self-assessment.

Learners should realise that they can accomplish their goals with hard work, persistence, and good strategies

Key Assessment Level 3: Short Answer Questions

1. Discuss how vegetation and water content influence mass wasting on slopes.
2. Analyse the socio-economic and environmental impacts of mass wasting events in human settlements.

Essay Questions

1. Discuss the factors that influence mass wasting. Provide relevant examples to support your discussion. [Total 15 marks] **(DoK 3)**

PLC Session 2

45 minutes | **Planning & Reviewing the Learning Plan**

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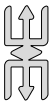
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c. integrate National Values, GESI, SEL, and 21st century skills into your learning activities, assessment tasks, and rubrics/mark schemes.

WEEK 3

Learning Indicators

1. *Examine the types of mass wasting*
2. *Discuss the socio-economic and environmental effects of mass wasting*

Focal Area 1: Types of Mass Wasting

Types of Mass Movement

1. **Creep:** The slowest form of mass wasting, involving the gradual downhill movement of soil and rock debris. It is often imperceptible to the naked eye but can cause tilting of trees, utility poles, and other structures over time. The most common example is **soil creep** which is the slow downslope movement of soil over a low gradient under the influence of gravity. Soil creep is the slowest of all mass movements. It is mainly caused by freezing and thawing or wetting and drying of soil. Upon freezing, the soil piles up at right angles to the slope, and subsequent thawing drops the soil, causing it to move downward. The process of soil piling up at right angles to the slope is called **heaving**. Soil creep can create step-like ridges called **terracettes**. Another example is **solifluction** (*a term used to describe the progressive movement of a mass down a slope caused by freeze-thaw activity*)

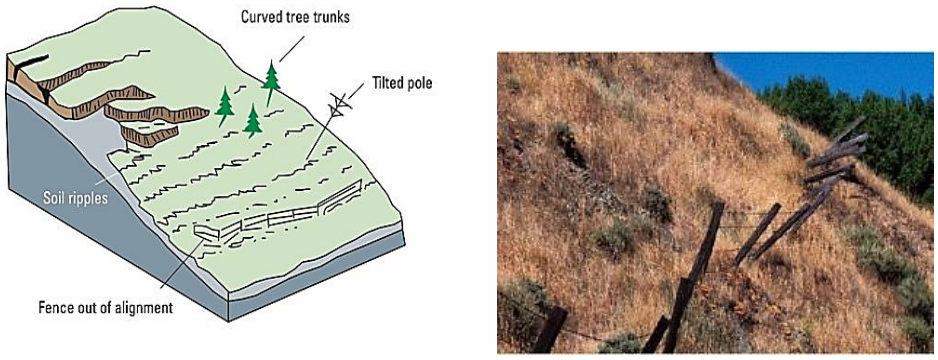


Figure. 3.1: *Tilted fence Soil creep shows evidence of soil creep*



Figure 3.2: *Terracettes on slopes* **Figure.3.3:** *Solifluction lobes*

2. **Slide:** Relatively rapid downslope movement of a large block of soil or rock along a well-defined surface. There are two forms of slide movement namely, **translational slide** and **rotational slide (slump)**.

a. **Translational slide** involves the downslope movement of a large mass of soil or blocks of rock along a relatively flat slope. The lowest part of the landslide, where the displaced material accumulates is the **toe**. Examples include **rock slide** and **landslide**. **Rock slide** involves the rapid downward movement of blocks of rocks along a relatively flat slope. On the other hand, **landslide** involves the rapid movement of large mass soil or rock debris along a relatively flat slope.

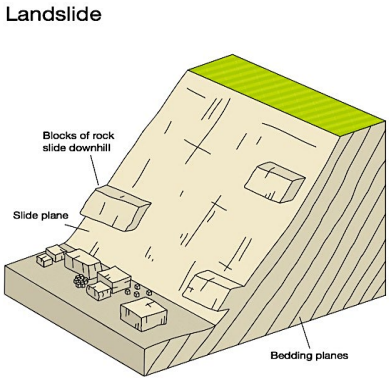


Figure 3.4: *Rock slide*

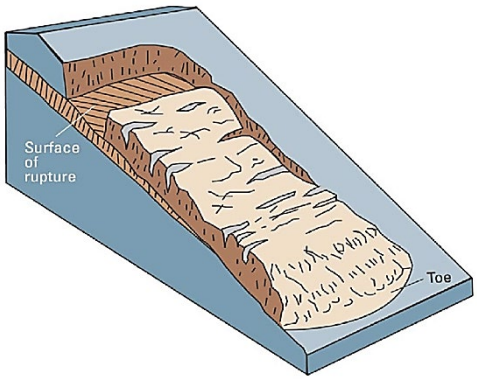


Figure 3.5: *Landslide*

b. **Rotational slides (Slump):** The downslope movement of a large mass of soil or rock debris along a curved slip surface or concave slope.

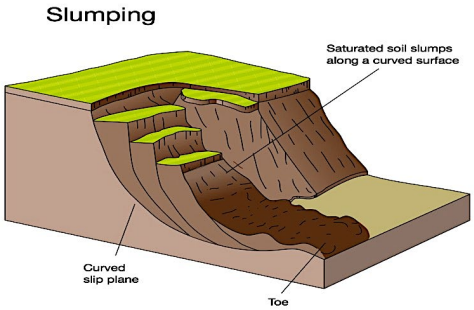


Figure 3.6: *Slumping*

3. **Flow:** Rapid downslope movement of a saturated mass of soil or debris that resembles a fluid. In flow movements, water only serves as a lubricant and not an agent of movement. Mudflows, debris flows and lahars (volcanic mudflows) are examples. Flows can be highly destructive due to their high velocity and ability to travel long distances. **Lobe** refers to a distinct, often rounded or elongated section of the flow that extends outward from the main body.

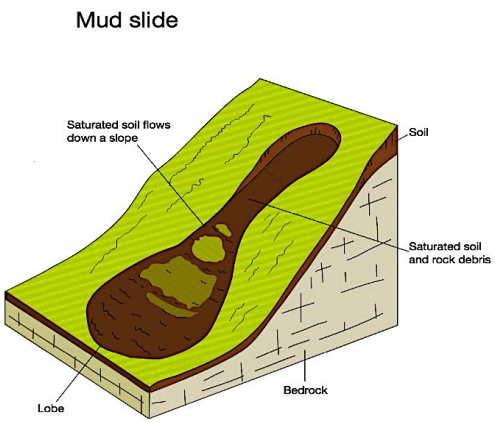


Figure 3.7: *Mudflow*

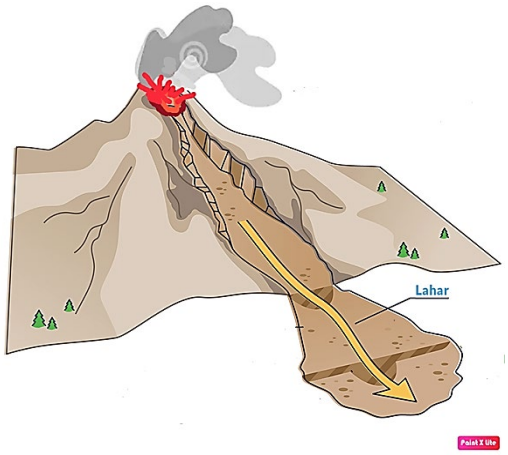


Figure 3.8: *Lahar during volcanic activity*

4. **Fall:** The sudden, freefall detachment and downward movement of rock or debris from a cliff or steep slope. Falling rocks and boulders pose a significant hazard to life and property in mountainous regions. A typical example is **rock fall. Talus** (or scree) refers to the accumulation of broken rock fragments at the base of cliffs or steep slopes. The **angle of repose** is the steepest angle at which a pile of rock fragments remains stable without sliding.

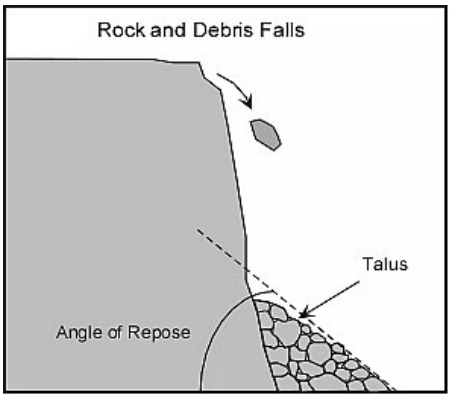


Figure.3.9: *Rock fall*

5. **Topple:** The rotation and tilting forward of a rock mass around a pivot point at its base. This movement often occurs along pre-existing joints or weaknesses in the rock. An example is **rock topple.**

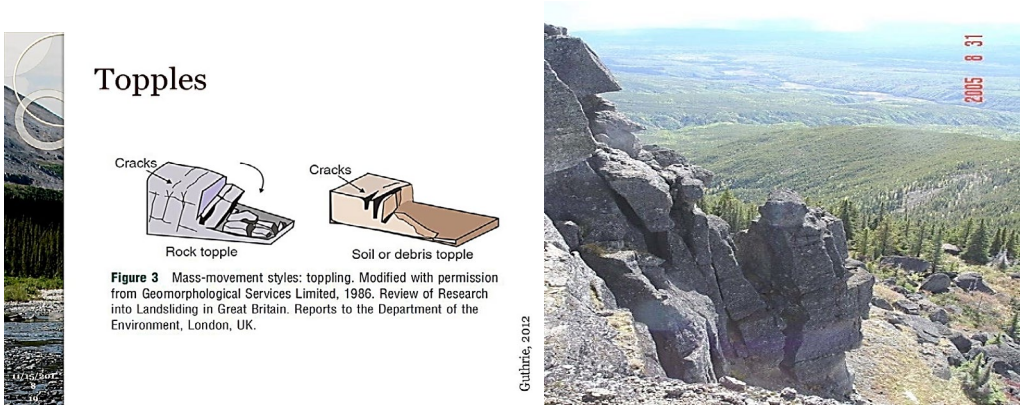


Figure 3.10: *Rock topple*

Learning Tasks

"Slide, Fall or Flow?"

1. Quietly think about what you know or have seen about mass wasting.
2. Write down the names of any types (e.g., landslide, rockfall, mudflow, slump) and what you think they involve.
3. In inclusive pairs, share your thoughts and compare your lists.
4. Work together to define at least three types of mass wasting processes using your own words.
5. One volunteer from each pair shares one type with the whole class.
6. Listen to other groups and write down any new types mentioned.

Pedagogical Exemplars

Talk for learning

Think-pair-share on the types of mass wasting processes

1. Implement the think-pair-share method to ensure all learners have the opportunity to engage with the topic of mass wasting processes individually, in pairs, and as a class.
2. Pose open-ended questions with varying levels of difficulty to challenge learners at different intellectual stages, ensuring everyone can contribute meaningfully.
3. Pair learners with diverse abilities and backgrounds to foster inclusivity and peer support, allowing them to learn from each other's perspectives.
4. Provide prompts or guiding questions to help focus discussions and assist learners in organising their thoughts.
5. Use diagrams or videos to visually explain mass wasting processes, catering to visual learners and enhancing comprehension.
6. Offer constructive feedback and encourage learners to reflect on their discussions, promoting self-awareness and growth.
7. Create a respectful and empathetic environment where learners feel comfortable sharing their ideas and listening to others, fostering social-emotional learning.
8. Allow learners to express their understanding through various formats, such as drawings or verbal explanations, to accommodate different learning styles.
9. Teach and model active listening skills to ensure that learners are fully engaged and respectful during discussions.
    - Learners should realise that they can accomplish their goals with hard work, persistence, and good strategies.

Focal Area 2: Socio-Economic and Environmental Effects of Mass Wasting

Introduction

Mass wasting can be sudden or gradual, and its effects can be catastrophic and often far-reaching. These effects can significantly disrupt human activities, endanger lives, and damage the environment. Understanding these impacts is essential for planning, disaster preparedness, and environmental management.

Socio-Economic Effects of Mass Wasting

1. **Loss of Lives and Injuries:** Sudden mass wasting events such as landslides, mudflows, and rockfalls often result in fatalities and injuries, especially in densely populated areas near unstable slopes. In 2019, a landslide in the Eastern Region of Ghana killed several people following heavy rains. Furthermore, the 2006 landslide in Leyte, Philippines, buried an entire village, killing over 1,100 people, mostly schoolchildren.

2. **Destruction of Infrastructure**: Mass wasting can destroy roads, bridges, railways, and buildings, disrupting transportation, communication, and access to essential services. In hilly areas like Akwapim and parts of the Volta Region, landslides often damage feeder roads, making farming communities inaccessible during the rainy season. Again, the 2014 Malin landslide in India destroyed homes and roads, cutting off entire villages from emergency assistance.
3. **Displacement of Communities**: Residents of affected areas are frequently forced to evacuate either temporarily or permanently due to unstable ground conditions. This results in social dislocation, loss of livelihoods, and strain on emergency shelters or host communities. Communities in mining zones such as Obuasi and Tarkwa have experienced forced relocations due to slope failures from both natural and human-induced mass wasting. In Nepal, frequent landslides during the monsoon season displace thousands, especially in rural mountainous regions.
4. **Loss of Agricultural Land and Crops**: Landslides and mudflows can bury or erode farmland, leading to a decline in food production and income for farming households. In the Ahafo Region, landslides have affected cocoa and plantain farms during heavy rains, threatening local food security and rural incomes. In Colombia's Andean highlands, landslides have repeatedly wiped-out coffee plantations, impacting the country's economy and farmers' livelihoods.
5. **Economic Costs**: The financial burden of mass wasting includes the cost of rebuilding damaged infrastructure, resettling displaced populations, and restoring livelihoods. Economic productivity declines when businesses are destroyed or access to markets is disrupted. Following floods and mudslides in Accra and surrounding areas, government agencies spent millions on road repairs and disaster relief. Again, the 2017 landslide in Sierra Leone's capital, Freetown, not only caused over 1,000 deaths but also cost the government millions of dollars in emergency response and recovery efforts.

Environmental Effects of Mass Wasting

1. **Soil Degradation and Loss of Fertile Land:** When slopes fail, the nutrient-rich topsoil is stripped away or buried, reducing agricultural productivity. In 2017, a series of rain-triggered landslides around Aburi displaced and buried farmlands on the eastern slopes of the Akwapim Range, rendering them temporarily unproductive. The 1999 Vargas tragedy in Venezuela saw extensive hillside collapse, washing away coffee plantations and causing long-term declines in soil fertility across the region.
2. **Increased Sedimentation and Waterway Blockage:** Loose debris from mass wasting often ends up in streams and rivers, raising sediment loads. This can silt up channels, reduce reservoir capacity, and even dam small waterways, leading to upstream flooding or sudden downstream release if the natural dam breaches. Following heavy rains in 2010, debris flows off the Kwahu escarpment into the Volta River tributaries exacerbated local flooding and siltation at small weirs used for irrigation. The 2014 Mount Ontake eruption-triggered mudflows in Japan carried vast amounts of volcanic sediment into nearby rivers, forcing frequent dredging to keep flood channels open.
3. **Alteration of Drainage Patterns and Increased Flood Risk:** When landslides block valleys or gullies, they can create temporary lakes; breach of these "landslide dams" then unleashes catastrophic floods. Moreover, slope scars can redirect surface runoff, concentrating flows elsewhere. Ghana example: Although rare, minor landslide-dammed ponds have been observed along lesser-known streams in the Atewa Range after intense downpours, temporarily inundating adjacent farmland. In 2008, an earthquake-induced landslide in China's Sichuan province dammed the Tangjiashan River; the subsequent breach sent a destructive flood wave downstream.

4. **Vegetation Loss and Habitat Destruction:** Mass wasting removes or buries plants and trees, disrupting local ecosystems and fragmenting wildlife habitat. Recovery can take decades, especially in montane forests. Deforestation on steep cocoa farms in the Western Region, coupled with heavy rains, has led to small-scale slide scars that strip away undergrowth and young shade trees, affecting bird and insect populations. The 2017 Sierra Leone mudslides buried forested slopes above Freetown, leading to the loss of endemic plant communities and displacing forest fauna.
5. **Water Quality Degradation:** Fine sediments, organic matter and potential pollutants (e.g. fertilisers, pesticides) washed downslope increase turbidity and nutrient loading in rivers and reservoirs, harming aquatic life and raising treatment costs for human consumption. Elevated turbidity in the Densu River has at times been linked to enhanced run-off from landslide-prone areas around Mamfe, impacting water supply for Accra's western suburbs. In New Zealand, frequent shallow-earthflows on deforested hillsides have led to higher nitrogen and phosphorus levels downstream, degrading trout habitat and necessitating stricter land-use controls.

Learning Tasks

Mass Wasting: Impacts That Matter

1. Join a diverse group (mixed ability, gender, and background). Assign roles such as researcher, designer, writer, and presenter.
2. Use textbooks, reliable websites, or videos to research the socio-economic (e.g., loss of lives, destruction of homes) and environmental effects (e.g., deforestation, soil erosion) of mass wasting.
3. Create a PowerPoint to include, but not limited to:
    a. Slide 1: Title and group members
    b. Slide 2: Brief explanation of mass wasting
    c. Slide 3: Socio-economic effects (with examples or images)
    d. Slide 4: Environmental effects (with examples or images)
    e. Slide 5: Conclusion and suggested solutions
4. Each group will present their findings in a short session. All members must speak.

Pedagogical Exemplars

Collaborative Learning

Conduct group research and create PowerPoint presentations on the socio-economic and environmental effects of mass wasting for class presentations.

1. Encourage learners to assign themselves roles based on their strengths and interests, such as researcher, designer, or presenter, promoting ownership and responsibility.
2. Provide a variety of research materials at different reading levels and formats, such as articles, videos, and infographics, to accommodate diverse learning abilities.
3. Offer guidance during the research process, helping groups identify credible sources and organise their findings effectively.
4. Form diverse groups to ensure a mix of skills and abilities, fostering an inclusive environment where all voices are valued.

5. Facilitate workshops on using PowerPoint and effective presentation skills, catering to different proficiency levels.
6. Create a supportive atmosphere where learners practice empathy, active listening, and effective communication, building a strong classroom community.
7. Provide constructive feedback on both the content and delivery of presentations, encouraging reflection and improvement.
8. Reinforce the importance of hard work, persistence, and strategic planning in achieving group goals, highlighting the value of teamwork.
9. Allow flexibility in presentation style, encouraging creativity and innovation in how learners convey their research findings.

Key Assessment Level 3: Short Answer Questions

1. Analyse the impact of mass wasting on agricultural productivity and local economies, using specific examples to support your answer.
2. Evaluate the environmental consequences of mass wasting on river systems and aquatic habitats, with specific.
3. Discuss how mass wasting events can lead to both immediate and long-term socio-economic challenges for affected communities, citing relevant examples.

Essay Questions

1. With relevant examples, explain how translational and rotational slides differ in terms of
   a. movement,
   b. slope type, and
   c. environmental impact.

   [Total 15 marks] **(DoK 3)**

2. Discuss three socio-economic effects of mass wasting on rural communities, using specific examples to illustrate how these events can alter livelihoods and infrastructure. Total 20 marks **(DoK 3)**

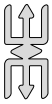
PLC Session 3

45 minutes	Planning & Reviewing the Learning Plan

1. Begin the session by recapping lessons from the previous year/session/week, focusing on how learning was applied.
2. Use your subject specific app to explore the content before planning. Ask the app to
   a. explain the week's concepts in a practical way that will make it easier for learners to understand
   b. identify two or three common misconceptions learners may have on the week's content and how to address them using contexts familiar to Ghanaian learners. (NTS 3a, 3g and 3m).
3. Use your subject specific app to plan your lesson. Ask the app to
   a. suggest the most effective method for teaching the week's concepts to learners with diverse backgrounds.

b. suggest learning activities, differentiation and essential questions based on the method of teaching (NTS 3a-3q)

c. review your prepared learning plan and address any challenging issues you may have identified in your subject area (NTS 3a-3c).



Note

- *Take note of the recap topics linked to Years 1 and 2 while preparing for your lesson.*
- *Refer to the Values Learning Community Handbook and link the values for the week in your lesson to ensure that learners are applying what they learn.*

4. Plan the week's key assessment with your app

   a. The key assessment for the week is ***short answer questions***. Chat with your app to plan this assessment, indicating what you and your learners will do before, during and after the assessment (NTS 3k-3q).

10 minutes **Content Exploration**

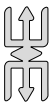
5. As a subject group, select one problem or idea/term in the week's content that is challenging (not a routine procedural question, but one that requires conceptual understanding) and then

   a. use the app, ask it to solve the problem step by step and explain the reasoning behind each step (you may be assisted by a teacher who is strong in the content area)

   b. all teachers in the group work through a similar problem individually for 3–4 minutes

   c. the group then works through the problem together step by step

   d. highlight the most common errors made at each step and discuss (NTS 1c, 1e, 2c, 2e, 3e-3j).



Note

- *This part is not just about 'How do I teach this?' but how do I teach it for learners to understand?*
- *If the group still shares the same content gap, use the app: ask it to solve the problem step by step and explain the reasoning behind each step.*
- *Problems/ideas discussed should be sourced from the Teacher Manual content, not invented separately. This keeps the content exploration directly connected to what teachers will deliver.*

30 minutes **Enactment**

6. Enact a teaching activity based on your learning plan (NTS la-1b, 1e-lg, 2c, 2e, 2f, 3c-3j and 3o).

   a. Colleagues observe with specific attention to clarity of concept explanation, use of familiar Ghanaian examples and how misconceptions are handled if they arise.

   b. After the enactment, ask for structured feedback from the group

      i. was the concept explained in a way that a learner with no prior knowledge could follow?
      ii. were the examples grounded in contexts familiar to Ghanaian learners?
      iii. did any misconceptions surface and if so, how were they addressed?

5 minutes	Reflection

7. Reflect and share your views on the session. One thing that worked well, what did not work well and what you will do differently. (NTS 1a, 1b).
8. Identify a critical friend to observe and provide feedback on your lesson in relation to the PLC Session conducted (NTS 1f, 1g).
9. Remember to
    a. transfer your chats into your learning planner template.
    b. read your Teacher Manual and related Learner Material in preparation for the next session. Take note of the recap weeks, which are linked to Years 1 and 2 (NTS 3a).
    c. integrate National Values, GESI, SEL, and 21st century skills into your learning activities, assessment tasks, and rubrics/mark schemes.

Section 1 Review

This section has explored key physical geography concepts, focusing on river channel development and associated landforms. It examined how river processes such as erosion, transportation, and deposition shape landforms like valleys, deltas, and floodplains. The socio-economic significance of these landforms in Ghana was also analysed, emphasising their roles in agriculture, fishing, transportation, and tourism. Additionally, mass wasting processes, including the types and the factors affecting mass wasting, have been examined. The socio-economic and environmental impacts of mass wasting were highlighted, illustrating how they can result in property damage, loss of life, and landscape alteration.

MARKING SCHEMES FOR THE KEY ASSESSMENTS

WEEK 1

Short Answer Type Questions

Q1.

Marking Scheme

- Description of the upper course characteristics (2 marks)
- Description of the middle course characteristics (2 marks)
- Description of the lower course characteristics (2 marks)

Total: 6 marks

Sample Answer

In the upper course, rivers have a steep gradient and flow quickly, resulting in vertical erosion that forms features like V-shaped valleys and waterfalls.

In the middle course, the gradient decreases, the river widens and deepens, and lateral erosion dominates, forming features like meanders and oxbow lakes.

In the lower course, the gradient is gentle, the river is wide and slow-moving, and deposition dominates, forming features like floodplains and deltas.

Q2

Marking Scheme

- Two socio-economic benefits (2 marks)
- Two socio-economic challenges (2 marks)
- Comparison/contrast of benefits and challenges (2 marks)

Total: 6 marks

Sample Answer

The socio-economic benefits of river landforms in Ghana include transportation and trade facilitated by the Akosombo Gorge and fertile floodplains that support agriculture. However, challenges include flooding during the rainy season, which disrupts homes and businesses, and pollution from illegal mining. While rivers provide essential resources and economic opportunities, they also present environmental and logistical challenges.

Q3

Marking Scheme

- Outline of general delta formation process (2 marks)
- Description of arcuate delta formation (1 mark)
- Description of bird's foot delta formation (1 mark)
- Description of cuspate delta formation (1 mark)
- Description of estuarine delta formation (1 mark)

Total: 6 marks

Sample Answer

Deltas form when a river slows down upon entering a standing body of water, depositing sediments that create new land. An arcuate delta, like the Nile Delta, forms with a fan shape as the river splits into multiple channels. A bird's foot delta, like the Mississippi Delta, forms with long, thin channels extending into the water. A cuspate delta, like the Tiber Delta, forms with a pointed shape due to fewer channels splitting. An estuarine delta forms in the mixing zone of fresh and saltwater, like the Volta Estuary, with sandy or muddy deposits.

Q4

Marking Scheme

- Explanation of river rejuvenation (2 marks)
- Impact on river landforms (2 marks)
- Impact on surrounding landscapes (2 marks)

Sample Answer

River rejuvenation occurs when a river gains renewed erosive power due to tectonic uplift, a drop in sea level, or increased discharge. It impacts river landforms by deepening valleys and creating features like incised meanders and gorges. The surrounding landscapes may experience increased erosion, alter the topography and potentially affect habitats and human activities.

Q5

Marking Scheme

- Description of meander formation process (2 marks)
- Characteristics of a meander (2 marks)
- Explanation of oxbow lake formation from a meander (2 marks)

Total: 6 marks

Sample Answer

Meanders form in the middle or lower course of a river as it flows across a flat landscape. Variations in the riverbed cause faster flow on one side, leading to erosion on the outer bank and deposition on the inner bank, creating curved bends. Meanders have a distinctive S-shape with erosion occurring on the outer bank and deposition on the inner bank. An oxbow lake forms when a meander becomes increasingly curved, the river cuts across the narrow neck, and deposition seals off the meander, isolating it from the main river flow.

Essay Questions

Q1

Structure and Marks Allocation

Answers should refer to both the contribution to Ghana's economic growth and the impact on the wealth of individuals.

a. **Hydroelectric Power Production (3 marks)**

   i. Explanation of how rivers, especially the Volta River, are used for generating hydroelectric power through dams like Akosombo, Kpong, and Bui. (2 marks)

   ii. Impact of meeting industrial and domestic energy needs in Ghana. (1 mark)

b. **Irrigation and Agriculture (3 marks)**
   i. Description of how rivers provide water for irrigation, enabling year-round farming and increasing agricultural productivity and individual wealth. (2 marks)
   ii. Mention of specific irrigation projects, such as those on the Volta and White Volta Rivers. (1 mark)

c. **Transportation and Trade (3 marks)**
   i. Explanation of how navigable rivers serve as transportation routes, especially in areas with limited road infrastructure, local employment and wealth generation. (2 marks)
   ii. Examples of rivers like the Volta and Pra facilitating the movement of goods and people. (1 mark)

d. **Tourism and Employment (3 marks)**
   i. Discussion of how rivers and associated landforms attract tourists, creating jobs and stimulating local economies, increasing wealth. (2 marks)
   ii. Examples of attractions such as Lake Volta and waterfalls. (1 mark)

e. **Source of Minerals and Economic Growth (3 marks)**
   i. Explanation of how rivers like the Birim and Pra provide valuable minerals such as diamonds and gold. (2 marks)
   ii. Contribution to Ghana's economic development through mining exports and impact of employment in mining and related industries. (1 mark)

Q2

Structure and Marks Allocation

a. **Challenge 1: Flooding (3 marks)**
   i. Explanation of how seasonal flooding affects communities.
   ii. Examples of past flood events and their impacts.

b. **Challenge 2: Displacement (3 marks)**
   i. Discussion on how construction projects, like dams, displace communities.
   ii. Example of community displacement due to the Akosombo Dam.

c. **Challenge 3: Waterborne Diseases (3 marks)**
   i. Explanation of how stagnation in certain areas leads to diseases like malaria.
   ii. Examples of specific health issues faced by the communities.

d. **Challenge 4: Loss of Livelihoods (3 marks)**
   i. Discussion on how fishing and farming activities are affected.
   ii. Examples of economic impacts on local livelihoods.

e. **Challenge 5: Environmental Degradation (3 marks)**
   i. Explanation of how riverbank erosion and pollution affect ecosystems.
   ii. Examples of specific environmental issues.

f. **Conclusion (3 marks)**

i. Summarise the key points discussed.

ii. Reflect on the importance of addressing these challenges for community well-being and sustainability.

Q3

Structure and Marks Allocation

Part A: Evaluating Negative Impacts (12 marks)

a. **Introduction (1 mark)**

i. Briefly introduce the context of the river's importance to the community for domestic and irrigation purposes.

b. **Negative Impacts (11 marks)**

i. Flooding During the Wet Season (3 marks)

- Explain how river overflow leads to flooding, damaging property and contaminating water supplies.
- Discuss the impact on sanitation and health.

ii. Water Quality Degradation (2 marks)

- Explain how increased sediment and debris during high flows affect water quality.
- Discuss implications for domestic use.

iii. Reduced Water Availability During the Dry Season (3 marks)

- Discuss the challenges of decreased river volume for irrigation and domestic use.
- Explain the impact on crop yields and household water access.

iv. Irrigation Challenges (3 marks)

- Explain how irregular water supply disrupts planting schedules and crop growth.
- Discuss potential for increased costs in water management.

Part B: Proposing Mitigation Strategies (8 marks)

a. **Identification of Strategies (4 marks)**

Award 1 mark for each relevant strategy identified. The strategies should be directly related to mitigating the negative impacts previously identified.

b. **Explanation of Strategies (4 marks)**

Award 1 mark for a clear and concise explanation of each strategy. The explanation should demonstrate how the strategy effectively mitigates the specific negative impact.

Q4

Structure and Mark Allocation

Part A: Analyse How River Channels Are Developed (8 marks)

a. **Introduction (1 mark)**

i. Define river channels and the significance of water in shaping landscapes.

b. **Processes of River Channel Development (7 marks)**

i. Erosion (3 marks)

- Explain the role of vertical and lateral erosion in forming river channels.
- Discuss headward erosion and its impact on the extension of river valleys.

ii. Transportation (2 marks)

- Describe how river transportation sediments and the factors affecting this process, such as water velocity and volume.

iii. Deposition (2 marks)

- Explain how deposition contributes to the development of river channels, affecting their shape and size over time.

Part B: Explain Why Different Landforms Are Developed at Different Stages of a River Channel (12 marks)

c. **Introduction (1 mark)**

i. Briefly introduce the concept of the river lifecycle and its stages.

a. **Landform Development at Different Stages (11 marks)**

i. Youthful Stage (3 marks)

- Describe the formation of features such as waterfalls and rapids due to steep gradients and active erosion.

ii. Mature Stage (4 marks)

- Explain the development of meanders and floodplains as the river gradient decreases and lateral erosion becomes more prominent.
- Discuss the role of sediment deposition in shaping these landforms.

iii. Old Age Stage (4 marks)

- Describe the formation of ox-bow lakes and deltas due to significant deposition and meandering.
- Explain how the gentle gradient and reduced velocity lead to pronounced deposition.

Additional Considerations

- Clarity and Detail: Responses should be well-organised and provide detailed explanations for each stage and process.
- Use of Examples: Including specific examples of rivers and associated landforms can enhance understanding and illustrate points effectively.
- Depth of Analysis: Demonstrating comprehensive understanding and insightful analysis of the processes and landforms will earn higher marks.

Q5

Structure and Mark Allocation

a. **Introduction to River Landforms and Human Interaction (3 marks):**

i. Introduces river landforms and their significance in human geography (1 mark).

ii. Sets the context by briefly mentioning the socio-economic relevance in Ghana (2 marks).

b. **Positive Impacts on Human Activities and Settlement Patterns (5 marks):**

i. Discusses the role of floodplains in agriculture due to fertile soil (2 marks).

ii. Explores benefits to fishing and transportation along rivers (1 mark).

iii. Provides specific examples from rivers in Ghana, such as the Volta River, to illustrate these benefits (2 marks).

c. **Negative Implications for Human Activities (4 marks):**

i. Analyse challenges such as flooding and its impact on settlements (2 marks).

ii. Discusses the risks associated with riverbank erosion and its effects on infrastructure (1 mark).

iii. Uses case studies or examples from Ghana to highlight these issues (1 mark).

d. **Critical Evaluation and Conclusion (3 marks):**

i. Weighs the pros and cons, providing a balanced view of the impact of river landforms (1 mark).

ii. Concludes with a critical assessment of how these challenges can be managed or mitigated in Ghana (1 mark).

iii. Offers suggestions for optimising the benefits while minimising the drawbacks (1 mark).

WEEK 2

Short Answers

Q1

Marking Scheme

- Explanation of the role of vegetation in slope stability (2 marks)
- Explanation of how the removal of vegetation affects slope stability (1 mark)
- Explanation of the role of water as a stabilising factor (1 mark)
- Explanation of the role of water as a destabilising factor (2 marks)

Total: 6 marks

Sample Answer

Vegetation influences mass wasting by stabilising slopes; plant roots bind soil, increasing cohesion and reducing erosion. Trees can anchor slopes, making them less prone to landslides. However, the removal of vegetation through deforestation or wildfires reduces root strength, increasing susceptibility to mass wasting. Water content can stabilise slopes by adding cohesion in small amounts, but it often acts as a destabilising factor. Excess water reduces shear strength by increasing pore pressure, promoting sliding. Heavy rainfall can saturate soils, triggering landslides, while freeze-thaw cycles can weaken rocks, leading to rockfalls.

Q2

Marking Scheme

- Identification of socio-economic impacts (2 marks)
- Explanation of specific examples or case studies (2 marks)
- Analysis of environmental impacts (2 marks)

Total: 6 marks

Sample Answer

Socio-economic impacts of mass wasting include the destruction of infrastructure, such as roads and homes, leading to financial losses and the displacement of communities. For example, landslides in mountainous regions can block transportation routes, affecting trade and access to services. Environmental impacts include the alteration of landscapes, loss of vegetation, and changes in drainage patterns. Mass wasting can also lead to habitat destruction and soil erosion, further impacting ecosystems and biodiversity. These events can disrupt local economies and necessitate costly recovery and mitigation efforts.

Essay Questions

Structure and Mark Allocation

a. **Introduction to Mass Wasting (4 marks)**
   i. Define mass wasting and its significance in landscape evolution (2 marks).
   ii. Briefly introduce the factors influencing mass wasting (2 marks).

b. **Factors Influencing Mass Wasting (9 marks)**
   i. Slope Angle (3 marks):
      - Explain how steep slopes increase gravitational force, leading to mass wasting (2 mark).
      - Provide an example, such as rockfalls on mountain slopes (1 mark).
   ii. Material Composition and Properties (3 marks):
      - Discuss the role of cohesive and loose materials in slope stability (2 marks).
      - Give examples, like clay-rich soils versus sand (1 mark).
   iii. Water Content (3 marks):
      - Describe how water acts as a lubricant, reducing friction and stability (2 marks).
      - Use examples such as landslides post-heavy rainfall (1 mark).

c. **Conclusion (2 marks)**
   i. Summarise the key points on the factors and their interactions (1 mark).
   ii. Highlight the importance of understanding these factors for risk management (1 mark).

WEEK 3

Short Answers

Q1

Marking Scheme

- Explanation of how mass wasting affects agricultural productivity (2 marks)
- Examples illustrating the impact on agriculture (2 marks)
- Analysis of the broader economic implications for local economies (2 marks)

Total: 6 marks

Sample Answer

Mass wasting affects agricultural productivity by stripping away nutrient-rich topsoil or burying farmland under debris, leading to reduced crop yields. For example, in the Ahafo Region, landslides have buried cocoa and plantain farms, threatening food security and income. This decline in agricultural productivity can lead to economic losses for farmers and disrupt local economies dependent on agriculture. The loss of crops affects food supply and can increase prices, impacting both local and national markets.

Q2

Marking Scheme

- Evaluation of the impact on river systems (2 marks)
- Examples of sedimentation and waterway blockage (2 marks)
- Analysis of the effects on aquatic habitats (2 marks)

Total: 6 marks

Sample Answer

Mass wasting increases sediment loads in rivers, leading to siltation that can reduce waterway capacity and cause flooding. For instance, debris flows off the Kwahu escarpment have exacerbated flooding by raising sediment levels in the Volta River tributaries. This sedimentation can degrade aquatic habitats by increasing turbidity and reducing light penetration, which affects plant and fish populations. High sediment loads can also increase nutrient levels, leading to algal blooms and oxygen depletion, further harming aquatic ecosystems.

Q3

Marking Scheme

- Discussion of immediate socio-economic challenges (2 marks)
- Examples illustrating immediate impacts (2 marks)
- Exploration of long-term challenges and examples (2 marks)

Total: 6 marks

Sample Answer

Immediate socio-economic challenges from mass wasting include loss of lives, injuries, and destruction of infrastructure, as seen in the 2019 landslide in Ghana's Eastern Region, which resulted in fatalities and damaged roads. These events disrupt transportation and communication, affecting emergency response and access to services. Long-term challenges include economic

costs of rebuilding and loss of livelihoods, as displaced communities face social dislocation and economic hardship. The 2017 Sierra Leone landslide not only caused over 1,000 deaths but also led to significant economic recovery costs, highlighting the prolonged impact on affected populations.

Essay Questions

Q1

Structure and Mark Allocation

a. **Description of Translational Slides (5 marks)**
   i. Definition and characteristics of translational slides (2 marks)
   ii. Explanation of how they move along a relatively flat slope (2 marks)
   iii. Example of a translational slide (1 mark)

b. **Description of Rotational Slides (5 marks)**
   i. Definition and characteristics of rotational slides (2 marks)
   ii. Explanation of how they occur along a curved slip surface (2 marks)
   iii. Example of a rotational slide (1 mark)

c. **Comparison and Environmental Impact (5 marks)**
   i. Comparative analysis of the two types of slides in terms of movement and slope (3 marks)
   ii. Discussion on potential environmental impacts with examples (2 marks)

Structure and Mark Allocation

a. **Introduction (2 marks)**
   i. Overview of Mass Wasting (1 mark)
      - Define mass wasting and explain its relevance to rural communities.
   ii. Importance of Understanding Socio-Economic Effects (1 mark)
      - Briefly outline the significance of understanding these effects for mitigation and planning.

b. **Socio-Economic Effects (15 marks)**
   i. Impact on Infrastructure (5 marks)
      - Explanation (2 marks)
        - Describe how mass wasting can damage roads, bridges, and buildings, disrupting transportation and communication.
      - Example (3 marks)
        - Provide a specific example, such as a landslide blocking a key road, and discuss the economic impact on trade and daily life.

c. **Effects on Agriculture and Livelihoods (5 marks)**
   i. Explanation (2 marks)
      - Explain how soil erosion and loss of arable land affect agriculture, leading to reduced crop yields and income.

ii. Example (3 marks)

- Use an example of a rural area where mass wasting has led to loss of farmland, illustrating the impact on food security and local economy.

d. **Impact on Community Safety and Health (5 marks)**

i. Explanation (2 marks)

- Discuss how mass wasting poses risks to human life and can lead to injuries or fatalities.
- Explain the psychological and health impacts on affected communities.

ii. Example (3 marks)

- Provide an example of a community affected by a landslide, detailing the immediate and long-term health and safety concerns.

e. **Conclusion (3 marks)**

i. Summary of Key Points (2 marks)

- Summarise the socio-economic effects discussed and their implications for rural communities.

ii. Mitigation and Planning (1 mark)

- Briefly suggest the importance of planning and mitigation strategies to address these challenges.

Additional Considerations

- Clarity and Structure: Responses should be well-organised and clearly articulated.
- Use of Examples: Specific and relevant examples enhance the quality of the response.
- Depth of Analysis: Demonstrating a comprehensive understanding and insightful analysis of the socio-economic effects will result in higher marks.

SECTION 2: MAP READING AND INTERPRETATION

STRAND: NAVIGATING OUR ENVIRONMENT

Sub-Strand: Maps, Their Elements and Analyses

Learning Outcome: *Analyse natural and cultural features on topographical maps based on the knowledge gained from the representation of relief features on maps*

Content Standard: *Demonstrate skills and competencies in interpreting and analysing maps*

INTRODUCTION AND SECTION SUMMARY

This section focuses on map analysis, the identification and interpretation of natural and cultural features on maps. It begins with an examination of natural features such as relief and drainage patterns, highlighting their significance in understanding the physical landscape. Subsequently, it explores cultural features like settlements, farms, and roads, emphasising how human activities are represented spatially. Finally, the section analyses the interrelationships between natural and cultural features, illustrating how physical landscapes influence human settlement patterns and land use.

The weeks and the indicators covered by the section are:

Week 4

- Analyse natural features on maps (e.g. relief, drainage)
- Analyse cultural features on maps (e.g. settlements, farms and roads)

Week 5: Analyse the interrelationships between natural and cultural features on maps.

The section on "Map Reading and Interpretation" in this Year 3 TM builds on the foundational skills and knowledge established in Years 1 and 2 within the "Navigating Our Environment" strand, specifically under the sub-strand "Maps, Their Elements and Analyses." In Year 1, students begin by examining different types of maps, their importance, and map scales (1.2.1.LO.1), as well as methods for representing relief on maps and interpreting contours (1.2.1.LI.1). Year 2 furthers this understanding by focusing on reproducing maps, measuring distances, determining directions and bearings, and drawing cross-sectional profiles (2.2.1.LO.1). The Year 3 curriculum continues this progression by having students analyse natural and cultural features on topographical maps and examine the interrelationships between these features (3.2.1.LO.1 and 3.2.1.LI.3).

SUMMARY OF Pedagogical Exemplars

This section employs activity-based learning to develop learners' map reading and interpretation skills. Learners work in small, culturally diverse groups to describe and analyse natural and cultural features on topographical maps. Through interactive tasks such as think-pair-share, they explore the interrelationships between these features and compare map views with 3D visualisations using Google Earth. Learners also engage in hands-on activities to determine intervisibility and calculate gradients between two points, promoting practical application of geographical skills. These approaches foster collaboration, critical thinking, and inclusivity while enhancing spatial awareness and analytical abilities.

ASSESSMENT SUMMARY

Indicators	DOK Level	*Assessment Strategy and/or Mode*
Week 4 1. Analyse natural features on maps (e.g. relief, drainage) 2. Analyse cultural features on maps (e.g. settlements, farms and roads)	4	Key Assessment (Group Project) • 4 short answer questions with marking scheme • An essay question involving analysis and interpretation of maps with a marking scheme showing structure and mark allocation
Week 5 1. Analyse the interrelationships between natural and cultural features on maps.	4	Key Assessment (Individual Class work/ Homework) • 4 short answer questions with marking scheme • An essay question involving analysis and interpretation of maps with a marking scheme showing structure and mark allocation

Y3 RECAP: Natural/Cultural Features Analysis and Interrelationships	
Year/Focal Areas	Activities/Tasks – can be in groups or pairs or individual
Year 1 Major Relief and Drainage Features of Ghana	1. Identify and discuss relief features of Ghana. 2. Identify and locate on a map the major rivers in Ghana. 3. Discuss social and economic importance of rivers to the people of Ghana. 4. State challenges presented by Ghana's rivers, explaining cause and effect.
Year 1 Maps, Elements, and Analysis	1. Use administrative maps of Ghana to identify and locate administrative regions and towns. 2. Discuss the importance of relief features in agriculture, tourism, and transportation.
Year 1 Interactions Between Physical and Human Activities	1. Examine how relief influences drainage and impacts human activities. 2. Discuss how physical features impact socio-economic development.
Year 2 Relief and Drainage in West Africa	1. Contrast the relief and drainage of Ghana with those of West Africa. Identify major drainage basins and relief features. 2. Summarise the causes of flooding in Ghana.

Year 2 Managing Floods in Ghana	1. Discuss river and relief features that make areas prone to flooding. 2. Explore how physical features influence human activities such as agriculture and settlement.
Year 2 Mountains	1. Identify physical features found in mountains, such as slopes, cliffs, and valleys. 2. Discuss how these features affect the location of settlements

WEEK 4

Learning Indicators

1. *Analyse natural features on maps (e.g. relief, drainage)*
2. *Analyse cultural features on maps (e.g. settlements, farms and roads)*

Focal Area 1: Natural features on topographical maps (e.g. relief, drainage)

Introduction

Topographical maps are essential tools for visualising and understanding the Earth's surface, going beyond simple location to illustrate the physical characteristics of an area. A key aspect of these maps is their representation of natural features, which are the elements of the landscape that exist without human intervention. These features provide crucial information about the environment and its natural processes. On topographical maps, natural features are typically depicted using a combination of symbols, colours, and lines, with relief and drainage being two of the most significant categories.

In topographical mapping, relief features are depicted through various specialised techniques. According to standard geographical practice, cartographers employ multiple methods to represent the Earth's varied terrain, including:

1. **Contour lines:** Continuous lines connecting points of equal elevation that show the three-dimensional terrain on a two-dimensional surface.

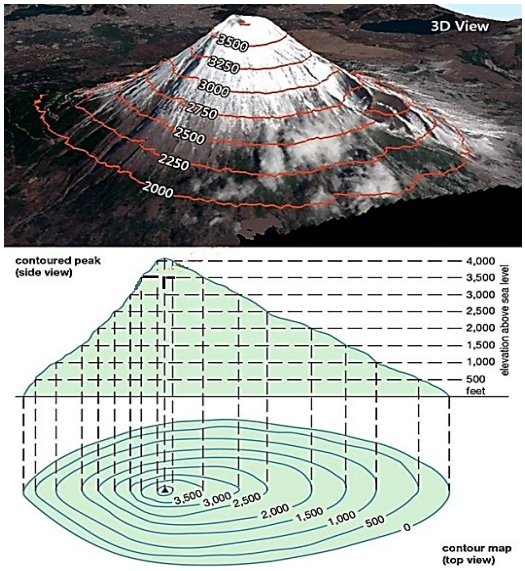


Figure 4.1: *Top, side and 3-D view of contours representing a rounded mountain*

2. **Trigonometrical points:** Precisely surveyed locations with known elevations that serve as reference points
3. **Spot heights:** Specific points with marked elevations that complement contour information
4. **Bench Mark:** It is a point on the ground whose elevation above a known reference datum (often mean sea level) has been precisely measured. On the map itself, a benchmark is typically symbolised by the letters "BM" accompanied by the specific elevation value (e.g., BM 733.5m).

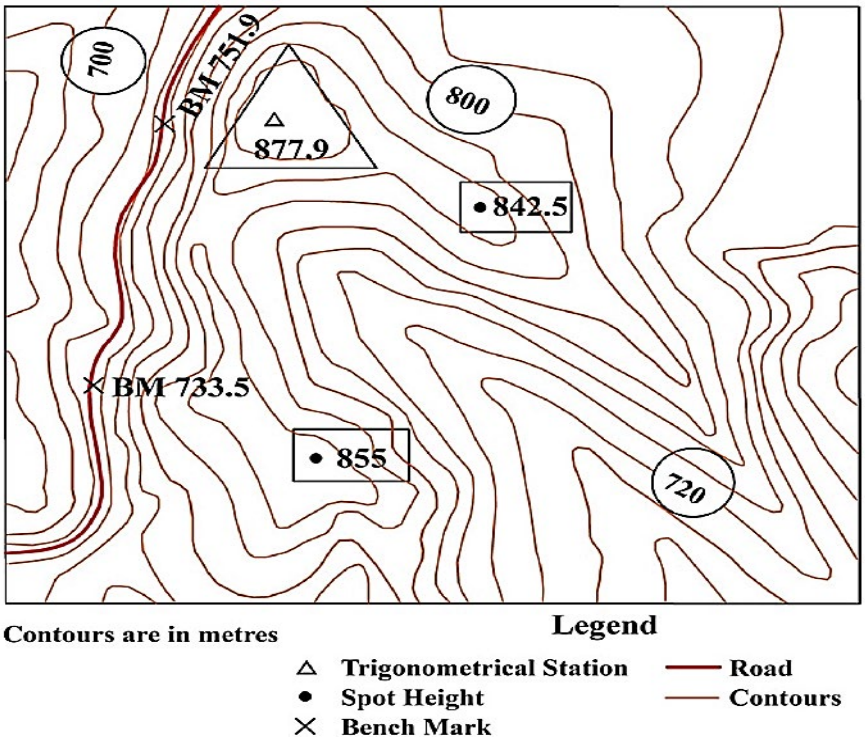


Figure 4.2: *Various methods of representing elevation on topographical map*

Natural features on topographical maps are categorised primarily into relief (landforms) and drainage (water features), each represented through a systematic combination of standardised symbols, colour conventions, and line patterns. These representations allow for comprehensive geographical analysis and interpretation of landscape characteristics.

Analysing Relief Features on Topographical Maps

Topographic maps show relief – the variation in land height – using contour lines and symbols. A contour line connects all points of equal elevation. For example, on a Ghana map, each brown contour might be 100 metres/feet above sea level. Closed loops of contours indicate a hill or mountain (higher values toward the centre). A single point marked with a dot and number (a spot height) gives the exact elevation at that point. A triangle symbol with a number marks a surveyed triangulation (trig) point. When contour lines are very close together, the slope is steep; when they are far apart, the slope is gentle. Flat plains have few or widely spaced lines. For instance, Ghana's coastal plains have gentle relief, while the Ashanti and Kwahu Plateaux in south-central Ghana are higher and hillier (In maps, these plateaux would appear as broad areas of brown shading or many concentric contours surrounded by lower contours.)

Describing Relief Characteristics on Topographical Maps

To effectively describe the relief of a mapped area, it is best to divide it into highlands and lowlands, analysing each separately.

Describing Highland features of Topographical maps

According to geographical standards, there is not a single universal elevation that defines a highland, as classification systems vary across different geographical regions and contexts.

Generally, in geographical terms:

1. Highlands are typically considered to be elevated areas above 600 metres (approximately 2,000 feet) from sea level
2. Some classification systems consider areas above 300 metres (1,000 feet) as uplands or highlands
3. In more mountainous regions, the threshold may be higher, sometimes 1,000 metres (3,300 feet) or more.

In order to effectively describe highland features on topographical maps, the following guidelines should be followed;

1. Identify the types of highlands present, such as ridges, plateaus, and conical hills. From Topographic map Extract A, highlands such as ridges, conical hills, spurs among others could be identified.
2. Describe the general direction of the highlands. For example, the ridge on the map extends from north-east to the southwestern part of the map.
3. State the highest points in the area. For example, the highest point is approximately 1,500 ft, located halfway between ABIRIW and AKROPONG settlements.
4. Comment on the nature of the slopes. For example, the slopes on either side of the central ridge are steep. However, the slopes at the north western corner of the map are fairly gentle.
5. Describe the tops/summits of the highlands. For instance, the ridge has ridged summits whiles whereas several peaks depict flat and rounded summits.
6. Mention areas with special highland features such as saddles/cols, passes, escarpments, knolls and others.
7. Describe valleys in the highland regions, which might be steep, deep, and narrow.
8. Note the characteristics of spurs associated with these valleys. For example, highland spurs might be steep-sided, narrow, and short in height.

Describing Lowland feature of Topographical maps

1. Specify the nature of the lowlands, such as undulating or dissected terrain. For instance, the south-western section of the map might consist of undulating land.
2. Describe the valleys, which are often wide, shallow, and gently sloping in lowland areas.
3. Indicate that lowlands are typically flat or gently sloping.
4. State the lowest and highest points in the lowland region, which approximately 100ft as indicated Topographic map Extract A.
5. Mention any isolated hills or conical hills present in the lowland areas.

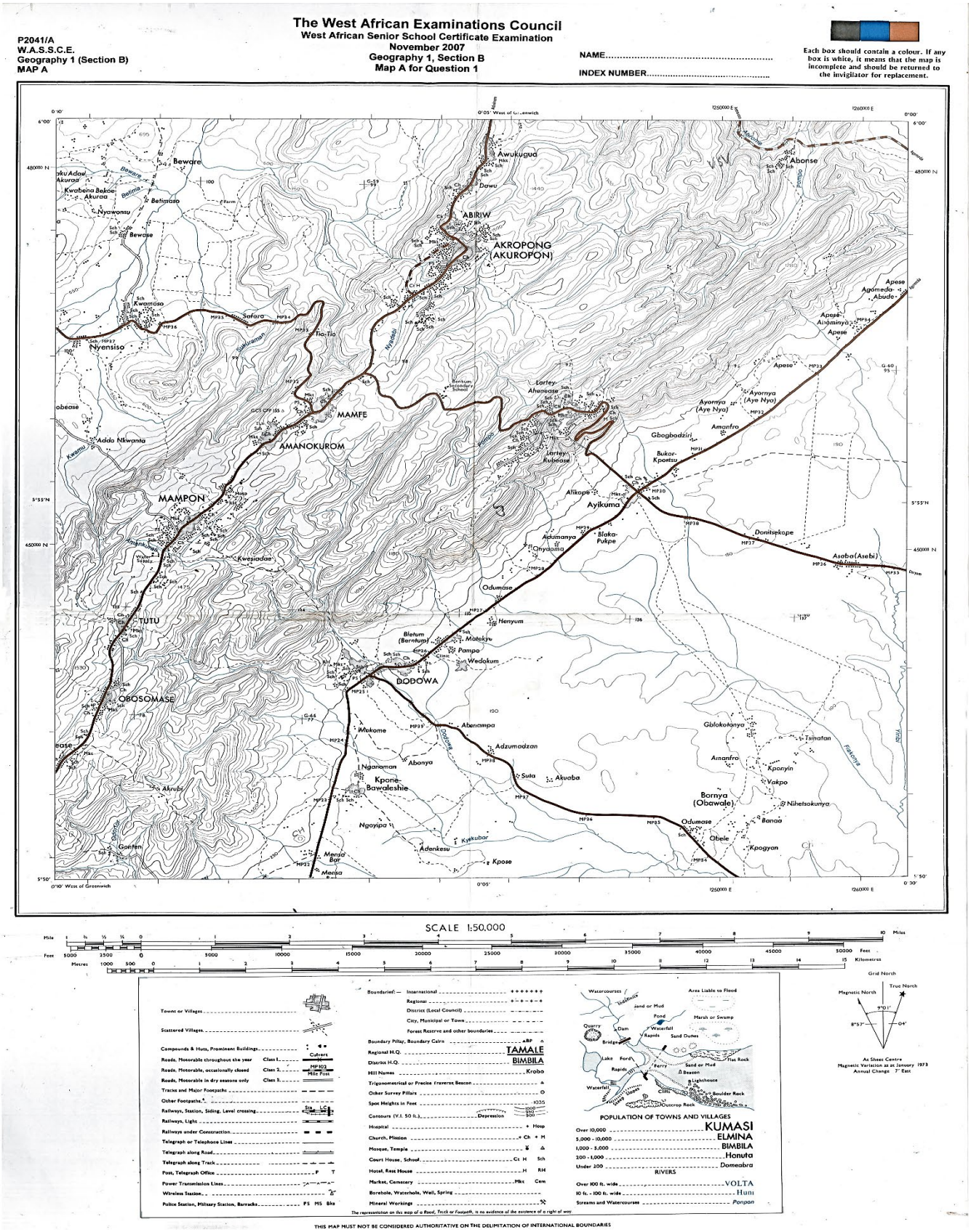


Figure 4.3: *Topo Map Extract of an area in Ghana*

Learning Tasks: "Reading the Land Together"

1. Form small, inclusive groups ensuring each voice is heard and respected.
2. Examine the topographical map quietly for 2 minutes; note contour lines, rivers, hills, and valleys.
3. In your group, take turns naming one natural feature you see and explain how you know (e.g. "Close contour lines mean a steep hill").
4. Mark each feature on a shared sheet or digital copy, using different colours or symbols.
5. Discuss how these features might affect local life (transportation, farming, water supply).
6. Check in with each other: share one thing you learned about maps and one thing you appreciated about your teammate's contribution.
7. Prepare to present three features and your group's reflections on teamwork to the class.

Pedagogical Exemplars

Activity-Based Learning

In small groups of people from different ethnic groups, describe and analyse the natural features on a topographical map

1. Form small groups with learners from different backgrounds to foster diverse perspectives and peer learning.
2. Supply topographical maps and legend guides, ensuring learners understand symbols and features.
3. Offer guiding questions to help groups focus on key natural features, such as rivers, mountains, and valleys.
4. Provide varying levels of guidance based on learners' familiarity with map reading, from basic orientation to advanced analysis.
5. Conduct mini-lessons on interpreting contour lines and map scales to enhance learners' analytical skills.
6. Encourage open dialogue within groups, promoting active listening and respectful sharing of ideas.
7. Provide constructive feedback on group analyses and encourage self-reflection on the activity.
8. Create an inclusive environment where learners feel valued and supported, emphasising empathy and collaboration.
9. Allow groups to present their findings creatively, such as through drawings or models, catering to different learning styles.

Focal Area 2: Cultural features on topographical maps (settlements, farms and roads)

Introduction

Cultural features (also called human-made features) are elements created by people and represented on topographical maps. These include settlements, roads, farms, and other forms of land use. Understanding these features is essential for interpreting how people interact with and modify the natural landscape.

Cultural features are shown on topographical maps using standard symbols and colours, often explained in the map legend. These features help us understand how land is being used for human activities such as living, farming, transportation , and trade. By analysing cultural features, geographers can interpret population distribution, economic activities, and infrastructure development in an area.

Settlement Patterns and Characteristics

Settlements are places where people live. They may vary in size, shape, function, and distribution.

Patterns of Settlement on Maps

Topographical maps show different settlement patterns

Pattern	Description	Map Appearance
Nucleated	Houses/buildings clustered together, usually near roads or rivers	A tight group of black squares or dots
Linear	Settlements arranged in a line, often along a road, river, or railway	A line of dots or squares following a transportation route like a road, rail or a river
Dispersed	Buildings scattered with large distances between them	Widely spread individual dots or small clusters

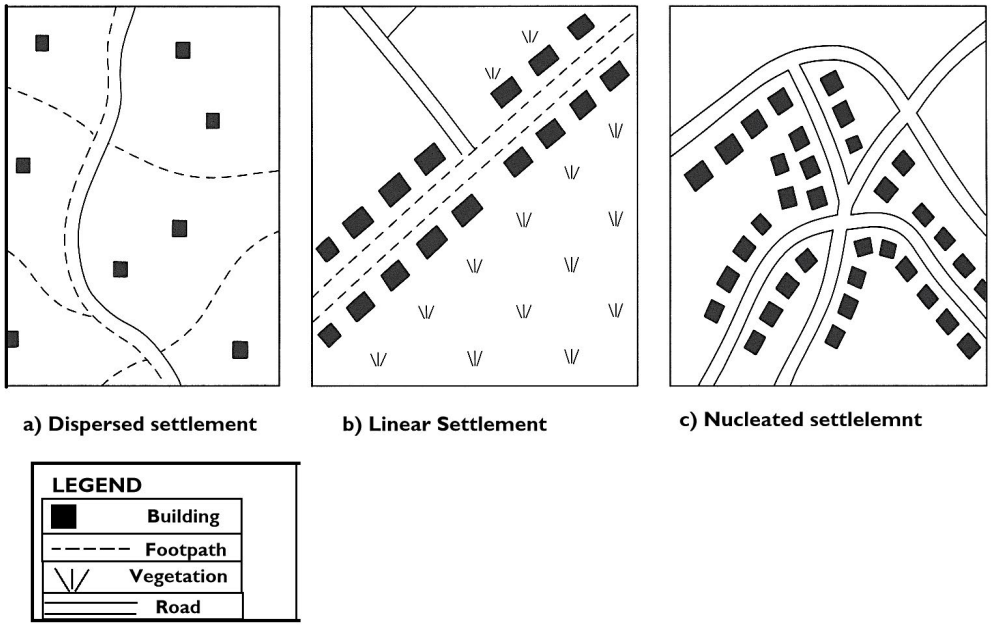


Figure 4.4: *Patterns of settlement of maps*

Describing settlement characteristics on Topographical Maps

1. Comment whether it is an isolated compound, scattered village, built-up area, district capital or administrative capital.
2. Identify the position of the settlement using the grid/coordinate reference
3. Comment on the spatial extent of the settlement (small, medium, large).
4. Describe the layout or pattern (e.g. nucleated, linear, dispersed).
5. Comment on the population size.
6. Note the physical features on which the settlement is located (e.g. valley, hilltop, riverbank).
7. Consider its position relative to other features (e.g. near a road junction, on a river confluence).
8. Identify the functions (e.g. residential, commercial, industrial, mining, agricultural).
9. Observe presence and types of transportation routes (e.g., roads, railways, bridges).
10. Suggest whether it's densely or sparsely populated based on building spacing.

Describing characteristics of farms on Topographical maps

1. Determine the type (e.g. arable, pastoral, mixed farming, plantation).
2. Identify whether the farming is small-scale (subsistence) or large-scale (commercial).
3. Observe and describe the shape and layout of a farm (e.g. regular, irregular, strip fields).
4. Note the proximity of farms to settlements (e.g. isolated farmsteads or clustered villages).
5. Examine how the landscape (flat or hilly) and water sources (rivers, streams) support farming.
6. Identify natural vegetation or cleared land that suggests farming activity.
7. Look for symbols or shading indicating cultivated land, orchards, plantations, or pasture.
8. Identify dams, ponds or wells that may support farming in dry areas.
9. Check the presence of roads or tracks linking farms to markets or settlements.
10. Based on vegetation and land use, infer suitable soils or climatic conditions for farming.

Describing characteristics of roads (or other routes) on Topographical maps

1. Identify different types of roads such as Class 1, Class 2, and Class 3 roads. These are often distinguished by varying line symbols and thickness.

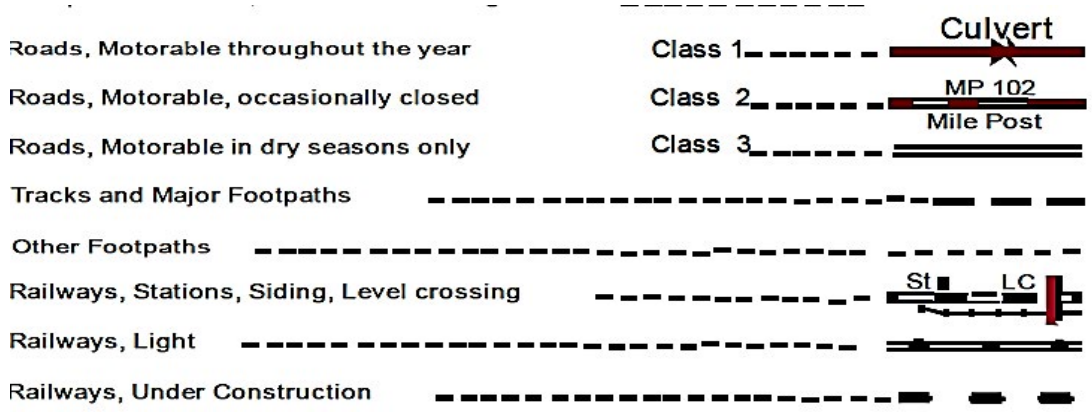


Figure 4.5: *Forms of routes*

2. Observe the layout and pattern of the roads, which could indicate urban planning, connectivity, and accessibility.
3. Note where roads intersect or merge, forming junctions, nodes or roundabouts. These are crucial for understanding traffic flow and navigation.
4. Steepness of roads can be inferred from contour lines. Roads running parallel to closely spaced contour lines indicate steep gradients.
5. Identify any symbols denoting bridges or tunnels, which indicate road continuity across physical barriers like rivers or mountains.
6. Roads might be marked with nearby landmarks such as schools, churches, or rivers, providing context to their location.
7. Assess the scale of the map to understand the distance and real-world length of the roads.
8. Always refer to the map's legend to accurately interpret road symbols and colours used.

Learning Tasks: Mapping Our Cultural/Human-made features

1. Form groups of 4-5 learners, ensuring diverse backgrounds within each group.
2. Receive a topographical map showcasing various cultural features (e.g., settlements, farms and roads).
3. As a group, collaboratively identify and circle at least five different cultural features on your map.
4. For each circled feature, discuss and write down one sentence describing its significance and one sentence explaining how it reflects the human interaction with the environment in that area. (Think: "What story does this feature tell us about people and the land?")
5. Prepare to share one of your group's identified features and its "story" with the whole class.
6. Listen actively and respectfully as other groups share, offering one positive comment or question after each presentation.

Pedagogical Exemplars

Activity-Based Learning

In small groups of people from different ethnic groups, describe and analyse the cultural features on a topographical map

1. Arrange learners into small groups with members from different ethnic backgrounds to promote inclusivity and diverse perspectives.
2. Provide topographical maps and a list of cultural features such as settlements, roads, and landmarks to guide learners' analysis.
3. Use guiding questions and graphic organisers to help learners focus on identifying and analysing cultural features on the map.
4. Offer various levels of assistance, such as vocabulary lists and simplified instructions, to accommodate learners with different intellectual abilities.

5. Conduct workshops on map reading and interpretation skills to ensure all learners have the foundational knowledge needed for analysis.
6. Set clear expectations for group dynamics, emphasising the importance of respecting equality, inclusivity, and diversity.
7. Provide constructive feedback on group analyses and encourage learners to reflect on their findings and group interactions.
8. Create a supportive environment that fosters empathy, active listening, and appreciation for diverse viewpoints.
9. Allow groups to present their analyses creatively, through posters or digital presentations, catering to different expression styles.

Key Assessment: Group Project

Short Answer Questions

1. A topographical map shows a major road running parallel to a river in a wide valley, while another road in a nearby mountainous area has numerous sharp bends (switchbacks). Analyse the relationship between the relief and drainage features and the likely reasons for the design of these two roads.
2. A new large settlement is planned for an area shown on a topographical map. One proposed location is on a wide, flat lowland plain next to a major river. A second location is on the top of a broad, isolated plateau. Critically evaluate the suitability of both locations for settlement development, explaining one major advantage and one major challenge for each.
3. Imagine you are analysing a topographical map to advise a commercial farming enterprise. The map shows two potential sites: Site A is a gently sloping lowland area with several streams, while Site B is a highland area with very closely spaced contour lines. Justify which site you would recommend and explain the potential problems the enterprise might face at the site you rejected.
4. Critique the effectiveness of using only contour lines to represent the relief of a varied landscape that includes both a broad, flat-topped hill and a narrow, steep-sided valley. Explain how incorporating spot heights would provide a more complete and accurate depiction of this landscape.

HINT

Assign Group Project to learners and give them reasonable time to complete it. Use the SS App to generate the project as well as the rubric. Learners' projects should be marked immediately and scores entered into the SAP.

Group Project

1. Study the Map extract below (Figure 4.6) and use it to answer the questions that follow. [Total 25 marks] **(DoK 4)**

Note for Editors

Please do not enlarge or reduced the map below. It should be maintained as it is. Thank you

TOPOGRAPHIC MAP EXTRACT SHOWING METHODIST GIRLS' HIGH SCHOOL, MAMFE

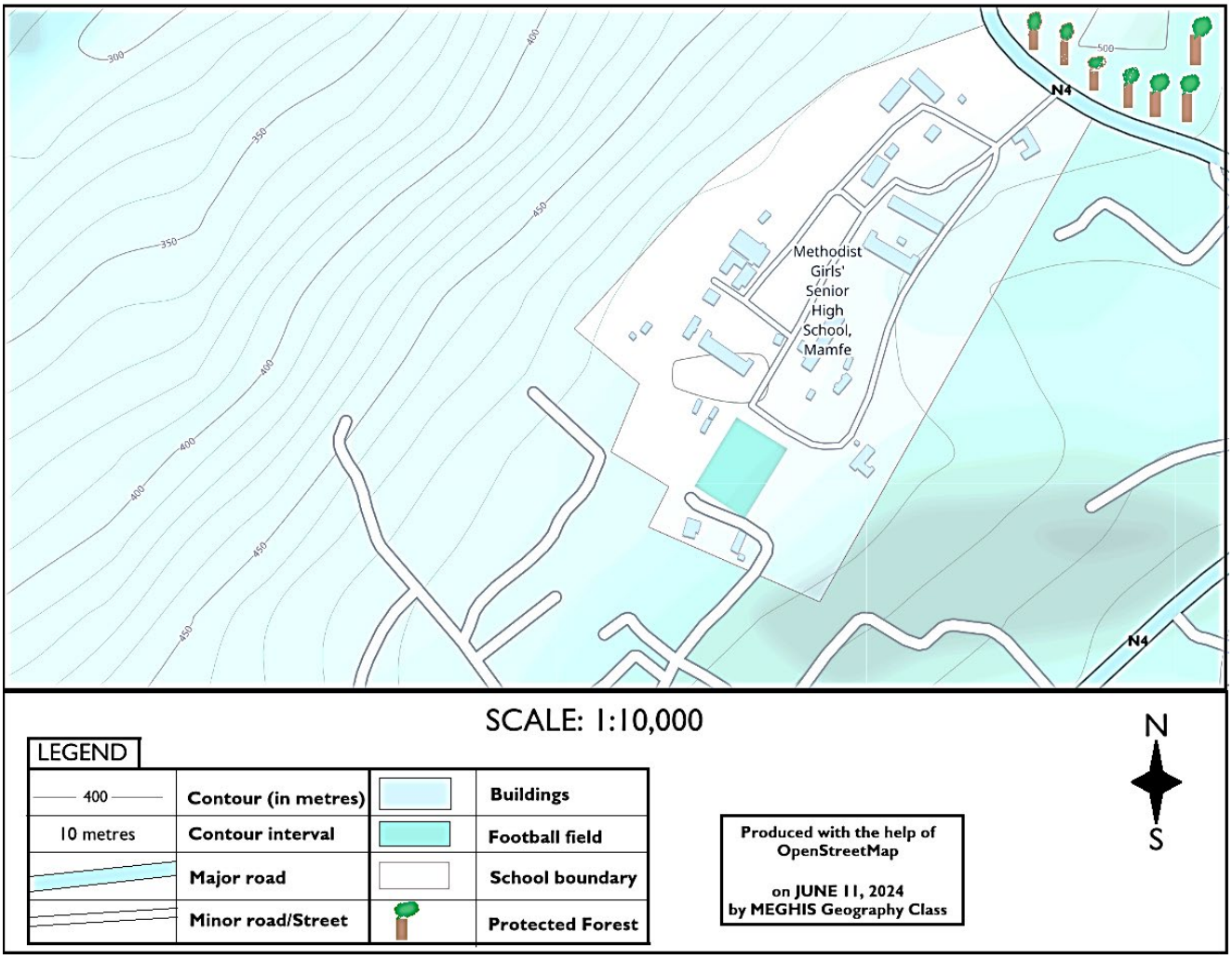


Figure 4.6: *Topo Map Extract highlighting Methodists Girls' High School, Mamfe*

a. Using a large plane Manila card, draw a new outline of the map to a scale of 1:2,500. Show working on how the scale factor was calculated. [5 marks]

b. On your new outline, insert and name;

   i. the entire boundary of Methodist Girls' High School and its minor streets [2 marks]

   ii. the entire area of the football field [2 marks]

   iii. the **N4** Major roads [2 marks]

   iv. any two index contours [2 marks]

   v. the Protected Forest [2 marks]

Note

Provide a legend for the above features inserted on your new map and show the Compass direction in order to be awarded full marks for (b)

c. Identify one natural feature on the map and its functions [2 marks]

d. Identify three cultural features, each with its functions [6 marks]

e. Assuming that you are a hiking group, you have two choices to walk on foot to the centre of the school compound, starting from two different points (that is, Point A, the north-western corner of the map and Point B, the south-eastern **corner** of the map). Which point will your hiking group choose to walk to the centre of the school? Give a reason for your choice. [2 marks] **(DoK 4)**

Structure and Mark Allocation

a. **Drawing the New Outline of the Map [5 marks]**

i. Scale Calculation (2 marks):

- Correct calculation of the scale factor (1 mark)
- Clear and logical working shown (1 mark)

ii. Outline Accuracy (3 marks):

- Correct dimensions and proportions of the map outline (2 marks)
- Neatness and clarity of the drawn outline (1 mark)

b. **Insertion and Naming of Features on the New Outline [10 marks total]**

i. Boundary of Methodist Girls' High School and Minor Streets [2 marks]:

- Accurate placement and naming (1 mark)
- Clear depiction of minor streets (1 mark)

ii. Area of the Football Field [2 marks]:

- Correct placement and naming (1 mark)
- Accuracy in scale representation (1 mark)

iii. N4 Major Roads [2 marks]:

- Accurate placement (1 mark)
- Proper naming (1 mark)

iv. Index Contours [2 marks]:

- Identification of two correct index contours (1 mark)
- Proper labelling (1 mark)

v. Protected Forest [2 marks]:

- Correct depiction and naming (1 mark)
- Accuracy in boundary representation (1 mark)

vi. Legend and Compass Direction [2 marks]

- Comprehensive and clear legend for all inserted features [1 mark]
- Correct placement and orientation of compass direction [1 mark]

c. **Identification and Function of Natural Feature [2 marks]**

i. Naming of a correct natural feature [1 mark]

ii. Function Explanation [1 mark]

d. **Identification and Function of Cultural Features [6 marks]**

i. Three Correct Cultural Features [3 marks]

ii. Function Explanation for Each Feature [3 marks]

e. **Hiking Route Decision [2 marks]**

i. Choice Justification [1 mark]:

- Logical and reasoned choice of starting point

ii. Supporting Reason [1 mark]:

- Clear explanation supporting the decision

Instructions for marking

1. Allow partial credit for near-correct features or explanations that demonstrate understanding (this could be a half mark, but needs to be justified to the learner)
2. Consider neatness and clarity of the presentation as a minor factor in awarding marks.
3. Evaluate group collaboration based on observation of the group dynamics and contribution.

PLC Session 4

45 minutes | **Planning & Reviewing the Learning Plan**

1. Begin the session by recapping lessons from the previous session, focusing on how learning was applied.
2. Use your subject specific app to explore the content before planning. Ask the app to
   a. explain the week's concepts in a practical way that will make it easier for learners to understand.
   b. identify three common misconceptions learners may have on the week's content and how to address them using contexts familiar to Ghanaian learners (NTS 3a, 3g and 3m).
3. Use your subject specific app to plan your lesson. Ask the app to
   a. suggest the most effective method for teaching the week's concepts to learners with diverse backgrounds.
   b. suggest learning activities, differentiation and essential questions based on the method of teaching (NTS 3a-3q).
   c. review your prepared learning plan and address any challenging issues you may have identified in your subject area (NTS 3a-3c).

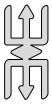
Note

- *Take note of the recap topics linked to Years 1 and 2 while preparing for your lesson.*
- *Refer to the Values Learning Community Handbook and link the values for the week in your lesson to ensure that learners are applying what they learn.*

4. Use your app to plan and administer the mode of assessment for the Student Assessment Portal (SAP)
   a. The key assessment for the week is ***group project***. Chat with your app to plan this assessment by reviewing or developing the assessment items/tasks and marking schemes/rubrics for the group project (NTS 3k-3q).

10 minutes Content Exploration

5. As a subject group, select one problem or topic/idea/term in the week's content that is challenging (not a routine procedural question, but one that requires conceptual understanding) and then
   a. use the app, ask it to solve the problem step by step and explain the reasoning behind each step (you may be assisted by a teacher who is strong in the content area)
   b. all teachers in the group work through the problem individually for 3–4 minutes
   c. the group then works through it together the problem, step by step
   d. highlight the most common errors made at each step (NTS 1c, 1e, 2c, 2e, 3e-3j).



Note

- *This part is not 'How do I teach this?' but how do I teach it for learners to understand?*
- *If the group still shares the same content gap, use the app: ask it to solve the problem step by step and explain the reasoning behind each step.*
- *Problems/ideas discussed should be sourced from the Teacher Manual content, not invented separately. This keeps the content exploration directly connected to what teachers will deliver.*

30 minutes Enactment

6. Enact a teaching activity based on your learning plan (NTS la-1b, 1e-lg, 2c, 2e, 2f, 3c-3j and 3o).
   a. Colleagues observe with specific attention to clarity of concept explanation, use of familiar Ghanaian examples and how misconceptions are handled if they arise.
   b. After the enactment, ask for structured feedback from the group
      i. was the concept explained in a way that a learner with no prior knowledge could follow?
      ii. were the examples grounded in contexts familiar to Ghanaian learners?
      iii. did any misconceptions surface and if so, how were they addressed?

5 minutes Reflection

7. Reflect and share your views on the session. One thing that worked well, what did not work well and what you will do differently. (NTS 1a, 1b).
8. Identify a critical friend to observe and provide feedback on your lesson in relation to the PLC Session conducted (NTS 1f, 1g).
9. Remember to
   a. transfer your chats into your learning planner template.
   b. read your Teacher Manual and related Learner Material in preparation for the next session. Take note of the recap weeks, which are linked to Years 1 and 2 (NTS 3a).
   c. integrate National Values, GESI, SEL, and 21st century skills into your learning activities, assessment tasks, and rubrics/mark schemes.

WEEK 5

Learning Indicator: *Analyse the interrelationships between natural and cultural features on maps*

Focal Area: Interrelationship between natural and cultural features on topographical maps

Introduction

Topographical maps provide detailed, accurate representations of the Earth's surface, showing both natural features (such as rivers, mountains, and valleys) and cultural features (such as roads, settlements, and farmlands). Understanding the interrelationship between these features is essential for interpreting how humans interact with the physical environment and how the environment influences human activities.

Natural Features are physical features of the Earth's surface formed by natural processes. Examples include:

1. Relief (hills, valleys, plateaus and plains)
2. Water bodies (rivers and streams, lakes, wetlands)
3. Vegetation (forests, grasslands/savannah)

Cultural Features are human-inducedor human-influenced features. Examples include:

1. Settlements (villages, towns, cities)
2. Roads, (railways, footpaths, bridges)
3. Farmlands and plantations
4. Dams and irrigation schemes

How to Analyse Interrelationships on Topographic Maps

1. **Relief and Settlement**
   a. Settlements often develop in lowland, flat well-drained plains or gentle slope areas because they are easier to build on and support agriculture, transportation, and infrastructure.
   b. Steep slopes or mountainous areas may have sparse settlements or be avoided altogether due to their rugged nature, risk of landslides, soil erosion, and difficulty in construction and transportation.
   c. Plateaus may support larger settlements due to their accessibility, relatively flat terrain, and stable ground which favour expansion and urban development.
   d. Valleys often attract linear settlements along river courses due to fertile soils, water availability, and relatively flat terrain. These areas may also serve as natural transportation routes.
   e. Ridges and escarpments may act as barriers to settlement expansion and transportation. Settlements may be located at the base or foot of such features where conditions are less harsh.
   f. Settlement density often decreases with increasing elevation, as higher altitudes generally have thinner soils, colder temperatures, and greater exposure to wind.

g. Natural terraces on slopes may be used for housing or small-scale farming, especially in densely populated or hilly areas, showing adaptation to relief.

h. Cliff or rugged coastlines are usually sparsely settled, whereas flat coastal plains support denser settlement due to easy access and trade opportunities.

i. Defensive settlements in history were often located on elevated areas (hilltops) for military advantage, and some may still exist today due to cultural heritage.

2. **Drainage and Human Activities**

a. Rivers and streams often attract settlements, agriculture, and roads due to the availability of water for domestic use, irrigation, and livestock.

b. Irrigated farming may be found along river valleys, especially in dry areas, indicating human dependence on natural water sources.

c. Bridges show interaction between transportation routes and water bodies, often constructed at narrow crossing points or where terrain allows.

d. Settlements are usually located on elevated ground near rivers, rather than directly on the floodplain, to avoid flooding while still accessing water.

e. River confluences may host larger settlements due to increased access to water and fertile land and historically served as trade centres.

f. Artificial drainage features such as canals, reservoirs, or dams may be visible, showing how humans modify natural drainage for agriculture, water storage, or hydroelectric power.

g. Wetlands or marshy areas are often avoided for settlement due to flooding risk, but may be used for fishing, rice cultivation, or conservation purposes.

h. Water bodies like lakes and rivers may support recreational activities, fishing, and tourism, indicated by facilities or access roads on the map.

i. Drainage patterns can influence road layout—roads may follow river courses in valleys (parallel) or avoid wide rivers by making detours to narrower crossing points.

j. Drainage networks may serve as natural boundaries between administrative areas, farms, or communities.

3. **Vegetation and Human Use**

a. Cleared forest areas may indicate agricultural or settlement expansion, showing how humans modify vegetation to create space for development.

b. Forest reserves may limit settlement or farming, indicating areas set aside for conservation, biodiversity, or environmental protection.

c. Some roads avoid dense forests, showing how vegetation can influence transportation planning due to difficulty in clearing or environmental regulations.

d. Plantation areas (e.g. cocoa, rubber, oil palm) may be identified by specific symbols or field patterns, reflecting economic use of natural vegetation.

e. Scattered trees or savanna vegetation may support pastoralism or extensive livestock grazing, especially in semi-arid zones.

f. Forests near rivers may be preserved for watershed protection, limiting nearby human activity to reduce erosion and maintain water quality.

g. Deforestation patterns may indicate timber extraction or charcoal burning, reflecting commercial or domestic use of forest resources.

h. Regrowth areas or secondary forests may suggest areas of former human activity that have been abandoned or allowed to regenerate.

i. Vegetation cover can affect settlement density—areas with dense forest are usually sparsely populated compared to open grassland or shrubland areas.

j. Vegetation may serve as windbreaks or natural buffers around farms and settlements, especially in exposed or dry areas.

k. Sacred groves or culturally protected vegetation zones may exist in traditional communities, indicating spiritual or cultural significance tied to vegetation.

4. **Transportation and Relief**

a. Roads and railways are usually constructed to avoid steep slopes or rugged terrain, as steep gradients increase construction costs and reduce efficiency.

b. Routes may follow valley floors or passes between hills, taking advantage of gentler slopes and natural corridors for easier movement.

c. Tunnels or winding roads suggest adaptations to challenging relief, particularly in mountainous or hilly areas.

d. Contour lines that cross at right angles indicate steep climbs, while roads that run parallel to contours follow gentler slopes or flat terrain.

e. Switchbacks or zigzag road patterns indicate transportation infrastructure adapting to steep inclines, commonly seen in highland areas.

f. Gaps or interruptions in road or rail networks may suggest barriers caused by cliffs, escarpments, or deep river valleys.

g. Bridges and cuttings (excavated sections) show human engineering solutions to overcome natural relief barriers.

h. Sparse or absent roads in mountainous regions often indicate inaccessibility due to rugged topography.

i. Transportation density is usually higher in lowland and gently undulating areas, where construction is easier and movement is more efficient.

j. Transportation lines converging at specific lowland points may reflect a natural relief feature like a valley junction that serves as a transportation hub.

k. Relief influences the straightness of roads, e.g. roads in flat areas tend to be straight, while those in hilly terrain are more curved or winding.

Methodology for Analysing Interrelationships between natural and cultural features on Topographical Maps

Understanding the connection between natural and cultural features on topographic maps involves a systematic approach. Learners must be trained to observe, interpret, and draw meaningful conclusions from spatial relationships shown on the map. The following detailed steps guide this process:

1. **Identify Natural Features**

Begin by examining the physical elements represented on the topographic map. These may include:

a. **Relief features**: Use contour lines to identify landforms such as hills, valleys, ridges, escarpments, plateaus, and depressions.
b. **Drainage features**: Look for rivers, streams, lakes, and marshes. Assess their pattern (e.g., dendritic, radial) and flow direction.
c. **Vegetation**: Identify forests, savanna, plantations, or scrublands, often represented with specific shading or symbols.
d. **Other features**: Such as rock outcrops, swamps, and wetlands.

Purpose: This step helps learners understand the physical environment and how it may influence or restrict human activities.

2. **Identify Cultural (Human-made) Features**

Next, locate human-made elements on the map, which may include:

a. **Settlements**: Towns, villages, or scattered buildings; observe their shape (nucleated, linear, dispersed).
b. **Transportation networks**: Roads, railways, bridges, tracks.
c. **Farming and land use**: Identifiable by patterns of cleared land, field boundaries, or symbols indicating plantations.
d. **Public infrastructure**: Schools, churches, markets, health centres, water tanks, or airstrips.

Purpose: Recognising these features allows the learner to analyse how people have modified or adapted to the natural landscape.

3. **Observe Proximity and Spatial Relationship**

This step involves analysing how close or distant cultural features are in relation to natural ones:

a. Are settlements near rivers or far from them?
b. Do roads follow the valleys or avoid steep hills?
c. Are farmlands located on flat plains or terraces?
d. Are there settlements close to forest reserves or distant from wetlands?

Purpose: Understanding spatial proximity reveals how humans take advantage of or avoid certain natural features due to environmental suitability or risk.

4. **Look for Patterns and Distribution Types**

Identify spatial patterns and relate them to physical conditions:

a. Linear patterns: Settlements or roads along rivers, coastlines, or valleys.
b. Dispersed patterns: Scattered buildings often in agricultural or highland regions.
c. Nucleated patterns: Clusters of buildings at road junctions or in flat, fertile valleys.
d. Transportation patterns: Roads circling around hills, radiating from central settlements, or concentrating in accessible lowlands.

Purpose: Recognising patterns helps infer how natural conditions such as relief, drainage, and vegetation guide human location choices and activities.

5. **Draw Conclusions (Interpret and Explain)**

Using observations from previous steps, learners should now draw logical conclusions about the interrelationships between the features:

a. Relief influences settlement location: Most settlements lie on flat or gently sloping land due to ease of construction and transportation.
b. Drainage supports farming and settlement: Rivers supply water for irrigation and domestic use.
c. Vegetation affects accessibility and land use: Dense forests may be cleared for farming; roads may avoid thick vegetation.
d. Human activity alters natural features: Forests are cleared for farmland, river courses are altered for irrigation, or hills are terraced for housing or farming.

Encourage learners to justify their interpretations with map evidence, such as contour values, symbols, distance measurements, and grid references.

Table 5.1: *Nature of relationship between natural and cultural features*

Natural Feature	Cultural Feature	Nature of Relationship
River	Settlement, farmland	River provides water for domestic use and irrigation
Hill	Sparse settlement	Steep terrain limits building and accessibility
Flat land	Dense farmland	Suitable for mechanised and subsistence farming
Forest	Logging road, cleared fields	Human use of vegetation for economic activity
Wetland	No development	Conservation or unsuitability for building



Figure 5.1: *Map Skills*

Learning Tasks: Where Nature Meets Culture

1. Form groups of 4-5 learners, ensuring diverse backgrounds within each group.
2. Carefully examine your assigned topographical map.
3. As a team, identify and list at least three natural features (e.g., rivers, mountains, valleys) and three cultural features (e.g., roads, settlements, farmlands).
4. Discuss within your group: How do these natural and cultural features influence each other? For example, does a river affect where a town is built? Does a road follow a valley?
5. Share one example of an interrelationship you've identified with another group.
6. Each member names one strength they saw in a teammate and one feeling they had while collaborating.

Pedagogical Exemplars

Activity-Based Learning

In small groups of people from different ethnic groups, describe and analyse the interrelationships of natural and cultural features on a topographical map.

1. Arrange learners into small groups with members from different ethnic backgrounds to promote inclusivity and diverse perspectives.
2. Provide topographical maps and access to digital tools like Google Earth to help learners identify and analyse natural and cultural features.
3. Use guiding questions and graphic organisers to help learners focus on the interrelationships between natural and cultural features on the map.
4. Offer varying levels of assistance, such as simplified instructions or vocabulary lists, to accommodate learners with different intellectual abilities.
5. Conduct workshops on map reading and interpretation skills to ensure all learners have the foundational knowledge needed for analysis.
6. Provide clear instructions and promote respectful dialogue within groups, emphasising the importance of listening to diverse viewpoints.
7. Offer constructive feedback on group analyses and encourage learners to reflect on their findings and group interactions.
8. Foster a supportive environment that emphasises empathy, active listening, and appreciation for diverse perspectives.
9. Allow groups to present their analyses creatively, through posters or digital presentations, catering to different expression styles.

Key Assessment Level 4: Individual Classwork

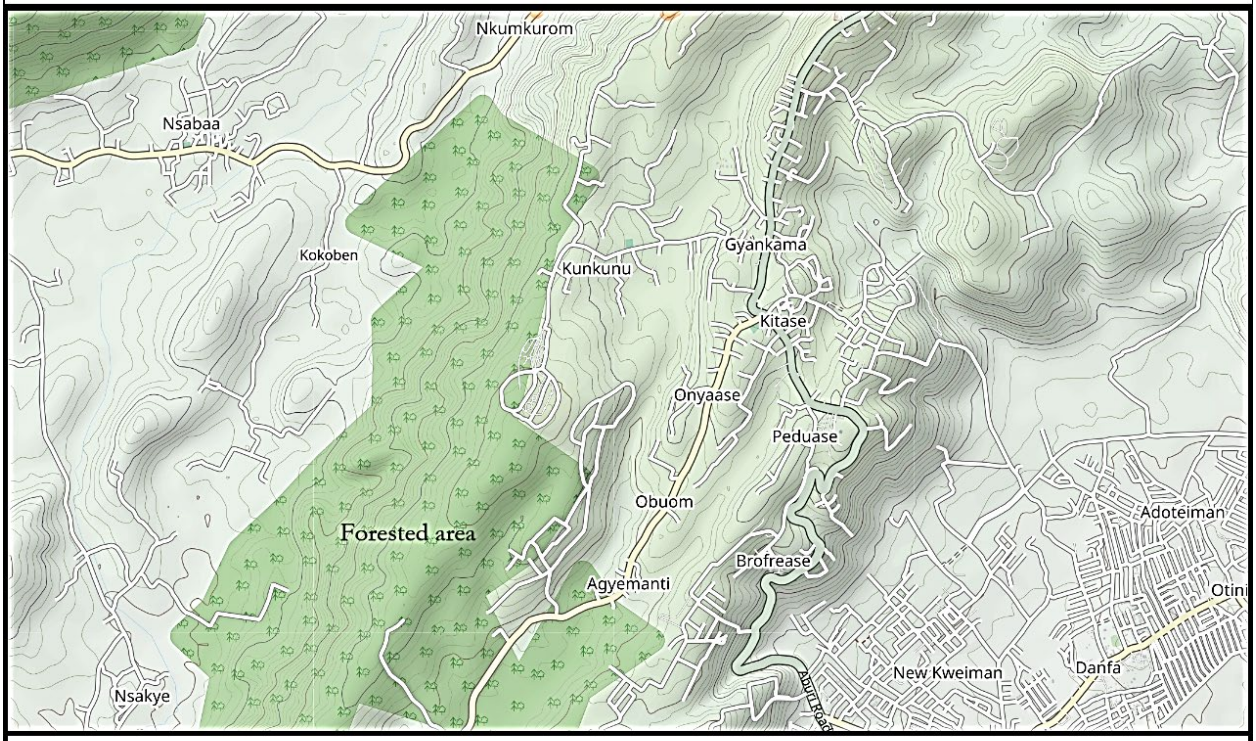
Short Answer Questions

1. Explain two main reasons why human settlements are often located near rivers as seen on topographical maps.

2. Using your knowledge of topographical maps, explain how the arrangement of contour lines influences the path a road takes through a hilly region.
3. Classify the following features as either 'Natural' or 'Cultural': River, Road, Forest, Bridge. For each feature, provide a simple reason for your classification.
4. Describe the settlement pattern that is most likely to develop in a narrow river valley and explain why this pattern occurs.

Essay Question

MAP EXTRAACT SHOWING SOME PARTS OF AKUAPEM RIDGE



1. Study the map extract and analyse how the relief and drainage of the mapped area have influenced the road network and settlement pattern.

[Total 15 marks] **(DoK 4)**

PLC Session 5

45 minutes | **Planning & Reviewing the Learning Plan**

1. Begin the session by recapping lessons from the previous year/session/week, focusing on how learning was applied.
2. Use your subject specific app to explore the content before planning. Ask the app to
   a. explain the week's concepts in a practical way that will make it easier for learners to understand

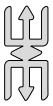
b. identify two or three common misconceptions learners may have on the week's content and how to address them using contexts familiar to Ghanaian learners. (NTS 3a, 3g and 3m).

3. Use your subject specific app to plan your lesson. Ask the app to

   a. suggest the most effective method for teaching the week's concepts to learners with diverse backgrounds.

   b. suggest learning activities, differentiation and essential questions based on the method of teaching (NTS 3a-3q)

   c. review your prepared learning plan and address any challenging issues you may have identified in your subject area (NTS 3a-3c).



Note

- *Take note of the recap topics linked to Years 1 and 2 while preparing for your lesson.*
- *Refer to the Values Learning Community Handbook and link the values for the week in your lesson to ensure that learners are applying what they learn.*

4. Plan the week's key assessment with your app

   a. The key assessment for the week is ***individual classwork***. Chat with your app to plan this assessment, indicating what you and your learners will do before, during and after the classwork (NTS 3k-3q).

10 minutes **Content Exploration**

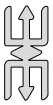
5. As a subject group, select one problem or idea/term in the week's content that is challenging (not a routine procedural question, but one that requires conceptual understanding) and then

   a. use the app, ask it to solve the problem step by step and explain the reasoning behind each step (you may be assisted by a teacher who is strong in the content area)

   b. all teachers in the group work through a similar problem individually for 3–4 minutes

   c. the group then works through the problem together step by step

   d. highlight the most common errors made at each step and discuss (NTS 1c, 1e, 2c, 2e, 3e-3j).



Note

- *This part is not just about 'How do I teach this?' but how do I teach it for learners to understand?*
- *If the group still shares the same content gap, use the app: ask it to solve the problem step by step and explain the reasoning behind each step.*
- *Problems/ideas discussed should be sourced from the Teacher Manual content, not invented separately. This keeps the content exploration directly connected to what teachers will deliver.*

30 minutes **Enactment**

6. Enact a teaching activity based on your learning plan (NTS la-1b, 1e-lg, 2c, 2e, 2f, 3c-3j and 3o).

a. Colleagues observe with specific attention to clarity of concept explanation, use of familiar Ghanaian examples and how misconceptions are handled if they arise.

b. After the enactment, ask for structured feedback from the group

i. was the concept explained in a way that a learner with no prior knowledge could follow?

ii. were the examples grounded in contexts familiar to Ghanaian learners?

iii. did any misconceptions surface and if so, how were they addressed?

5 minutes **Reflection**

7. Reflect and share your views on the session. One thing that worked well, what did not work well and what you will do differently. (NTS 1a, 1b).
8. Identify a critical friend to observe and provide feedback on your lesson in relation to the PLC Session conducted (NTS 1f, 1g).
9. Remember to

a. transfer your chats into your learning planner template.

b. read your Teacher Manual and related Learner Material in preparation for the next session. Take note of the recap weeks, which are linked to Years 1 and 2 (NTS 3a).

c. integrate National Values, GESI, SEL, and 21st century skills into your learning activities, assessment tasks, and rubrics/mark schemes.

Section 2 Review

The section delved into the essential map analysis skills, focusing on interpreting both natural and cultural features. It examined natural features and cultural features, and their spatial organisation and distribution. A key focus was on understanding the interrelationships between natural and cultural features, recognising how physical landscapes influence settlement patterns and how human activities, such as transportation networks, adapt to terrain features.

Additional Resources

Textbooks and Publications

1. Anderson, K. & Ryan, B. (2020) *Topographic map interpretation and analysis.*
2. Bierman, P. R. & Montgomery, D. R. (2020) *Key concepts in geomorphology.* 2nd edn.
3. Gregory, K. J. (2019) *The basics of geomorphology: Key concepts.*
4. Monkhouse, F. J. & Wilkinson, H. R. (2016) *Maps and diagrams: Their compilation and construction*. Reprinted edn.
5. Murphy, B. & Hall, T. (2021) *Geographical skills and fieldwork for GCSE and A-level.*
6. Robinson, A. H. (1995) *Elements of cartography.* 7th edn.
7. Wilson, J. P. & Fotheringham, A. S. (eds.) (2018) *The SAGE handbook of GIS and society.*

· Maps and Digital Tools

1. Topographical maps
2. Google Earth for comparing map views with 3D visualisations

MARKING SCHEMES FOR THE KEY ASSESSMENTS

WEEK 4

Q1

Marking Scheme

- Analysis of Valley Road (3 marks):
  - Identifies that the road runs parallel to the river in the valley, following a path of gentle relief. (1 mark)
  - Explains that this path follows a gentle gradient, making construction easier, cheaper, and travel more efficient. (2 marks)
- Analysis of Mountain Road (3 marks):
  - Identifies that the sharp bends are a design feature to navigate the steep terrain shown by closely spaced contour lines. (1 mark)
  - Explains that this design reduces the steepness of the climb by increasing the road's length, making it possible for vehicles to ascend or descend the mountain safely. (2 marks)

Total: 6 marks

Sample Answer

The road in the wide valley runs parallel to the river because this is the easiest and most efficient path. Valleys provide natural corridors with gentle slopes, which are cheaper to build on and allow for faster travel.

Conversely, the road in the mountainous area has numerous sharp bends to manage or avoid the steep gradient. Steep slopes are shown by closely spaced contour lines, and building a straight road up such a slope would be too steep for vehicles. The bends increase the length of the road, which reduces the overall gradient and makes the climb manageable and safe.

Q1

Marking Scheme

- Evaluation of Lowland Plain (3 marks):
  - Advantage: Identifies ease of construction due to flat terrain and excellent access to water from the river for domestic, agricultural, and transportation use. (1 mark)
  - Challenge: Identifies the significant risk of flooding due to its low-lying position next to the river. (2 marks)
- Evaluation of Plateau (3 marks)
  - Advantage: Identifies that the relatively flat terrain on the plateau is good for construction and expansion, and its elevated position may offer defensive benefits. (1 mark)
  - Challenge: Identifies the difficulty and high cost of building transportation routes (roads) up the steep slopes and potential challenges with securing a reliable water supply at a high elevation. (2 marks)

Total: 6 marks

Sample Answer

The lowland plain offers the advantage of being flat, which makes the construction of buildings and infrastructure easier and less costly. Its proximity to the river provides a crucial source of water for domestic use and irrigation. However, the major challenge is the high risk of flooding, as settlements on floodplains are vulnerable during heavy rains.

The plateau offers the advantage of a stable, flat surface for building and expansion, and its elevated position provides natural defence. The primary challenge would be accessibility; constructing roads and other infrastructure up the steep escarpment would be difficult and expensive, and sourcing a reliable water supply could also be problematic at that altitude.

Q3

Marking Scheme

- Recommendation and Justification (3 marks):
  - o Recommends Site A (the lowland area). (1 mark)
  - o Justifies the choice by explaining that the gentle slopes are suitable for using farm machinery and the streams provide a reliable water source for irrigation, which supports large-scale farming. (2 marks)
- Analysis of Rejected Site (3 marks):
  - o Identifies that Site B has steep slopes, as indicated by the closely spaced contour lines. (1 mark)
  - o Explains that this steep terrain is difficult for machinery, highly prone to soil erosion, and makes transportation of farm inputs and produce difficult and expensive. (2 marks)

Total: 6 marks

Sample Answer

I would recommend Site A for the commercial farming enterprise. Its gently sloping lowland terrain is ideal for large-scale agriculture because it allows for the easy use of machinery and is less prone to erosion. The presence of several streams is a major advantage, ensuring a consistent water supply for irrigation.

I would advise against Site B. The closely spaced contour lines indicate a steep and rugged terrain. The potential problems here are significant: the steep slopes would make it difficult to use modern farm machinery, increase the risk of severe soil erosion during rainfall, and make it very difficult to construct access roads for transporting goods, ultimately hindering profitability.

Q4

Marking Scheme

- Critique of Using Only Contour Lines (4 marks):
  - o Explains that on the broad, flat-topped hill, contours would be very far apart or absent, failing to show minor but important variations in height. (2 marks)
  - o Explains that in the narrow, steep-sided valley, the contour lines would be so close together they might merge on the map, making it difficult to read and interpret the valley's true depth and shape. (2 marks)

- Explanation of Incorporating Spot Heights (4 marks):
    - o Explains that a spot height could mark the exact elevation on the flat top of the hill, providing precise information where contours are not useful. (2 marks)
    - o Explains that spot heights can also mark the exact elevation at the bottom of the valley, giving a clear indication of its depth, which is hard to determine from merged contour lines alone. (2 marks)

Total: 8 marks

Sample Answer

Using only contour lines would be ineffective for this landscape. On the broad, flat-topped hill, the contours would be very widely spaced, giving the impression of perfectly flat land and failing to show any subtle changes in elevation. In the narrow, steep-sided valley, the contours would be extremely close together, potentially merging into a single thick line, which would make the map look cluttered and difficult to interpret the valley's depth.

Incorporating spot heights would provide a more complete and accurate depiction. A spot height could be placed on the plateau to show its exact maximum elevation, which the contours fail to do. Similarly, a spot height placed at the bottom of the narrow valley would provide the precise elevation of the valley floor, allowing a map user to accurately calculate the valley's depth, which is crucial information that the clustered contours would obscure.

WEEK 5

Short Answer Questions

Q1

Marking Scheme

- Reason 1 (2 marks): 1 mark for identifying a valid reason (e.g., water supply) and 1 mark for a brief explanation.
- Reason 2 (2 marks): 1 mark for identifying a second valid reason (e.g., fertile land/ transportation) and 1 mark for a brief explanation.

Total: 4 marks

Sample Answer

- Source of Water: Rivers provide a reliable source of water, which is essential for domestic use (drinking, cooking), irrigation for farming, and for livestock.
- Fertile Land and Transportation: River valleys often have fertile soils deposited by the river, which are excellent for agriculture. They also provide relatively flat terrain that can serve as a natural transportation route.

Q2

Marking Scheme

- Identifies that closely spaced contours indicate steep slopes. (1 mark)
- Explains that roads will avoid crossing closely packed contours at right angles. (2 marks)
- Explains that roads in hilly areas are often designed to be winding or run parallel to the contours to maintain a gentle gradient, making them easier and safer to travel. (2 marks)

Total: 5 marks

Sample Answer

The arrangement of contour lines directly influences a road's path in a hilly region. Closely spaced contour lines indicate a steep slope, while widely spaced lines show a gentle slope. To avoid a climb that is too steep, roads are constructed to curve and wind, often running parallel to the contour lines. This design creates a gentler, more gradual route up the hill, even though it makes the road longer, which is a necessary adaptation to the challenging relief.

Q3

Marking Scheme

- Award 1 mark for each correct classification. (4 marks total)
- Award 1 mark for each correct reason. (4 marks total)

Total: 8 marks

Sample Answer

- River: Natural feature. It is a physical feature of the Earth's surface formed by natural processes, not by humans.
- Road: Cultural feature. It is a human-caused or human-influenced feature built for transportation.
- Forest: Natural feature. It is a form of vegetation that exists as part of the physical environment without human creation.
- Bridge: Cultural feature. It is a structure built by humans to overcome a natural barrier like a river, facilitating transportation

Q4

Marking Scheme

- Correctly identifies the settlement pattern as Linear. (2 marks)
- Explains that this pattern occurs because buildings (houses, farms) are constructed in a line along the river to maximise access to water, fertile land, or the transportation route provided by the valley floor. (2 marks)

Total: 4 marks

Sample Answer

The settlement pattern most likely to develop in a narrow river valley is a linear pattern. This occurs because the physical shape of the valley restricts development. Settlements are built in a line following the course of the river to ensure access to water for domestic and agricultural use, take advantage of the fertile soils on the valley floor, and utilise the valley as a natural transportation corridor.

Essay Questions

Marking Scheme

Section 1: Identifying Relevant Physical and Man-Made Features (5 marks)

- **2 marks**: Identifying key physical features such as hills, valleys, rivers, and elevation changes.
- **2 marks**: Identifying human-caused features, including roads, settlements, and infrastructure.
- **1 mark**: Noting how relief (e.g., steep slopes, flat plains) is visually represented on the map (e.g., contour lines, shading).

Section 2: Analysing Relationships Between Relief and Human Features (5 marks)

- **2 marks**: Explaining how relief has influenced road placement (e.g., roads following river valley floors, avoiding steep slopes).
- **2 marks**: Describing how relief affects settlement distribution (e.g., towns in flatter areas, sparsely populated highland areas).
- **1 mark**: Linking relief to transportation challenges or benefits (e.g., accessibility, elevation, flood risk).

Section 3: Evaluating the Importance of Relief and Topography (5 marks)

- **2 marks**: Judging the significance of relief in shaping land use and human activity.
- **2 marks**: Considering additional factors such as historical development, economic needs, or agricultural suitability.
- **1 mark**: Offering a reasoned conclusion about the overall impact of relief and drainage on the settlement and road network.

SECTION 3: POPULATION STUDIES IN GHANA

STRAND: HUMAN AND ENVIRONMENT

Sub-Strand: Physical Setting and People

Weeks 6 and 7

Learning Outcome: *Using the knowledge gained in the physical environment, analyse population growth and distribution, migration trends and settlement types in Ghana*

Content Standard: *Demonstrate understanding of population growth and distribution, migration trends and settlement types in Ghana*

Week 8

Learning Outcome: *Compare Ghana's population growth and migration trends to Africa and the world.*

Content Standard: *Analyse the population growth and migration trends in Africa and the world*

INTRODUCTION AND SECTION SUMMARY

This section provides a comprehensive analysis of population growth, distribution, and migration patterns, highlighting how demographic changes shape settlement types and spatial organisation. It begins by examining population growth trends and their spatial distribution across rural and urban areas, emphasising regional variations. Key factors influencing population changes—including birth rates, economic opportunities, and government policies—are explored to understand their impact on migration and settlement patterns. The section also discusses migration trends, focusing on rural-urban migration, internal displacement, and international movements, and how these trends reshape communities. Finally, a comparative analysis of Ghana's population growth relative to African and global trends offers insights into broader demographic shifts, underscoring the implications for national development, resource management, and policy planning.

The weeks and the indicators covered by the section are:

Week 6:

- Examine population growth and distribution in Ghana
- Discuss factors influencing population growth, population distribution and migration in Ghana

Week 7: Discuss migration trends, settlement types and patterns in Ghana

Week 8:

- Compare Ghana's population growth to that of Africa and the world
- Explore the socio-economic implications of migration from Africa to the rest of the world

The section on "Population Studies in Ghana" in this Year 3 TM builds upon the foundation laid in Year 1 and Year 2 within the "Human and Environment" strand, specifically under the sub-strand "Physical Setting and People." In Year 1, students begin by examining the physical environment of Ghana, including its relief, drainage, climate, vegetation, and soils, along with their socio-economic importance (1.3.1.LO.1). This foundational knowledge is crucial for understanding population dynamics as it relates to geographic and environmental factors. Year 2 extends this understanding by comparing and contrasting Ghana's physical geography with that of West Africa and Africa (2.3.1.LO.1), setting the stage for more complex analyses in Year 3. The Year 3 curriculum continues this exploration by focusing on population growth, distribution, migration trends, and settlement types in Ghana (3.3.1.LO.1), and comparing these dynamics to trends in Africa and the world (3.3.1.CS.2).

SUMMARY OF Pedagogical Exemplars

This section integrates diverse, learner-centred pedagogies to develop geographic skills and understanding of population and settlement patterns. Activity-based learning is used to engage learners in analysing natural and cultural features on topographical maps, calculating gradients and intervisibility, and sketching migration maps. Think-pair-share and talk-for-learning strategies promote critical discussion on spatial relationships and population dynamics. Collaborative and group learning foster teamwork as learners analyse population growth, distribution, and density using multimedia resources. Experiential learning allows learners to compare Ghana's population trends with those of Africa and the world, while inquiry-based learning encourages independent research into migration and its socio-economic implications. All pedagogies are designed to be inclusive, culturally responsive, and promote critical thinking and active participation.

ASSESSMENT SUMMARY

Indicators	DOK Level	Assessment Strategy and/or Mode
Week 6 1. Examine population growth and distribution in Ghana 2. Discuss factors influencing population growth, population distribution and migration in Ghana	4	Key Assessments Mid-Semester Examination Group Work • 3 short answer questions with marking scheme • 2 essay questions with discussion and case study sections with a detailed marking scheme showing structure and marks allocation
Week 7 1. Discuss migration trends, settlement types and patterns in Ghana	3	Key Assessments (Individual class/ homework) • 4 short answer questions with marking scheme • 2 essay questions with discussion and map drawing sections with a detailed marking scheme showing structure and marks allocation

Week 8 1. Compare Ghana's population growth to that of Africa and the world 2. Explore the socio-economic implications of migration from Africa to the rest of the world	3	Key Assessments (Individual/Group Assignment/Work) • 4 short answer questions with marking scheme • 2 essay questions with analysis evaluation sections with a detailed marking scheme showing structure and mark allocation

Y3 RECAP: Population Growth, Distribution, and Migration in Ghana	
YEAR/TOPIC	**Activities/Tasks – can be in groups or pairs or individual**
Year 1: Physical Settings and People	1. Draw the outline map of Ghana and describe the location and size. 2. Discuss the implications of Ghana's size for its population and resources.
Year 2: Population Dynamics	1. Use pictures and videos to explain population growth, distribution, and density. 2. Distinguish between population growth, distribution, and density in Ghana.
Year 1: Socio-economic Impacts of Physical Features	1. Identify and discuss how physical features influence human activities and settlements. 2. Use maps to identify and discuss population distribution and migration patterns.
Year 2: Migration Trends and Settlement Patterns	1. Discuss factors influencing population growth and migration in Ghana. 2. Explore settlement patterns that are the direct result of migration, for example country to country, rural to urban, causes: push/pull factors AND opposite flows, urban to rural, causes: incentives and reasons using a range of examples on a local/ global scale.
Year 1: Human Settlements and Distribution	1. Use maps to identify different settlement types and patterns. 2. Discuss the socio-economic implications of different settlement patterns.

WEEK 6

Learning Indicators

1. *Examine population growth and distribution in Ghana*
2. *Discuss factors influencing population growth, population distribution and migration in Ghana*

Focal Area 1: Population Growth and Distribution in Ghana

Introduction

The population of a country is the total number of people who live within its geographical boundaries at a specific point in time. Population growth and distribution are critical aspects of geography that influence many facets of a country's development. In Ghana, understanding these concepts helps us appreciate the dynamics of human settlements, resource utilisation, and developmental planning.

Population Growth in Ghana

Population growth refers to the increase in the number of people in a particular area over time expressed as a rate (percentage).

Since its first official census in 1960, Ghana's population has experienced consistent and accelerating growth. Beginning at 6.7 million, the population surged to 30.8 million by 2021, marking a fourfold increase over 61 years. The most dramatic expansion occurred after 1984, when the population more than doubled from 12.3 million to 30.8 million by 2021. This period saw a sharp rise in annual population growth, reflecting broader demographic and socioeconomic trends (GSS, 2021).

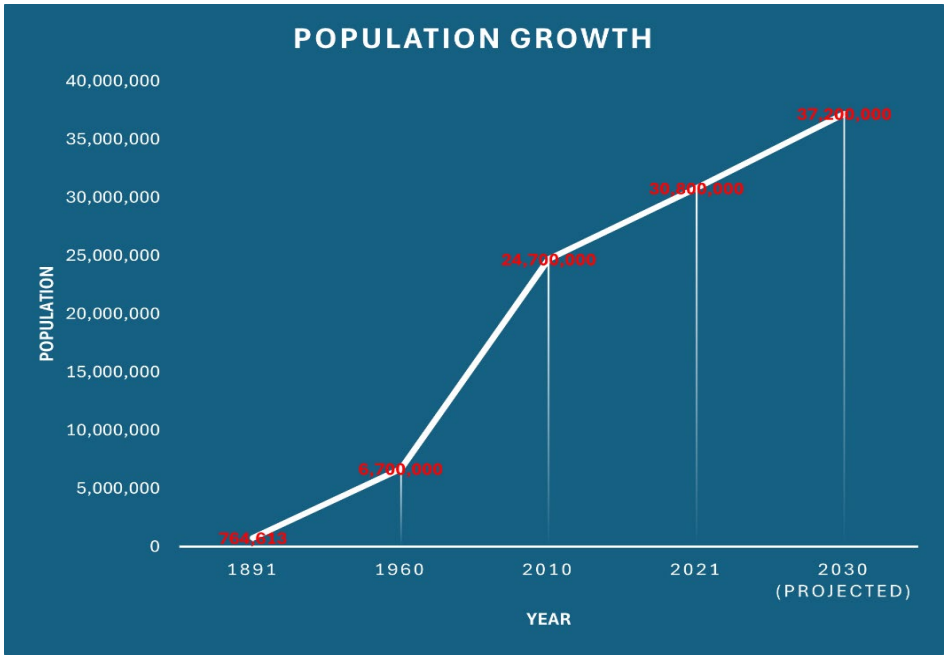


Figure 6.1: *Line graph showing Ghana's population growth for the past, present and future*

Figure 6.1 illustrates Ghana's population growth from 1891 with historical data points and a projection for 2030. It clearly shows a dramatic increase in population over the period. Starting from a relatively low 764,613 in 1891, the population grew to 6.7 million by 1960. The pace of growth accelerated significantly in the following decades, reaching 24.7 million in 2010 and 30.8 million in 2021. The

graph projects this upward trend to continue, with an estimated population of 37.2 million by 2030. The steepening slope of the line indicates an increasing rate of population growth, highlighting the rapid demographic changes Ghana has experienced and is expected to continue undergoing.

Population Distribution in Ghana

Population distribution refers to how people are spread across a specific area. It is influenced by physical geography (climate, soils, water), economic opportunities, infrastructure and historical settlement patterns. Since natural resources and economic opportunities are not fairly distributed across the spatial dimension of Ghana, people are not evenly distributed across the land. As a consequence, some areas are densely populated while others are sparsely populated.

Population density is a measurement that indicates the number of people living per unit area of land, typically expressed as people per square kilometre or square mile. It provides insight into how crowded or spacious an area is, helping to understand settlement patterns and resource distribution.

For example, if a region has a high population density, it means that a large number of people live in a relatively small area, usually seen in urban cities. Conversely, a low population density suggests that people are spread out over a larger area, which is common in rural regions. Population density is a crucial factor in planning for infrastructure, services, and resource management.

General Spatial Pattern

1. **Densely Populated Areas**
    a. Coastal Areas: The regions along the coast, particularly the Greater Accra Region and parts of the Central and Western Regions, are densely populated. This is due to historical factors related to trade, administration, and economic opportunities, especially in the major cities.
    b. Ashanti Region: This region, with Kumasi as its capital, is also a highly populated area due to its rich history, economic activities (including trade and industry), and fertile agricultural lands.
    c. Major Cities: Besides Accra and Kumasi, other significant urban centres like Sekondi-Takoradi, Cape Coast, and Tamale also have high population densities compared to the national average. The Greater Accra Metropolitan Area, including Accra and Tema, stands out with the highest population density.
2. **Sparsely Populated Areas**
    a. Northern Regions: The Savannah, North East, and Upper West Regions generally have lower population densities. This is often attributed to factors such as lower rainfall, different agricultural practices, and historical patterns of settlement.
    b. Ahafo Region: This is currently the least populous region in Ghana and, consequently, has a lower population density.
    c. Bono East Region: While not the least populous, it also tends to have a sparser population distribution compared to the southern regions.
    d. Oti and Volta Regions: Certain parts of these regions, particularly away from the main towns and cities, are also sparsely populated.

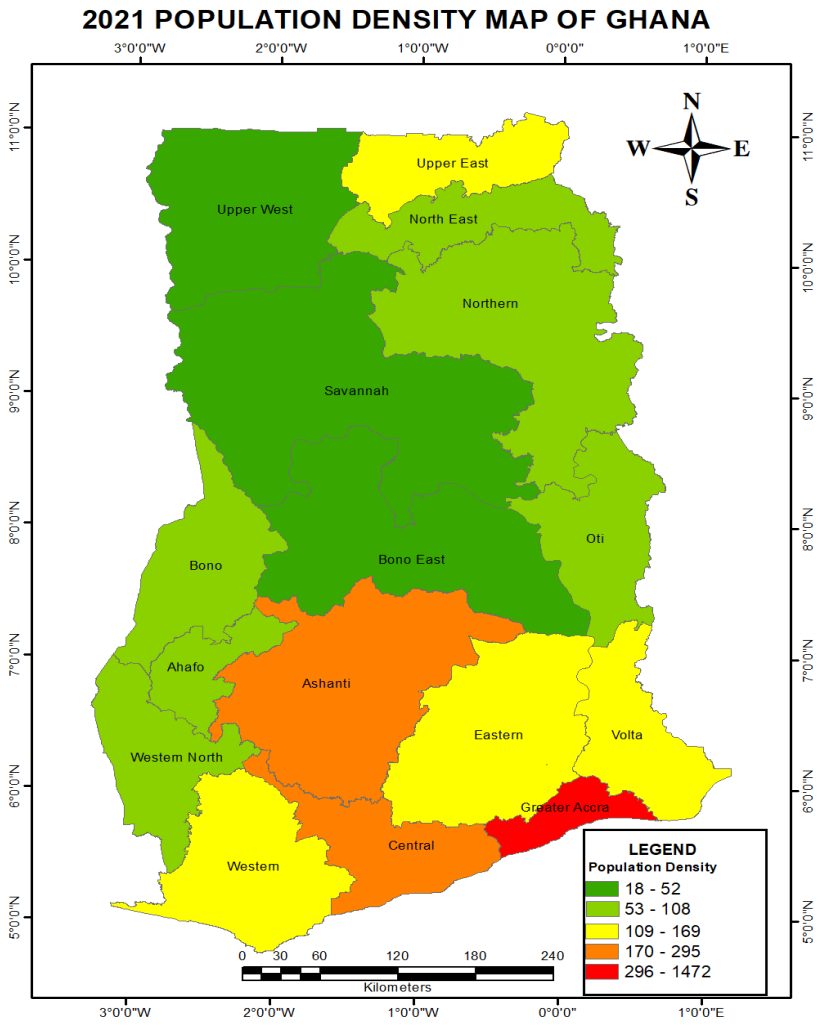


Figure 6.2: *2021 population density map of Ghana*

Distinguish between population growth, distribution and density

Population Growth

a. **Definition**: The change in the size of a population over time, expressed either as an absolute number or as a rate (e.g. 2.3 % per annum).

b. **Focus**: Temporal—how the total number of people increases (natural increase and net migration).

c. **Example**: Ghana's population grew from about 6 million in 1960 to over 33 million in 2024, at roughly 2.2 % per year.

Population Distribution

a. **Definition**: The pattern or arrangement of where people live across a given area (e.g. regions of a country).

b. **Focus**: Spatial—where people are located and how they are clustered or dispersed.

c. **Example**: In Ghana, most people live in southern and forest–coastal regions (Greater Accra, Ashanti), while northern savannah zones are sparsely settled.

Population Density

a. **Definition**: The number of people per unit area, usually expressed as persons per square kilometre (people/km²).

b. **Formula:**

c. **Focus**: Quantitative measure of how crowded or spacious an area is.

d. **Example**: Greater Accra has a density of over 1,200 people/km², whereas the Savannah Region has fewer than 20 people/km².

Key Distinction

Table 6.1: *Key distinctions among population growth, distribution and density*

Aspect	Population Growth	Population Distribution	Population Density
What it measures	Change in total numbers over time	Location and pattern of settlement	Number of people in a given area
Dimension	Temporal	Spatial	Spatial quantitative
Units	People or % per year	Descriptive (regions, urban/rural)	People per km²
Use in planning	Projection of future needs	Identifying service gaps & migration flows	Assessing overcrowding or underuse

Learning Tasks

"Population Patterns in Focus"

1. In small, mixed-ability groups, assign roles (researcher, note-taker, presenter, encourager).
2. Watch a short video and examine pictures showing different regions' population growth, distribution, and density.
3. In your group, take turns to point out:
   a. One example of area or region with rapid population growth
   b. One area of high/low population density
   c. One pattern of population distribution (urban vs rural)
4. On printed photos or screenshots, label each trend with brief notes.
5. Write one sentence per trend describing:
   a. What you observe (e.g. "The city skyline shows urban density.")
   b. Why it happens (e.g. "People move here for jobs.")
6. Each member shares one thing they learnt and one positive feeling about teamwork.
7. Present your annotated image and one SEL insight in a 2-minute group showcase.

"Population Puzzle"

1. In small, mixed-background groups, assign roles (reader, recorder, presenter, connector).
2. Each person writes a simple definition for population growth, distribution, and density.
3. Take turns reading your definitions; together, refine into one clear sentence for each term.
4. On a sheet or digital slide, draw three columns labelled Growth, Distribution, and Density. Write your agreed definitions at the top.
5. Under each column, list one local or global example (e.g. rapid city expansion, mountain village clusters, crowded markets).
6. Use simple symbols or colours to highlight differences (e.g. arrows for growth, dots for distribution, grid for density).
7. Each member names one strength they saw in a teammate's idea and one positive feeling about working together.
8. Share your chart and SEL reflection in a 2-minute group showcase.

Pedagogical Exemplars

Groupwork

With the aid of pictures and videos, work in groups to explain population growth, distribution and density

1. Organise learners into small groups with diverse ethnic and intellectual backgrounds to ensure inclusivity and varied perspectives.
2. Provide pictures, videos, and infographics that illustrate population growth, distribution, and density to support visual learning.
3. Use guiding questions to help groups focus on key concepts and encourage critical thinking about population dynamics.
4. Offer differentiated materials and assistance, such as simplified texts or advanced data analysis tasks, to accommodate varying intellectual abilities.
5. Facilitate workshops on interpreting demographic data and using visual aids effectively to enhance learners' analytical skills.
6. Promote effective communication and collaboration within groups, emphasising respectful dialogue and valuing all contributions.
7. Provide constructive feedback on group explanations and encourage learners to reflect on their learning process and interpersonal skills.
8. Foster a supportive environment where empathy, active listening, and appreciation for diverse viewpoints are emphasised to enhance social-emotional learning.
9. Allow groups to creatively present their explanations, using digital presentations or role-plays, accommodating different learning styles and expressi*ons.*

Collaborative Learning

Distinguish between population growth, distribution and density.

1. Form mixed-ability and mixed-ethnicity groups to encourage collaboration and exposure to diverse perspectives.
2. Use pictures and videos to visually support learners' understanding of population growth, distribution, and density.
3. Provide clear guidelines and differentiated prompts to help groups focus on distinguishing between the concepts of population growth, distribution, and density.
4. Offer tailored support such as one-on-one guidance, additional resources, or modified tasks to cater to varied intellectual abilities.
5. Conduct workshops on interpreting demographic data to enhance learners' analytical skills.
6. Set clear expectations for group dynamics, emphasising respect, open-mindedness, and valuing diverse contributions.
7. Provide constructive feedback on group discussions and encourage learners to reflect on their learning experiences and group interactions.
8. Foster an environment that promotes empathy, active listening, and respectful dialogue, enhancing social-emotional learning.
9. Allow groups to present their findings creatively, using verbal, written, or digital formats, accommodating different expression styles.
10. Teach techniques like mindfulness strategies and self-talk to help learners manage emotional reactions and behaviours.

Focal Area 2: Factors influencing population growth and population distribution in Ghana

Factors Influencing Population Growth in Ghana

Ghana's population has grown significantly from 6.7 million in 1960 to approximately 33 million in 2024, with an annual growth rate of about 2.23% (GSS, 2024). The rapid growth is driven by a combination of demographic, social, economic, and environmental factors. The key factors influencing population growth in Ghana include the following:

a. **High Fertility Rates**

The Total Fertility Rate (TFR), which refers to the average number of children a woman is expected to give birth to, is about 3.66 (GSS, 2024). The Crude Birth Rate (CBR) on the other hand is 28.55 births per 1,000 population, reflecting a high rate of natural increase.

Factors Influencing High Fertility Rate:

i. **Cultural Norms**: In many Ghanaian communities, large families are valued as a sign of prosperity and social status. Traditional beliefs often emphasise the importance of children for lineage continuity and economic support in old age, particularly in rural areas.

ii. **Limited Access to Family Planning:** Despite improvements, access to contraception and family planning education remains uneven, particularly in rural regions. The 2014 Ghana

Demographic and Health Survey reported that modern contraceptive use was about 22% among all women and approximately 27% among currently married women, contributing to sustained relatively high fertility levels. Demographics of Ghana - Wikipedia.

iii. **Early Marriage and Childbearing**: Early marriage is common, particularly in northern regions, leading to longer reproductive periods. The median age at first birth is around 20 years, contributing to higher fertility rates.

iv. **Education Levels**: Lower female education levels, especially in rural areas, correlate with higher fertility. Women with secondary or higher education tend to have fewer children, but educational access remains a challenge in some regions.

b. **Declining Mortality Rates**

Improvements in healthcare and living conditions have significantly reduced mortality rates, contributing to population growth by increasing the number of people surviving to reproductive age. The Crude Death Rate (CDR) fell from 19.0 per 1,000 in 1960 to 7.5 in 2021, and 6.14 in 2022. Life expectancy has risen from 45.5 years in 1960 to 65.7 years in 2024.

Factors Influencing Declining Mortality Rates:

i. **Healthcare Improvements:** Expanded access to medical facilities, vaccinations, and maternal and child health programs has significantly reduced mortality rates in Ghana. The infant mortality rate declined from about 120 deaths per 1,000 live births in 1960 to approximately 33.9 in 2022. Similarly, the crude death rate fell from 19.0 per 1,000 people in 1960 to about 7.5 in 2021 and 6.14 in 2022. Life expectancy has also increased substantially, rising from about 45 years in 1960 to around 64–65 years in 2022. These improvements reflect overall progress in healthcare delivery and living conditions.

ii. **Sanitation and Nutrition**: Better access to clean water, sanitation, and nutrition has decreased deaths from preventable diseases like malaria and diarrheal diseases. Government initiatives, such as the National Health Insurance Scheme (NHIS), have improved healthcare access.

iii. **Urbanisation**: Urban areas, with 59% of the population in 2024, offer better healthcare infrastructure, reducing mortality compared to rural areas.

c. **Migration Patterns**

Migration has a minimal impact on Ghana's population growth compared to fertility and mortality. The net migration rate in 2022 was -0.16 migrants per 1,000 population, indicating a slight outflow according to The World Factbook.

Contributing Factors:

i. **Internal Migration**: Significant internal movement occurs from rural to urban areas, particularly to Greater Accra and Ashanti, driven by job opportunities and better services. This does not affect total population growth but influences distribution and density.

ii. **International Migration**: Some Ghanaians emigrate for economic opportunities, particularly to Europe and North America, but immigration (e.g., from neighbouring countries) partially offsets this. The net effect is a slight reduction in population growth.

iii. **Refugee Movements**: Ghana hosts a small number of refugees, but this has a negligible impact on overall population figures.

d. **Socio-economic and Policy Factors**

Socioeconomic conditions and government policies shape fertility and mortality trends, indirectly influencing population growth.

Contributing Factors

i. **Economic Development**: Ghana's growing economy, with a GDP growth rate of 3.8% in 2023 World Bank, has improved living standards, reducing mortality but also encouraging urban migration, which sustains high birth rates in some areas.

ii. **Education Policies**: The Free Senior High School (SHS) policy, introduced in 2017, has increased educational access, particularly for girls, which may reduce fertility rates over time as educated women tend to have fewer children. However, the impact is gradual.

iii. **Family Planning Programs**: Government and NGO efforts to promote contraception have reduced TFR from 6.85 in 1960 to 3.66 in 2022, but uptake remains low in some regions, sustaining high birth rates.

iv. **Cultural and Religious Influences**: Religious beliefs, common across Ghana's Christian, Muslim, and traditional communities, often encourage large families, supporting high fertility.

Impact: These factors create a complex interplay. For instance, improved education and family planning are beginning to lower fertility, but cultural preferences and uneven access maintain growth momentum. The youthful population (median age 21.1 years in 2024) ensures continued growth due to a large reproductive-age cohort, according to Worldometer.

e. **Environmental and Geographic Influences**

Environmental factors indirectly influence population growth by affecting living conditions and economic opportunities.

Contributing Factors:

i. **Climate and Resources**: Southern regions, with favourable climates and resources like cocoa and minerals, support higher population densities and indirectly sustain growth by attracting migrants. Northern regions, with harsher climates (e.g., droughts), have lower growth rates.

ii. **Urbanisation**: Rapid urbanisation (59% urban in 2024) concentrates populations in areas with better services, reducing mortality and sustaining growth through better healthcare access.

Impact: Favourable southern conditions support higher population growth by enabling larger, healthier populations, while northern challenges limit growth in those areas, contributing to regional disparities.

Quantitative Insights

To illustrate the impact of these factors, consider the natural increase rate (CBR - CDR):

In 1960: 49.8 (CBR) - 19.0 (CDR) = 30.8 per 1,000.

In 2022: 28.55 (CBR) - 6.14 (CDR) = 22.41 per 1,000.

This decline in natural increase rate reflects lower fertility and mortality, but the absolute population increase remains high due to a larger base (e.g., 0.717 million annually from 2021 to 2024).

The following table summarises population trends in Ghana between 1960 and 2022

Year	Population	TFR	CBR (per 1,000)	CDR (per 1,000)	Natural Increase (per 1,000)
1960	6,726,815	6.85	49.8	19	30.8
1984	12,296,081	6.24	44.9	14.2	30.7
2000	18,912,079	4.85	35.9	9.9	26
2010	24,658,823	4.21	33	8.6	24.4
2021	30,832,019	3.49	27	7.5	19.5
2022	33,107,275	3.66	28.55	6.14	22.41

Table 6.3: *Key demographic indicators over time* *(Sources: GSS, 2021; GSS, 2024)*

Table 6.3, compiled from GSS and The World Factbook, highlights how high fertility and declining mortality have driven growth, with migration playing a minor role.

Implications for Ghana

The interplay of these factors has significant implications:

a. **Economic Pressure**: A rapidly growing population (doubling time ~31 years at 2.23%) strains resources, requiring more jobs and infrastructure.

b. **Demographic Dividend**: The youthful population (37% under 14 in 2021) offers potential economic benefits if educated and employed.

c. **Policy Needs**: Enhanced family planning, healthcare, and education policies are critical to managing growth sustainably.

Ghana's population growth is primarily driven by high fertility rates, fuelled by cultural norms and limited family planning, and declining mortality rates due to improved healthcare and living conditions. Migration has a minimal impact, while socioeconomic factors like education and economic development, and environmental factors like climate, shape regional growth patterns. Understanding these factors is crucial for addressing Ghana's demographic challenges and leveraging its youthful population for development.

Learning Tasks: "Talk & Think: Population in Ghana"

1. Pay close attention to the presentation or video on population distribution and migration in Ghana.
2. Note down one new idea about where people live and one about why they move.
3. In turn, share your notes on factors influencing:
    a. Population growth (e.g. birth rates, health care)
    b. Distribution (e.g. location of resources, climate)
    c. Migration (e.g. jobs, education, environment)

4. In mixed-ability groups, list two factors for each category.
5. Ensure everyone contributes at least one idea.
6. Each member names one thing they appreciated in a peer's contribution and one feeling they have about the class discussion.

Pedagogical Exemplars

Talk for learning

- Listen to a presentation or watch a video on population distribution and migration.
- Through a whole class session, discuss factors influencing population growth, population distribution and migration in Ghana.

1. Choose presentations or videos with clear narration and visuals, suitable for diverse intellectual abilities, and provide transcripts or closed captions to support all learners.
2. Provide learners with guiding questions to focus their attention on key aspects of population distribution and migration.
3. Facilitate a whole-class discussion, encouraging participation from all learners and valuing diverse perspectives and insights.
4. Use open-ended questions of varying complexity to engage learners at different intellectual levels and promote critical thinking.
5. Offer background information on Ghana's population dynamics to ensure all learners have the foundational knowledge necessary for the discussion.
6. Promote an inclusive environment where learners feel comfortable sharing their ideas and actively listening to others.
7. Provide constructive feedback on learners' contributions and encourage self-reflection on their learning and participation.
8. Foster a supportive atmosphere that emphasises empathy, respect, and understanding of different viewpoints.
9. Allow learners to express their understanding through discussions, written reflections, or creative projects, catering to different learning styles.
10. Encourage the use of SEL techniques, such as mindfulness and self-regulation, to help learners manage emotions during discussions.

Key Assessment: Mid-Semester Examination

Short Answer Questions (Dok 3)

1. The Ghanaian government introduced the Free Senior High School (SHS) policy in 2017. Analyse how this policy could influence Ghana's future population growth rate.
2. **Table 6.3** shows that Ghana's Total Fertility Rate (TFR) has fallen significantly since 1960, yet the population continues to grow rapidly. Analyse two key factors that explain why a declining fertility rate does not immediately stop or reverse population growth in Ghana.

   Total: 6 marks

3. The Greater Accra Region has the highest population density, while the Savannah Region has one of the lowest. Imagine you are a government planner deciding where to build a single, large, specialised cancer treatment hospital. Using the concepts of population distribution and population density, justify which region you would prioritise and explain the limitations of using only total regional population figures for this decision.

Essay Questions

1. a. With reference to Figure 6.3 and migration trends within Ghana, analyse the extent to which Natural Increase and Rural to Urban migration have influenced the rapid increase in Ghana's population since 1960. [8 marks]

   b. Discuss how this rapid population growth has affected

   i. education [6 marks]

   ii. health care [6 marks]

[Total 20 marks] **(DoK 3)**

2. **Group Work: Teacher should assign each group an area of focus**

   Research Task: comparative population analysis for Ghana

   [Total 20 marks] (**DoK 3**)

   a. Using the 2021 Population Density Map of Ghana (Figure 6.1), identify one highly populated region and one sparsely populated region. (2 marks)

   b. Outline the reasons for the different population densities (4 marks)

   c. Give a reasoned explanation as to how population density in each region might impact the following socio-economic factors:

      i. Infrastructure development (2 marks)

      ii. Health Services (2 marks)

      iii. Educational Facilities (2 marks)

      iv. Employment opportunities (2 marks)

      v. Waste Management and Sanitation (2 marks)

      vi. Government revenue/tax generation (2 marks)

      vii. Housing and settlement planning (2 marks)

HINT

*Conduct **Mid-semester Examination**. It should cover contents taught from Week 1 to 5. Refer to the **Table of Specification and Structure of the Paper** to guide you. Learners' papers should be marked immediately and scores entered into the SAP.*

Structure

Section A: 25 Multiple-choice questions

Section B: 2 Essay Questions

Table of specification for item construction for section A and B

Week	Learning Indicator	Types of questions	DoK Levels				Total
			1	2	3	4	
1	Describe the development of river channels and associated landforms Examine the importance of river landforms to the socio-economic development in Ghana	MCQs	2	2	-		4
		ESSAY	-	-	-		-
2	Discuss mass wasting and the factors that influence it	MCQs	2	2	2		6
		ESSAY	-	-	1		1
3	Examine the types of mass wasting Discuss the socio-economic and environmental effects of mass wasting	MCQs	-	2	1		3
		ESSAY	-	-	-		
4	Analyse natural features on maps (e.g. relief, drainage) Analyse cultural features on maps (e.g. settlements, farms and roads)	MCQs	3	2	1		6
		ESSAY					
5	Analyse the interrelationships between natural and cultural features on maps	MCQs	1	3	2		6
		ESSAY			1		1
		Total	**8**	**11**	**8**		**27**

PLC Session 6

45 minutes **Planning & Reviewing the Learning Plan**

1. Begin the session by recapping lessons from the previous session, focusing on how learning was applied.
2. Use your subject specific app to explore the content before planning. Ask the app to
   a. explain the week's concepts in a practical way that will make it easier for learners to understand.
   b. identify three common misconceptions learners may have on the week's content and how to address them using contexts familiar to Ghanaian learners (NTS 3a, 3g and 3m).
3. Use your subject specific app to plan your lesson. Ask the app to
   a. suggest the most effective method for teaching the week's concepts to learners with diverse backgrounds.
   b. suggest learning activities, differentiation and essential questions based on the method of teaching (NTS 3a-3q).
   c. review your prepared learning plan and address any challenging issues you may have identified in your subject area (NTS 3a-3c).

Note

- *Take note of the recap topics linked to Years 1 and 2 while preparing for your lesson.*
- *Refer to the Values Learning Community Handbook and link the values for the week in your lesson to ensure that learners are applying what they learn.*

4. Use your app to plan and administer the mode of assessment for the Student Assessment Portal (SAP)

   a. The key assessment for the week is ***mid-semester examination***. Chat with your app to plan this assessment by reviewing or developing the assessment items/tasks and marking schemes/rubrics for the mid-semester examination (NTS 3k-3q).

10 minutes **Content Exploration**

5. As a subject group, select one problem or topic/idea/term in the week's content that is challenging (not a routine procedural question, but one that requires conceptual understanding) and then

   a. use the app, ask it to solve the problem step by step and explain the reasoning behind each step (you may be assisted by a teacher who is strong in the content area)

   b. all teachers in the group work through the problem individually for 3–4 minutes

   c. the group then works through it together the problem, step by step

   d. highlight the most common errors made at each step (NTS 1c, 1e, 2c, 2e, 3e-3j).

Note

- *This part is not 'How do I teach this?' but how do I teach it for learners to understand?*
- *If the group still shares the same content gap, use the app: ask it to solve the problem step by step and explain the reasoning behind each step.*
- *Problems/ideas discussed should be sourced from the Teacher Manual content, not invented separately. This keeps the content exploration directly connected to what teachers will deliver.*

30 minutes **Enactment**

6. Enact a teaching activity based on your learning plan (NTS la-1b, 1e-lg, 2c, 2e, 2f, 3c-3j and 3o).

   a. Colleagues observe with specific attention to clarity of concept explanation, use of familiar Ghanaian examples and how misconceptions are handled if they arise.

   b. After the enactment, ask for structured feedback from the group

      i. was the concept explained in a way that a learner with no prior knowledge could follow?

      ii. were the examples grounded in contexts familiar to Ghanaian learners?

      iii. did any misconceptions surface and if so, how were they addressed?

5 minutes **Reflection**

7. Reflect and share your views on the session. One thing that worked well, what did not work well and what you will do differently. (NTS 1a, 1b).

8. Identify a critical friend to observe and provide feedback on your lesson in relation to the PLC Session conducted (NTS 1f, 1g).
9. Remember to
    a. transfer your chats into your learning planner template.
    b. read your Teacher Manual and related Learner Material in preparation for the next session. Take note of the recap weeks, which are linked to Years 1 and 2 (NTS 3a).
    c. integrate National Values, GESI, SEL, and 21st century skills into your learning activities, assessment tasks, and rubrics/mark schemes.

WEEK 7

Learning Indicator: *Discuss migration trends, settlement types and patterns in Ghana*

Focal Area 1: Population Migration in Ghana

Introduction

Population migration is defined as the movement of people from one place to another with the intention of settling temporarily or permanently. Migration is a key feature of Ghana's demographic landscape. Influenced by economic, social, environmental, and historical factors, migration in Ghana includes internal and international movements. According to the 2021 Population and Housing Census, 28.9% (8.2 million) of Ghana's population of 30.8 million were identified as migrants, with notable flows from northern to southern Ghana in search of better opportunities and living conditions.

Various Forms of Migration in Ghana

Migration in Ghana can be categorised into several forms, reflecting the diversity of movement patterns.

1. **Internal Migration:** The movement of people within the borders of a single country.
    a. **Inter-Regional Migration**: Inter-regional migration refers to the movement of people from one administrative region to another. According to the Ghana Statistical Service's 2021 Thematic Report on Migration, 55.1% of all internal migrants in Ghana, representing about 4,537,018 people, moved between regions. Most of these movements were from rural areas in the northern parts of the country, such as the Upper East, Upper West, and Northern Regions, to more urbanised and economically vibrant regions in the south, including Greater Accra, Ashanti, Eastern, and Western Regions. This type of migration is often driven by the search for better economic opportunities, education, and improved living conditions. For example, many young professionals move from Kumasi in the Ashanti Region to Accra in the Greater Accra Region to take up jobs in the banking and ICT sectors. Traders from Bawku in the Upper East Region also relocate to Sekondi-Takoradi in the Western Region to work in the growing oil and gas industry. Additionally, students from Tamale in the Northern Region often move to Tema in the Greater Accra Region to pursue tertiary education and internship opportunities. These migration patterns highlight the strong pull of southern urban centres, which offer more employment, educational, and business opportunities compared to the rural northern regions.
    b. **Intra-Regional Migration:** Intra-regional migration refers to the movement of people within the same administrative region. This type of migration is usually short-distance and often motivated by family reasons, marriage, employment, or access to social services such as education and healthcare. According to the Ghana Statistical Service's 2021 Thematic Report on Migration, intra-regional migration accounted for 44.9% of internal migrants in the country, representing approximately 3,702,216 people. Unlike inter-regional migration, which often involves long-distance travel across regions, intra-regional migration tends to occur between rural and urban areas within the same region or between neighbouring towns and communities. For example, in the Ashanti Region, people frequently move from smaller towns such as Offinso or Bekwai to the regional capital, Kumasi, in search of jobs, better housing, or to join family members. In the Volta Region, individuals may migrate from rural communities to Ho for schooling or to access health services. Similarly, in the Central Region, anglers may move

between coastal communities like Winneba and Cape Coast depending on seasonal changes in fish stocks. Intra-regional migration plays a vital role in local development. It helps to distribute labour within regions and supports the growth of small towns by providing a steady stream of human resources. It is also influenced by traditional family structures, where individuals relocate to care for aging relatives or to live closer to extended family. While not as economically driven as inter-regional migration, intra-regional movements are essential for maintaining social ties and sustaining community-based economies.

c. **Rural to Urban Migration in Ghana:** Rural to urban migration refers to the movement of people from villages or small towns into larger towns and cities, often in search of better economic opportunities, education, and improved living conditions. This has been a major driver of urbanisation in Ghana over the decades. According to the Migration in Ghana Report, by 2010, 44.5% of Ghana's urban population aged five years and above—representing about 2,752,623 people—were migrants, most of whom had moved from rural areas. As a result of this sustained movement, the level of urbanisation in Ghana increased significantly from 23% in 1960 to 59% in 2024. Examples of rural to urban migration in Ghana include young farmers from northern villages relocating to Tamale to find work in its growing services sector. In the Brong-Ahafo Region, many graduates migrate to Kumasi to join the booming garment and furniture industries. Along the coast, fisherfolk and traders from towns like Winneba and Elmina often move to the Accra-Tema corridor to engage in petty trading, hawking, or to operate in local markets. These movements contribute to rapid urban growth, but they also create challenges such as pressure on housing, transportation, health facilities, and sanitation services in cities. Nonetheless, rural to urban migration remains a key part of Ghana's socio-economic development, helping individuals and families to improve their livelihoods.

d. **Urban to Rural Migration in Ghana:** Urban to rural migration describes the movement of people from towns and cities back to villages or smaller towns. Although less common than rural to urban flows, this trend has grown in recent years as individuals and families seek a lower cost of living, a quieter lifestyle, or new business opportunities outside the crowded cities. Data from Ghana's internal migration studies indicate that between 2000 and 2010, urban-to-rural migration increased by approximately 9.7%, driven largely by retirees and young families leaving Accra, Kumasi and Takoradi for their home communities or other rural areas. Typical examples include a retired nurse from Korle Bu Hospital who returns to live with family in Wenchi, Bono Region; a young couple leaving Tema to establish a mango-processing enterprise in a village near Hohoe in the Volta Region; and graduates unable to afford city rents relocating to Ejisu in Kumasi to open tutorial centres. While these movements can alleviate pressure on urban housing, transportation and sanitation, they also pose challenges for rural areas, such as increased demand for land, water supply and local health and education services. Nonetheless, urban-to-rural migration remains an important dimension of Ghana's demographic change, spreading economic activity and skills more evenly across the country.

e. **Voluntary vs. Forced Migration:** Voluntary migration is predominant, driven by economic and social aspirations, while forced migration occurs due to environmental stress (e.g., droughts in the north) or political instability, though less common.

f. **Temporary Migration:** Temporary migration involves movements that last for a limited period—typically less than one year—after which migrants return to their original communities. In Ghana, this form of migration is often seasonal or contract-based:

i. **Seasonal Farm Labour:** Young men and women from northern regions travel to the cocoa belts of Ashanti and Western Regions during planting and harvest seasons, then return home once work subsides.

ii. **Fishing and Fishing Support:** Fisherfolk and fish processors from Central and Western coastal towns move to fishing camps along Lake Volta or the Gulf of Guinea for several months before resettling in their home villages.

iii. **Short-Term Contracts:** Artisans, construction workers or health-care staff may accept fixed-term postings in Accra, Tema or Takoradi, returning home when their contracts expire.

g. **Permanent Migration**: Permanent migration denotes relocation with no pre-planned return date, typically involving a change of usual residence for at least twelve months. In Ghana, permanent moves are driven by long-term economic, educational or family considerations:

i. **Urban Settlements:** Families leaving villages in the Northern or Upper East Regions to settle indefinitely in Accra, Kumasi or Sekondi-Takoradi, seeking stable employment and better social services.

ii. **Education and Career:** Graduates from rural polytechnics who remain in southern cities to pursue professional careers in banking, ICT, teaching or health care.

iii. **Family Reunification:** Spouses and children joining breadwinners who have already moved to urban centres, creating permanent household transfers.

The North–South Migration Trend

Migration from northern to southern Ghana is a prominent internal migration pattern, with almost one in five people born in the north (18.4% in 2000) living in the south. The 2021 census shows high out-migration from northern regions like Upper East (2.0% in-migration rate) and high in-migration to southern regions like Greater Accra (35.1% in-migration rate) Thematic Report on Migration 2021.

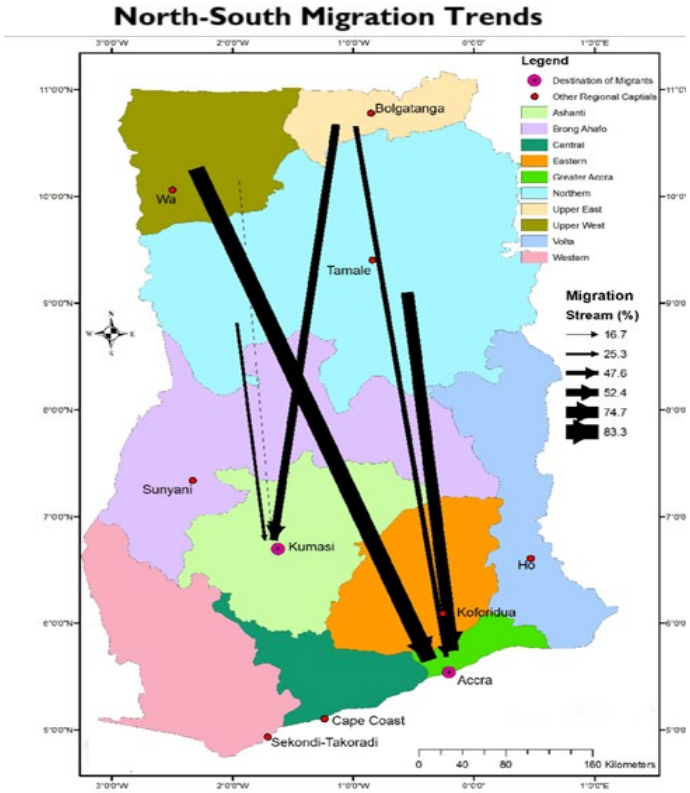


Figure 7.1: *Flow Map of Ghana showing North-South Migration of the Youth (2013)*

Reasons include

1. **Environmental Push and Pull:** Northern Ghana lies in the Sudano-Sahelian zone, experiencing erratic rainfall and prolonged droughts, leading to crop failures. This situation often pushes people.

   The fertile lands of Southern Ghana serve as a major pull factor for migrants from the drought-prone northern regions, driven by agricultural opportunities, economic stability, and better living conditions.

2. **Economic Opportunities:** Economic opportunities refer to favourable conditions or circumstances that enable individuals, businesses, or nations to improve their financial well-being, create wealth, and enhance overall prosperity. Economic opportunities in southern Ghana act as a strong pull factor for migrants from the northern regions of Ghana due to significant disparities in development, employment, and living standards.

3. **Social Amenities:** Social amenities such as quality healthcare, education, electricity, water supply, transportation, and recreational facilities play a major role in attracting migrants, particularly from rural and less-developed regions to urban and more developed areas in Ghana

4. **Historical and Cultural Patterns:** Migration in Ghana is deeply rooted in historical events, ethnic movements, and cultural practices that have shaped settlement patterns over centuries. These factors continue to influence modern migration trends, particularly between the North and South, as well as rural-urban movement. Long-standing migration routes, established during colonial times for labour in southern mines and farms, continue to facilitate movement. Cultural ties and family networks in the South also encourage migration

Factors Influencing Population Distribution in Ghana

Population distribution is shaped by a combination of physical, economic and social factors. Below is an overview of each category, with Ghana-specific examples.

Physical Factors

1. **Climate and Rainfall:** Climate and rainfall patterns significantly influence settlement distribution in Ghana. The Forest–Coastal Belt, which includes regions like Greater Accra, Central, and Western, receives higher and more reliable rainfall (1,500–2,000 mm annually), supporting dense population settlements. In contrast, the Savannah Zones, covering areas such as the Upper East, Upper West, and Savannah Regions, experience lower rainfall (800–1,100 mm annually) and occasional droughts, which limit agricultural productivity and water availability, leading to sparser settlements.

2. **Soil Fertility and Vegetation:** Soil fertility and vegetation also affect population distribution in Ghana. Regions like Ashanti, Eastern, and Western have rich forest soils that support cocoa, oil palm, and a variety of food crops, encouraging dense rural populations. In contrast, the northern savannah zones have less fertile lateritic and sandy soils, which only support extensive rain-fed farming and livestock rearing, resulting in lower rural population densities.

3. **Relief and Topography:** Relief and topography play a key role in influencing settlement patterns in Ghana. Lowland areas and river valleys, such as those around the Volta Basin and the coastal plains, have flat terrain that supports agriculture, infrastructure development, and dense settlement. In contrast, highland and hilly areas like the Akwapim-Togo ranges and the Kwahu Plateau are generally less populated due to their challenging terrain, with settlements mainly found in areas where mining or tourism activities create economic opportunities, such as Aburi and Kwahu.

4. **Water Availability:** Water availability significantly influences where people settle in Ghana. Areas near year-round water sources such as the Volta River, Black Volta, and other smaller streams support irrigation, fishing, and household use, encouraging higher population densities. In contrast, regions in the northern fringes, where water is limited to seasonal streams, tend to have more dispersed and often semi-nomadic populations due to the difficulty in sustaining farming and daily living activities.

Economic Factors

5. **Employment Opportunities:** Employment opportunities have a strong influence on population distribution in Ghana. Urban industrial centres such as Accra–Tema, Kumasi, and Takoradi offer jobs in manufacturing, services, and the oil sector, attracting large numbers of migrants. In rural areas, agricultural zones like the cocoa-growing regions in Ashanti and Western, and tree crop belts in Bono East and Ahafo, provide employment that sustains local communities.
6. **Infrastructure and Services:** Infrastructure and access to services also shape settlement patterns. Well-developed road and rail networks, such as the Accra–Kumasi highway and the western rail line, promote development along their corridors and encourage peri-urban growth. Similarly, towns with good access to social amenities, including hospitals, schools, and markets—such as Sunyani, Koforidua, and Hohoe—attract more residents.
7. **Access to Markets:** Access to markets further drives settlement. Coastal ports in Tema and Takoradi create trade-related jobs that contribute to dense populations in nearby areas. Regional trading centres like Ejura and Tamale act as key collection and distribution points for agricultural produce, encouraging people to settle around them.
8. **Industrial and Resource Development:** Industrial and resource development also contribute to population distribution. Gold-mining towns such as Obuasi and Tarkwa attract workers and their families, leading to densely populated communities. The discovery of oil and gas offshore has similarly led to increased settlement and economic activity in and around Sekondi-Takoradi.

Social Factors

9. **Historical Settlement Patterns:** Historical settlement patterns continue to shape Ghana's population distribution. Major urban centres such as Kumasi and Cape Coast have retained their significance due to their roles as capitals of pre-colonial kingdoms like the Asante and Fante states. Similarly, southern towns that hosted early missionary schools and colonial hospitals still attract populations due to the enduring presence of these institutions.
10. **Cultural and Ethnic Networks:** Cultural and ethnic networks also influence where people live. Many individuals settle near ancestral homes, maintaining high population densities in ethnic strongholds, such as among the Ewe in the Volta Region. Additionally, towns with traditional authority, chieftaincy seats, and popular festivals—like Navrongo and Kpalimé—attract both seasonal visitors and permanent residents.
11. **Education and Health Facilities:** Access to education and health services further determines settlement. Cities that host universities and polytechnics, such as Accra, Kumasi, Tamale, Ho, and Cape Coast, draw students, lecturers, and support services. Similarly, large referral hospitals, including Korle Bu and Komfo Anokye, attract patients and healthcare professionals, encouraging urban growth in surrounding areas.

12. **Government and Planning Policies:** Government and planning policies play a role in shaping settlement patterns. The establishment of new regional and district capitals, such as Dambai in the Oti Region, promotes migration of civil servants and associated development. Rural development initiatives, including resettlement schemes, agro-villages, and rural electrification, also help attract people to less populated areas.

Focal Area 2: Settlement Types and Patterns in Ghana

Introduction

The study of how and where people live is a fundamental aspect of geography. A settlement, in its broadest sense, refers to any community, whether permanent or temporary, in which people reside, without regard to its size, population, or level of importance.

In simple terms, a settlement can be understood simply as a place where people live. This definition encompasses a wide spectrum of human habitation, from a solitary house situated in a remote area to a large urban centre with millions of inhabitants. Indeed, settlements can range in scale from an isolated dwelling occupied by a single family to a mega-city, which is characterised by a population exceeding ten million residents. Recognising this vast range in scale is crucial when examining the different types and patterns of settlements found in Ghana and around the world. The concept of scale will be a recurring theme as we delve deeper into the characteristics and distribution of human settlements.

Types of Settlements in Ghana

Ghana exhibits a diverse range of settlement types, which can broadly be categorised into rural and urban settlements, each with distinct characteristics and examples.

1. **Rural Settlements: Characteristics and Examples**
    - **Low Population Density:** Rural settlements have a smaller, more spread-out population compared to urban areas.
    - **Location:** Typically found outside urban centres, often in remote or peripheral areas.
    - **Economy Based on Natural Resources: The** livelihoods of residents are mainly tied to agriculture, fishing, mining, or other land-based activities.
    - **Economic Diversity:** Rural settlements vary depending on their dominant economic activity—such as farming, fishing, crafts, or mining.
    - **Traditional Skills and Practices:** Many rural communities maintain traditional livelihoods like carving, weaving, or herbal medicine.
    - **Social Structure:** Settlements may be organised around tribal or ethnic groupings, with distinct sub-communities.
    - **Proximity to Urban Areas:** Some rural settlements exist near urban centres but retain rural characteristics due to small population sizes and traditional ways of life.
    - **Example**: Okurase, a village in the Eastern Region with about 3,500 people; main occupations include subsistence farming and carving; comprises seven sub-communities representing different tribes.



Figure 7.2: *Satellite image of Okurase*

2. **Urban Settlements: Characteristics and Examples**

   a. **High Population Density:** Urban areas in Ghana have a large concentration of people living in a relatively small area.

   b. **Improved Infrastructure:** Better road networks, electricity supply, water systems, and communication facilities compared to rural areas.

   c. **Presence of Social Amenities:** Availability of schools, hospitals, markets, banks, recreational centres, and other services.

   d. **Economic Activities:** Predominance of non-agricultural jobs such as trading, services, manufacturing, and formal employment.

   e. **High-rise Buildings and Planned Layouts:** Urban areas often feature modern buildings, housing estates, and more planned layouts (though some areas still experience informal settlements).

   f. **In-migration:** Attraction of people from rural areas in search of jobs, education, and better living conditions.

   g. **Higher Cost of Living**: Urban areas in Ghana typically have higher rent, food prices, and transportation costs.

   h. **Traffic Congestion:** Common in major cities like Accra and Kumasi due to an increased number of vehicles and inadequate road expansion.

   i. **Environmental Challenges:** Issues like poor waste disposal, air and noise pollution, and flooding due to rapid and unplanned urbanisation.

   j. **Diverse Population**: Urban areas are culturally diverse, with people from different ethnic backgrounds and regions.

   k. **Examples**: Three popular examples of urban settlements in Ghana are Accra, Kumasi, and Tamale.



Figure 7.3: *Satellite image of Accra*

Settlement Patterns in Ghana

Settlement patterns refer to the spatial arrangement of where people live. In rural areas, these patterns are often influenced by the natural features of the landscape. The three primary types of rural settlement patterns are dispersed, nucleated, and linear.

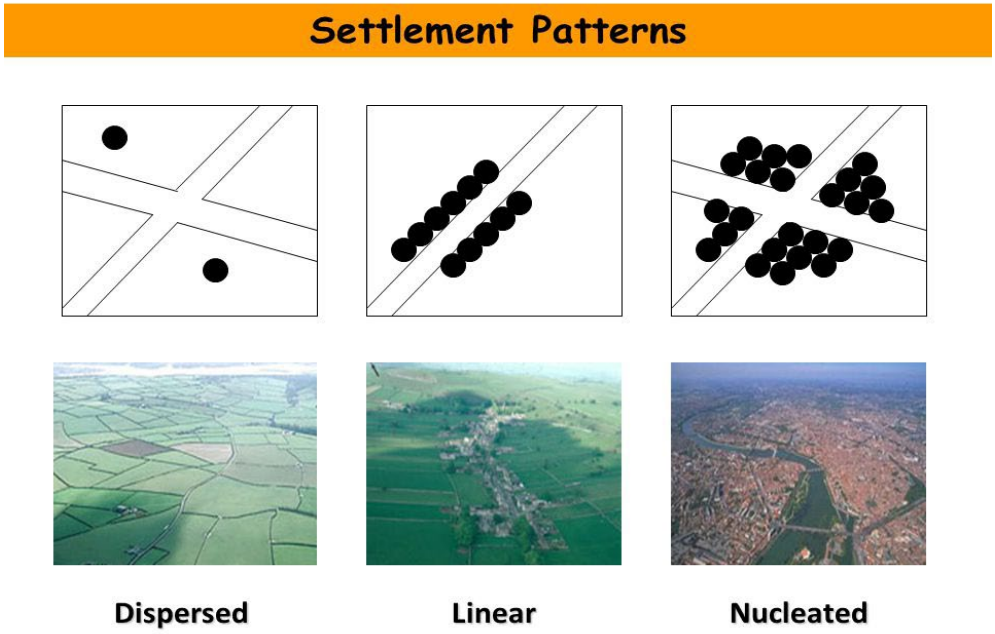


Figure 7.4: *Settlement Patterns*

1. **Rural Settlement Patterns:**
   a. **Dispersed Settlements: Characteristics**
      i. Buildings and houses are widely spaced over a large area.
      ii. Found in regions where large plots of land are needed for farming or grazing.
      iii. Associated with lineage-based land ownership and inheritance patterns.

iv. Settlement pattern often starts from ancestral core areas and expands outward.

v. Influenced by patrilocal traditions, where male offspring build near their father's lineage.

vi. Domestic fission (family splitting) leads to scattered household distribution.

vii. Reflects social and kinship systems, particularly in Northern Ghana.

viii. Makes provision of public services like schools and clinics more difficult.

ix. Land is commonly divided into radial strips from original circular farms.

x. Examples of dispersed settlements in Ghana include Kumbyili, Savelugu and Walewale, all in the northern regions.

b. **Nucleated Settlements: Characteristics**

i. Houses and buildings are spread out over a wide area with significant distances between them.

ii. Common in highland or hilly areas where the terrain makes close settlement difficult.

iii. Found in regions where people need large areas of land for farming or animal grazing.

iv. Settlements often originate from ancestral core areas and gradually expand outward.

v. Lineage and inheritance systems influence the spread of households, especially through land division.

vi. Domestic fission leads to the establishment of new homesteads away from original compounds.

vii. Patrilocal traditions cause male children to settle near their father's lineage, contributing to dispersion.

viii. Makes public service delivery difficult due to the large distances between dwellings.

ix. Common in Northern Ghana, where fixed cultivation and traditional land tenure systems prevail.

x. The layout of houses often reflects family structures and social organisation.

xi. An example of a rural nucleated settlement in Ghana is Paga in the Upper East Region.

c. **Linear Settlements: Characteristics**

i. Buildings are arranged in a straight line, often along roads, rivers, or valleys.

ii. Common in areas with flat terrain that allows linear development.

iii. Settlements form along transportation routes for easy access and movement.

iv. Houses are usually built facing the main road or river, with farms behind or nearby.

v. Encourages ease of communication and trade among residents.

vi. May develop due to geographical constraints, such as narrow valleys or ridges.

vii. Provides easy access to shared facilities like markets, schools, and water sources.

viii. Often found in areas with limited space for outward expansion.

ix. Typically found in rural areas transitioning to semi-urban due to increased movement.

x. Promotes a more organised layout compared to dispersed settlements.

xi. An example is Bimbila in the Northern region along the main road

2. **Urban Settlement Patterns:**
   a. **Nucleated Pattern**
      i. Buildings and structures are clustered closely, forming dense urban centres.
      ii. Common in major cities with commercial hubs and administrative functions.
      iii. Examples: Accra, Kumasi, Tema.
   b. **Linear Pattern**
      i. Settlements develop along major roads, railways, or rivers, creating elongated urban forms.
      ii. Often seen in cities expanding along transportation corridors.
      iii. Examples: Takoradi (along the coastal road), Cape Coast (along the coast and main road).
   c. **Dispersed Pattern**
      i. Urban buildings spread out with low density, often in suburban or peri-urban areas.
      ii. Seen in the outskirts where residential areas are scattered.
      iii. Examples: Some suburbs of Accra, like Ashaley Botwe, and parts of Madina.
   d. **Concentric Pattern**
      i. Urban growth radiates outward from a central business district (CBD) in rings or zones.
      ii. The CBD is surrounded by commercial, residential, and industrial zones.
      iii. Examples: Accra, Kumasi.
   e. **Satellite Town Pattern**
      i. Smaller urban settlements develop around a major city but remain separate.
      ii. Often serve as residential or industrial centres supporting the main city.
      iii. Examples: Madina and Tema near Accra, and Ejisu near Kumasi.

Factors Influencing Settlement Development in Ghana

The development of settlements in Ghana is influenced by a complex interplay of physical geography, economic activities, social organisation, historical events, and socio-political dynamics.

1. **Physical Factors**
   a. **Relief and Topography**: Settlements tend to develop on flat or gently sloping land for easier construction and farming, while steep or mountainous areas are less favoured.
   b. **Water Supply**: Availability of rivers, streams, and underground water sources attracts settlements due to the need for drinking, farming, and domestic use.
   c. **Soil Fertility**: Fertile soils encourage settlements in areas suitable for agriculture, supporting food production and livelihoods.
   d. **Climate**: Areas with moderate climate and adequate rainfall are preferred for settlement due to better living and farming conditions.
2. **Economic Factors**
   f. **Employment Opportunities:** Settlements grow around places offering jobs, such as commercial centres, industries, and mining areas.

g. **Trade and Market Access:** Proximity to markets and trade routes encourages urban growth by facilitating business and access to goods.

h. **Transportation and Infrastructure:** Good road networks, ports, railways, and airports attract settlements by improving mobility and communication.

3. **Socio-cultural Factors**

i. **Historical and Ancestral Links:** Many settlements develop around ancestral lands or culturally significant sites, influenced by traditions and kinship.

j. **Security and Protection**: Settlements may cluster in defensible locations for protection against attacks or natural threats.

k. **Religious and Educational Institutions:** Presence of schools, churches, mosques, and hospitals attracts people to settle nearby.

4. **Political Factors**

l. **Government Policies and Planning:** Urban planning, zoning laws, and investment in infrastructure guide settlement patterns and growth.

m. **Administrative Centres:** Capital cities and regional capitals attract settlements due to administrative activities and services.

5. **Technological Factors**

n. **Availability of Modern Utilities**: Access to electricity, water, sanitation, and telecommunications influences settlement location and expansion.

o. **Construction Technology:** Advances allow building in previously unsuitable areas, promoting urban expansion.

Table 7.1: *Classification of Rural Settlements in Ghana by Economic Activity*

Type of Settlement	Key Characteristics/Examples
Agricultural Settlements	Focused on crop cultivation and livestock rearing; examples include many villages in the Volta and Northern Regions.
Mining Settlements	Developed around mineral extraction sites (gold, diamonds, etc.); examples include Obuasi (though now urbanising, it originated as a mining settlement) and smaller mining communities in the Western Region.
Fishing Settlements	Located along the coast or major rivers, with economies centred on fishing; examples include communities along the coast of the Central and Western Regions, and near Lake Volta.
Traditional/Cultural Settlements	Retain strong ties to traditional crafts, ceremonies, or historical significance; examples include craft villages near Kumasi (Bonwire, Ntonso, etc.) and historically significant towns with traditional chieftaincy roles.

Learning Tasks

"Mapping Migration in Ghana"

1. In mixed-ability groups with members from high- and low-density areas; assign roles (sketcher, data-collector, narrator, encourager).
2. Quietly list major internal migration trends (e.g. rural→urban, north→south).
3. On blank outlines of Ghana, draw regions/provinces and major cities.
4. Use arrows of different thickness to show volume and direction of migration flows.
5. Beside each arrow, write one factor driving that trend (e.g. jobs, education, environment).
6. In your group, talk about how these movements affect both origin and destination communities.
7. Each member shares one thing they learned and one appreciative comment about a teammate.
8. Present your annotated map and one SEL reflection in a 2-minute group summary.

"Settlements of Ghana: Patterns & Places"

1. In mixed-ability groups, assign roles (researcher, recorder, presenter, supporter) ensuring every voice is heard.
2. Individually jot down one type of settlement (e.g. hamlet, village, town, city) and one pattern (nucleated, linear, dispersed).
3. In your group, compare notes and agree on three settlement types and two patterns found in Ghana.
4. Use atlases, maps or images to find real examples of each type and pattern—note their locations.
5. On a sheet or slide, draw simple symbols for each settlement and pattern, label examples, and mark locations on a mini-map of Ghana.
6. Briefly talk about why each settlement type and pattern exists (e.g. agriculture, trade, terrain).
7. Each member names one strength they saw in a teammate's contribution and one feeling about your teamwork.
8. In a 3-minute group showcase, display your visual, explain your findings, and share your SEL insight.

Pedagogical Exemplars

Activity-Based learning

In mixed ability groups of people from different population density areas, sketch a map of Ghana showing migration trends.

1. Organise learners into mixed-ability groups with members from different population density areas to ensure inclusivity and diverse perspectives.

2. Supply maps, drawing materials, and digital tools like Google Earth to assist learners in visualising and sketching migration trends.
3. Provide scaffolding materials such as worksheets and guiding questions to help learners focus on identifying and understanding migration trends.
4. Offer tailored assistance, such as one-on-one guidance or modified tasks, to accommodate varied intellectual abilities within the groups.
5. Conduct workshops on map reading and sketching techniques to ensure all learners have the foundational skills necessary for the activity.
6. Promote effective communication and teamwork within groups, emphasising respect and valuing diverse contributions.
7. Provide constructive feedback on group sketches and encourage learners to reflect on their learning process and group interactions.
8. Foster an environment that emphasises empathy, active listening, and respectful dialogue, contributing to social-emotional learning.
9. Teach learners mindfulness strategies, breathing exercises, and self-talk to help them manage emotional reactions and behaviours during group activities.
10. Allow groups to present their maps and findings creatively, using verbal, written, or digital formats, accommodating different expression styles.

Collaborative Learning

In mixed ability and all-inclusive groups, explore settlement types and patterns in Ghana.

1. Organise learners into mixed-ability and inclusive groups to encourage collaboration and diverse perspectives.
2. Supply maps, pictures, and videos that illustrate different settlement types and patterns in Ghana to support visual and contextual learning.
3. Use guiding questions and scaffolding materials to help learners focus on identifying and analysing settlement types and patterns.
4. Conduct workshops on interpreting maps and understanding settlement dynamics to build foundational skills necessary for analysis.
5. Offer tailored support, such as one-on-one guidance or modified tasks, to accommodate varied intellectual abilities.
6. Promote effective communication and teamwork within groups, emphasising the importance of respecting diverse viewpoints.
7. Provide constructive feedback on group findings and encourage learners to reflect on their learning process and group dynamics.
8. Foster an environment that emphasises empathy, active listening, and respectful dialogue, contributing to social-emotional learning.
9. Teach learners mindfulness strategies, breathing exercises, and self-talk to help them manage emotional reactions and behaviours during group activities.
10. Allow groups to present their analyses creatively, using verbal, written, or digital formats, accommodating different expression styles.

Key Assessment Level 3: Group Assignment

Short Answer Questions - Dok 3

1. There is a given proof that outlines reasons for the North-South migration trend in Ghana. Analyse how a severe, multi-year drought in the northern regions could intensify this migration pattern and create new challenges for a destination city like Accra.
2. Dispersed settlement patterns are common in Northern Ghana. Imagine you are a government official tasked with providing new schools and clinics to a region with this settlement pattern. Critically evaluate two major challenges you would face in successfully implementing this project.
3. A recent graduate leaves their village near Tamale to find work in Tamale city. After two years, they secure a better job in Accra and move there. Analyse how this person's journey demonstrates both migration types and the likely pull factors at each stage.
4. While rural-to-urban migration is dominant, it is true that there is also a growing trend of urban-to-rural migration by retirees and entrepreneurs. Evaluate how this reverse migration could contribute positively to the development of rural communities. Provide two distinct potential benefits.

Essay Questions (Individual Class / Home Work)

1. a. Discuss the major migration trends in Ghana and their socio-economic impacts on both the regions of origin and destination. In your response, include examples of inter-regional and rural to urban migration. [10 marks]
   a. Explain how these migration trends pose challenges and opportunities to the country's development. [10 marks]

   [Total 20 marks] (**DoK 3**)
2. a. Draw a map of Ghana, and using arrows, indicate the direction of movement of people to indicate the major migration routes within and among the various regions. [12 marks]

   b. Discuss four reasons for the movements represented by the arrows. [8 marks]

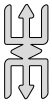
   [Total 20 marks] **(DoK 3)**

PLC Session 7

45 minutes	Planning & Reviewing the Learning Plan

1. Begin the session by recapping lessons from the previous year/session/week, focusing on how learning was applied.
2. Use your subject specific app to explore the content before planning. Ask the app to
   a. explain the week's concepts in a practical way that will make it easier for learners to understand
   b. identify two or three common misconceptions learners may have on the week's content and how to address them using contexts familiar to Ghanaian learners. (NTS 3a, 3g and 3m).
3. Use your subject specific app to plan your lesson. Ask the app to
   a. suggest the most effective method for teaching the week's concepts to learners with diverse backgrounds.
   b. suggest learning activities, differentiation and essential questions based on the method of teaching (NTS 3a-3q)

c. review your prepared learning plan and address any challenging issues you may have identified in your subject area (NTS 3a-3c).



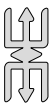
Note

- *Take note of the recap topics linked to Years 1 and 2 while preparing for your lesson.*
- *Refer to the Values Learning Community Handbook and link the values for the week in your lesson to ensure that learners are applying what they learn.*

4. Plan the week's key assessment with your app
   a. The key assessment for the week is ***group assignment***. Chat with your app to plan this assessment, indicating what you and your learners will do before, during and after the assignment (NTS 3k-3q).

10 minutes **Content Exploration**

5. As a subject group, select one problem or idea/term in the week's content that is challenging (not a routine procedural question, but one that requires conceptual understanding) and then
   a. use the app, ask it to solve the problem step by step and explain the reasoning behind each step (you may be assisted by a teacher who is strong in the content area)
   b. all teachers in the group work through a similar problem individually for 3–4 minutes
   c. the group then works through the problem together step by step
   d. highlight the most common errors made at each step and discuss (NTS 1c, 1e, 2c, 2e, 3e-3j).



Note

- *This part is not just about 'How do I teach this?' but how do I teach it for learners to understand?*
- *If the group still shares the same content gap, use the app: ask it to solve the problem step by step and explain the reasoning behind each step.*
- *Problems/ideas discussed should be sourced from the Teacher Manual content, not invented separately. This keeps the content exploration directly connected to what teachers will deliver.*

30 minutes **Enactment**

6. Enact a teaching activity based on your learning plan (NTS la-1b, 1e-lg, 2c, 2e, 2f, 3c-3j and 3o).
   a. Colleagues observe with specific attention to clarity of concept explanation, use of familiar Ghanaian examples and how misconceptions are handled if they arise.
   b. After the enactment, ask for structured feedback from the group
      i. was the concept explained in a way that a learner with no prior knowledge could follow?
      ii. were the examples grounded in contexts familiar to Ghanaian learners?
      iii. did any misconceptions surface and if so, how were they addressed?

5 minutes	Reflection

7. Reflect and share your views on the session. One thing that worked well, what did not work well and what you will do differently. (NTS 1a, 1b).
8. Identify a critical friend to observe and provide feedback on your lesson in relation to the PLC Session conducted (NTS 1f, 1g).
9. Remember to
    a. transfer your chats into your learning planner template.
    b. read your Teacher Manual and related Learner Material in preparation for the next session. Take note of the recap weeks, which are linked to Years 1 and 2 (NTS 3a).
    c. integrate National Values, GESI, SEL, and 21st century skills into your learning activities, assessment tasks, and rubrics/mark schemes.

WEEK 8

Learning Indicators

1. *Compare Ghana's population growth to that of Africa and the world*
2. *Explore the socio-economic implications of migration from Africa to the rest of the world*

Focal Area 1: Contrasting Population Growth: Ghana in the Context of Africa and the World

Introduction

Gaining insights into the dynamics of population growth is paramount for effective policy formulation and development planning across the globe. This is particularly true for nations like Ghana, which occupies a unique demographic space within the African continent and the broader world. While previous discussions have elaborated on the specific population characteristics of Ghana, this focal area aims to provide a comparative analysis, contrasting Ghana's population growth trends with those of Africa and the world. By examining these differences and similarities, a clearer picture emerges of the specific challenges and opportunities that Ghana faces in its development journey. This comparative lens allows for a deeper appreciation of the factors driving demographic change and the potential socio-economic implications.

Ghana's Population Growth: Trends and Characteristics

1. Ghana's growth rate peaked at 3.32% in 1957 but has declined to ~1.89% in 2024.
2. Key features: young median age (21 years), fertility rate (3.3–3.4), and rapid urbanisation (58–60% urban).
3. Urbanisation is driven by economic opportunities but strains infrastructure.
4. Population momentum will likely sustain growth despite declining fertility.

Africa's Population Growth: A Continental Perspective

1. Africa is the fastest-growing continent (2.3% in 2024), with regional disparities (e.g., >3% in Middle/Eastern Africa vs. <2% in Southern/Northern Africa).
2. Younger median age (19 years) and higher fertility (4.0–4.1) than in Ghana.
3. Urbanisation lags in Ghana (44–45% urban) but is accelerating, creating infrastructure challenges.
4. Potential for a demographic dividend, but requires investments in education and jobs.

Global Population Growth: Contrasting Patterns

1. Global growth rate (0.8–0.9%) is much lower than Africa's, driven by declining fertility (2.25 children/woman).
2. Regional divergence: Sub-Saharan Africa grows at 2.5%, while Europe/N. America stagnate.
3. Higher median age (30 years) and life expectancy (73.3 years) reflect an advanced demographic transition.
4. Global urbanisation (~55%) parallels Ghana's, posing similar challenges for sustainable development.

Comparative Analysis of Population Growth Rates

A direct comparison of population growth rates for Ghana, Africa, and the world over recent years clearly illustrates Ghana's position within these broader trends.

Table 8.1: *Comparing Population Growth Rates (Sources: GSS 2021,2024)*

Year	Ghana Growth Rate	Africa Growth Rate	World Growth Rate
2020	2.01%	2.43%	0.97%
2021	1.98%	2.38%	0.86%
2022	1.94%	2.34%	0.84%
2023	1.93%	2.34%	0.88%
2024	1.89%	2.32%	0.87%

This table clearly demonstrates that Ghana's population growth rate consistently falls between the higher growth rate of Africa and the lower growth rate of the world. This intermediate position suggests that Ghana faces a unique set of circumstances, balancing the need for economic and social development with the pressures of a growing population, although at a less rapid pace than many other African nations. The population's annual doubling time for Ghana was estimated at 36 years in 2024, indicating the pace at which the population is expected to double if the current growth rate persists. This necessitates careful planning for future resource allocation and infrastructure development.

Historically, Ghana's population growth rate has shown variations in its proximity to the African and global averages. In the mid-20th century, Ghana's growth rate was quite high, closer to the rates seen in many African countries at the time. However, over the decades, as Ghana's growth rate has gradually declined, the gap between its growth rate and the African average has widened, while it remains significantly higher than the global average, which has also been declining but at a slower pace in some periods.

Key Demographic Indicators: A Comparative Lens

Table 8.2: *Population Characteristics: Ghana, Africa, and the World (circa 2022)*

Characteristic	Ghana (2022)	Africa (2022)	World (2022)
Total Population	33,149,152	~1.4 billion (est. 1.373 billion in 2021)	~8.0 billion (reached in Nov 2022)
Fertility Rate	3.43 children per woman	~4.3 children per woman (2021)	~2.27 children per woman (2021)
Mortality Rate	6.14 deaths/1,000 population (Crude Death Rate)	~8 deaths/1,000 population (Crude Death Rate, 2021)	~8 deaths/1,000 population (Crude Death Rate, 2021)
Life Expectancy	69.37 years (WHO, 2022 est.)	~63 years (2021)	~72 years (2021)

Literacy Rate (Adult)	61% women, 74% men (15-49 years, 2022)	~70% (overall average, varies widely by country)	~86.3% (overall, recent estimate)
Median Age	20.7 years	Not readily available for entire continent, but generally very young (e.g., Sub-Saharan Africa: ~18-20 years)	~30 years
Urban Population %	56.60%	~44% (2021)	~57%

Sources (GSS, 2021: *World Bank, 2023; World Factbook, 2024; Worldometer, 2024).*

Population Structure and Urbanisation

1. Youthful Population Structure
   a. 36% of Ghanaians are aged 0-14, and 60% are working age (15-64) (2024).
   b. Reflects a youth bulge common in Africa, contrasting with aging populations globally.
2. Demographic Dividend Potential
   a. Large working-age population offers economic growth opportunities if paired with:
   b. Investments in education/skills training.
   c. Job creation to absorb the workforce.
3. Rapid Urbanisation
   a. 58-60% urban (vs. Africa's 44-45%), nearing global averages (~55%).
   b. Pros: Drives economic activity and innovation.
   c. Cons: Strains infrastructure (housing, transportation) and risks inequality.
4. Policy Imperatives
   a. Urban planning to manage growth sustainably.
   b. Essential services (water, sanitation) to support urban populations

Socio-Economic Factors and Policy Implications

1. Key Drivers of Population Trends
   a. Population growth is shaped by healthcare access (higher life expectancy), education (lower fertility, especially for women), and government policies (family planning, economic development).
   b. Poverty and gender inequality can increase fertility rates, while economic opportunities and female empowerment tend to reduce them.
2. Ghana's Declining Fertility & Challenges
   a. Falling fertility rates are linked to greater contraceptive use and women's labour force participation.

b. Youth unemployment drives migration for education/jobs abroad, impacting domestic labour markets.

3. Policy Recommendations for Sustainable Growth
   a. Invest in education, healthcare (including family planning), and job creation to harness Ghana's youthful population.
   b. Prioritise urban planning and infrastructure to manage rapid urbanisation and ensure inclusive development.
4. Global Implications
   a. Similar patterns exist worldwide: education and economic growth reduce fertility, while inequality and poverty sustain high birth rates.

Targeted policies are essential to balance demographic dividends with sustainable development

Future Projections and Potential Impacts

1. Ghana's Moderating Growth
   a. Population growth rate expected to decline to 1.4% by 2043, yet total population may reach 48.8 million.
   b. At current rates, population could double in 33 years, demanding long-term planning.
2. Africa's Rapid Expansion
   a. Continent projected to reach 2.5 billion by 2050, maintaining high growth trends.
   b. Contrasts with global slowdown, highlighting regional disparities.
3. Global Trends
   a. World population growth to peak mid-2080s, with Ghana and Africa outpacing global averages.
4. Key Implications for Ghana
   a. Infrastructure needs: Schools, healthcare, and transportation must expand to match growth.
   b. Environmental/resource pressures: Sustainable management is critical for water, land, and energy.
   c. Economic potential: Declining growth rates may ease youth dependency and boost per capita income if paired with:
      i. Job creation and education investments.
      ii. Proactive policies in urban planning and agriculture.

Outlook: Ghana faces both challenges (resource strain) and opportunities (demographic dividend) – strategic planning will determine whether growth translates into sustainable development.

Learning Tasks: "Comparing Population Trends"

1. Individually find growth rates for Ghana, Africa and the world (e.g. UN charts, World Bank Figures).
2. On graph paper or a digital tool, plot three lines (Ghana, Africa, World) over the same time period.

3. Mark one year when Ghana's growth was highest and one when Africa's or the world's trend changed noticeably.
4. Write two bullet sentences describing:
    a. How Ghana's growth compares to Africa's overall trend
    b. How both compare to the global average
5. Pair up and share one insight you found surprising and one feeling about interpreting real-world data.
6. Volunteers briefly explain their charts' stories and SEL reflections to the group

Pedagogical Exemplars

Experiential learning

Using relevant charts and figures, compare Ghana's population growth to that of Africa and the world.

1. Organise learners into mixed-ability groups with members from different backgrounds to promote inclusivity and diverse perspectives.
2. Provide relevant charts and figures comparing Ghana's population growth to Africa and the world, ensuring visual clarity and accessibility for all learners.
3. Use scaffolding materials such as worksheets and guiding questions to help learners focus on key comparisons and analyses.
4. Offer tailored assistance, such as one-on-one guidance or simplified materials, to accommodate varied intellectual abilities within the groups.
5. Conduct workshops on interpreting statistical data and using charts effectively to enhance learners' analytical skills.
6. Promote effective communication and teamwork within groups, emphasising respect and valuing diverse contributions.
7. Provide constructive feedback on group analyses and encourage learners to reflect on their learning process and group dynamics.
8. Foster an environment that emphasises empathy, active listening, and respectful dialogue, contributing to social-emotional learning.
9. Encourage learners to realise that they can accomplish their goals with hard work, persistence, and effective strategies, reinforcing a growth mindset.

Focal Area 2: Socio-Economic Implications of Migration from Africa to the Rest of the World

Introduction

In recent decades, many Africans have migrated to other parts of the world, including Europe, North America, the Middle East, and Asia. This movement has had significant social and economic effects on both the countries they leave and those they settle in.

Reasons Why People Migrate from Africa to the Rest of the World

People migrate for various reasons, commonly classified as push and pull factors.

Push Factors (Conditions that compel people to leave their country of origin)

These are the adverse circumstances within African countries that drive individuals to seek opportunities elsewhere.

1. **High Unemployment and Poverty:** A significant lack of viable economic opportunities is a primary driver. Many African economies struggle to create enough jobs for their rapidly growing, youthful populations. This leads to widespread unemployment and underemployment, forcing individuals to seek livelihoods abroad. For instance, in 2023, the youth unemployment rate in Ghana stood at over 13%, highlighting the challenge.
2. **Political Instability and Conflict:** Regions plagued by armed conflict, civil wars, and political unrest often result in mass displacement. People flee violence, persecution, and the breakdown of social order to seek safety and stability. Examples include conflicts in parts of the Sahel region, Sudan, and the Democratic Republic of Congo, which have generated millions of refugees and internally displaced persons.
3. **Poor Healthcare and Educational Systems**: Inadequate access to quality healthcare services and limited opportunities for higher education or specialised training compel many to migrate. Individuals seek better medical treatment for themselves or their families, or superior educational prospects for their children or for personal advancement that are unavailable or of a lower standard domestically.
4. **Environmental Challenges and Climate Change:** Africa is highly vulnerable to the impacts of climate change. Recurring droughts, desertification, floods, and other natural disasters can devastate agricultural livelihoods, displace communities, and exacerbate food insecurity, pushing people to migrate in search of more sustainable environments. The shrinking of Lake Chad, for example, has displaced hundreds of thousands of people in the surrounding countries.
5. **Human Rights Abuses and Persecution:** Individuals or groups facing persecution based on their ethnicity, religion, political beliefs, or sexual orientation, as well as those subjected to arbitrary detention, torture, or extrajudicial killings, often have no choice but to seek asylum or refuge in other countries.
6. **Lack of Social Amenities and Infrastructure:** Deficiencies in basic services such as clean water, sanitation, reliable electricity, and adequate housing, particularly in rural areas, can contribute to the desire to migrate to places with better living conditions.
7. **Corruption and Governance Issues:** Pervasive corruption can undermine economic development, discourage investment, and lead to a lack of trust in public institutions, diminishing hope for a better future within the country.

Pull Factors (Attractive conditions in destination countries that draw people)

These are the perceived benefits or opportunities in other parts of the world that attract migrants from Africa.

1. **Better Job Opportunities and Higher Wages:** The prospect of securing gainful employment with significantly higher wages compared to what is available at home is a powerful pull factor. Developed economies often have labour shortages in certain sectors (e.g., healthcare, agriculture, care services) or offer salaries that are simply unattainable in many African countries.
2. **Access to Quality Healthcare and Education:** Destination countries, particularly in Europe, North America, and parts of Asia, often boast advanced healthcare systems and world-class educational institutions. Migrants seek these superior services for their families' well-being and for their own professional and academic development.
3. **Political Stability and Security:** The promise of a peaceful, stable environment free from conflict, political oppression, and social unrest is a major draw for those fleeing violence or instability. This offers a sense of security and predictability that is often lacking in their home countries.
4. **Better Standard of Living and Social Services:** Destination countries typically offer a higher standard of living, characterised by better infrastructure, reliable public services (transportation, utilities), and a more robust social welfare system, including social security and unemployment benefits.
5. **Opportunities for Career and Personal Development:** Migrants, particularly skilled professionals, are attracted by environments that offer greater scope for career advancement, professional training, research opportunities, and personal growth that might not be available in their home countries.
6. **Existing Diaspora Networks:** The presence of established communities of fellow nationals in destination countries provides a support system, making the transition easier and offering social and economic connections that can facilitate finding employment and housing.
7. **Demand for Specific Skills:** Some developed countries actively recruit skilled labour in areas where they face shortages, such as medical professionals (doctors, nurses), engineers, and IT specialists.

Impacts of Migration on the Source Country (Country of Origin)

Migration has a complex and often dual impact on the countries from which people emigrate.

Positive Impacts

1. **Remittances**: This is arguably the most significant positive impact. Remittances are the monetary transfers sent by migrants back to their families and communities in their home countries. In 2023, remittance inflows to Sub-Saharan Africa were estimated to be around $54 billion by the World Bank. These funds significantly improve the living standards of recipient households, supporting consumption, education, healthcare, and investment in small businesses or housing. For some African countries, remittances constitute a substantial portion of their GDP, exceeding official development aid.
2. **Skill and Knowledge Transfer**: Migrants who return to their home countries (return migration) often bring back valuable new skills, technologies, business acumen, and international best practices acquired abroad. This "brain gain" can contribute to various sectors, enhancing productivity and innovation. For example, Ghanaian professionals returning from the diaspora can introduce new approaches in healthcare, education, or entrepreneurship.
3. **Reduced Unemployment Pressure:** Emigration, particularly of young, unemployed individuals, can temporarily ease the pressure on domestic labour markets, reducing unemployment rates and potential social unrest associated with job scarcity.

4. **Increased Trade and Investment:** Diaspora communities can foster stronger trade links between their home and host countries. They may also directly invest in businesses, real estate, or infrastructure projects in their countries of origin.
5. **Social and Cultural Connections:** Migration strengthens cultural ties and promotes a broader global perspective within the source country as people maintain connections with family and friends abroad.

Negative Impacts

1. **Brain Drain:** This is a major concern. The emigration of highly skilled workers (e.g., doctors, nurses, engineers, academics, IT specialists) leads to a significant loss of human capital. This "brain drain" weakens critical sectors, strains public services, and can hinder long-term development. For example, many African countries face severe shortages of medical professionals due to migration to developed countries.
2. **Family Separation and Social Disruption:** Long-term or permanent separation of family members can lead to emotional distress, psychological challenges, and a breakdown of traditional family structures. Children left behind by migrating parents may face difficulties in upbringing and development.
3. **Dependency on Remittances:** While remittances are beneficial, an over-reliance on them can create a "culture of dependency." It may discourage domestic economic development efforts if governments or individuals perceive remittances as a substitute for productive economic activity, or if there's less pressure to create local jobs.
4. **Loss of Productive Workforce:** Even if not "brain drain" (loss of highly skilled individuals), the emigration of younger individuals can reduce the available workforce in agriculture, manufacturing, and other sectors, leading to labour shortages in specific areas.
5. **Demographic Imbalances:** Sustained out-migration, particularly of young adults, can lead to an aging population in the source country, reducing the proportion of the working-age population relative to dependents.
6. **Social Costs of Irregular Migration:** The risks associated with irregular migration (e.g., deaths in deserts or at sea, exploitation) impose significant social and emotional costs on families and communities in the source country.

Impacts of Migration on the Destination Country (Receiving Country)

Migration also greatly impacts the countries that receive migrants by presenting both opportunities and challenges.

Positive Impacts

1. **Labour Force Support and Filling Labour Shortages:** Migrants often fill jobs that native-born populations are unwilling or unable to do, or where there are labour shortages due to demographic changes (e.g., aging populations). This is particularly evident in sectors like agriculture, construction, care services, hospitality, and sometimes highly specialised fields like IT and healthcare. For instance, in the UK's National Health Service (NHS), a significant proportion of doctors and nurses are foreign-born, including many from African countries.

2. **Cultural Diversity and Enrichment:** Migrants bring diverse languages, cuisines, traditions, music, and perspectives, contributing to a vibrant multicultural society. This cultural exchange can enrich social life, foster tolerance, and stimulate creativity.
3. **Economic Contribution:** Migrants contribute significantly to the economy of destination countries. They pay taxes (income tax, consumption tax), contribute to social security systems, spend money on goods and services, and often start businesses, creating jobs for others. Studies by the OECD often show that migrants contribute more to taxes than they consume in public services over their lifetime.
4. **Demographic Rejuvenation:** In countries with aging populations and declining birth rates, immigration helps to maintain a younger workforce, supporting pension systems and ensuring the dynamism of the labour market.
5. **Innovation and Entrepreneurship:** Migrants often exhibit high rates of entrepreneurship, starting new businesses that create jobs and introduce innovative products or services.
6. **Increased Consumption and Demand:** A growing population due to immigration increases overall demand for goods and services, stimulating economic activity and growth.

Negative Impacts

1. **Pressure on Public Services:** A sudden or large influx of migrants can place increased demand and strain on existing public services such as housing, education, healthcare, and public transportation infrastructure, particularly if planning and investment do not keep pace.
2. **Cultural Integration Challenges:** While diversity is positive, differences in language, cultural norms, values, and religious practices can sometimes lead to social tensions, misunderstandings, or challenges in effective integration, particularly if there are insufficient integration policies.
3. **Discrimination and Xenophobia:** Migrants, particularly those from different racial or ethnic backgrounds, may face prejudice, unfair treatment, racism, xenophobia, and social exclusion from some segments of the host society. This can manifest in employment, housing, or daily interactions.
4. **Wage Depression in Certain Sectors:** In some specific sectors, a large supply of migrant labour (especially low-skilled) can potentially lead to downward pressure on wages for native-born workers in similar jobs, although this is a complex and debated economic effect.
5. **Social Cohesion Issues:** If not managed well, large-scale migration can sometimes lead to concerns about social cohesion, particularly if migrants are concentrated in certain areas or if there are perceptions of competition for resources.

Challenges Faced by African Migrants

The journey and integration process for African migrants can be fraught with significant difficulties.

1. **Risky and Irregular Migration Routes:** Many African migrants resort to irregular (undocumented) routes due to limited legal pathways. This often involves dangerous journeys across the Sahara Desert, where migrants face extreme heat, lack of water, and exploitation by smugglers, followed by perilous sea crossings (e.g., across the Mediterranean) in unseaworthy boats, leading to countless deaths. The International Organisation for Migration (IOM) records thousands of deaths on these routes annually.
2. **Exploitation and Abuse:** Migrants, especially those without legal status, are highly vulnerable to exploitation by human traffickers, smugglers, and unscrupulous employers. They may be subjected to forced labour, sexual exploitation, exorbitant fees, debt bondage, and other forms of abuse.

3. **Legal and Documentation Issues:** Acquiring necessary visas, residency permits, and work permits can be a complex, costly, and time-consuming process. Many face difficulties with documentation, leading to irregular status and increased vulnerability.
4. **Language and Cultural Barriers:** Upon arrival, migrants often face significant challenges in adjusting to new linguistic environments and unfamiliar cultural norms, which can impede their ability to find employment, access services, and integrate socially.
5. **Racism and Discrimination:** African migrants, particularly those who are Black, may experience systemic racism, prejudice, and discrimination in various aspects of life in host countries, including employment, housing, law enforcement, and social interactions. This can be a major barrier to successful integration and can impact mental well-being.
6. **Limited Access to Social Services:** Undocumented migrants, in particular, often have limited or no access to essential social services like healthcare, education, or social welfare programs, increasing their hardship.
7. **Psychological Trauma:** Many migrants have experienced traumatic events in their home countries (conflict, persecution) or during their journey, leading to psychological distress, anxiety, and depression that may not be adequately addressed.
8. **Financial Exploitation:** Some migrants face financial exploitation from recruitment agencies, employers, or even within their own communities.

Role of Return Migration

Return migration refers to the process where individuals who have migrated to another country decide to return to their country of origin after a period of living abroad. This return can be voluntary (due to personal choice, completion of studies, or successful accumulation of savings) or involuntary (due to deportation, expiry of visas, or unfavourable conditions in the host country).

Return migration plays an increasingly recognised role in development, leading to a "brain gain" phenomenon.

1. **Skill and Knowledge Transfer:** Returnees bring back a wealth of new skills, specialised knowledge, international best practices, and innovative ideas acquired in more developed economies. This human capital can be instrumental in improving various sectors such as healthcare, education, technology, and business management within Ghana.
2. **Investment and Entrepreneurship:** Many returnees save money or gain access to capital while abroad, which they then invest in businesses, real estate, or other productive ventures upon their return. They often start businesses that create jobs and introduce new services or products to the local economy. For instance, Ghana has seen a rise in start-ups founded by returnees from the diaspora.
3. **Social Influence and Cultural Exchange:** Returnees can introduce new social norms, work ethics, management styles, and cultural practices that they've experienced abroad. They often act as agents of change, influencing local communities and fostering a more globalised outlook.
4. **Community Development:** Returnees often have a strong desire to contribute to their home communities. They may support local development initiatives, fund projects in education, health, or infrastructure, or engage in philanthropic activities.
5. **Remittances and Diaspora Engagement:** Even upon return, many continue to facilitate remittances or maintain strong links with the diaspora, encouraging further investment and engagement from their networks abroad.

6. **Strengthening Institutions:** Returnees with experience in governance, public service, or civil society organisations abroad can apply their knowledge to strengthen local institutions and improve public sector efficiency.

Learning Tasks

"Migration Matters Inquiry"

1. *I*n mixed-ability, inclusive groups, assign roles (researcher, recorder, presenter, encourager).
2. Use textbooks, reliable websites, news articles or community interviews to find socio-economic implications of migration (push and pull factors).
3. For each implication, write a one-line description and record its source.
4. Group your findings into positive and negative effects.
5. On a poster or slide, map out at least three implications with arrows or icons. Label each clearly.
6. In your group, share one surprise you discovered and one feeling you had while researching.
7. Each team presents two key implications and their SEL reflection in a 3-minute showcase.

"Talking Migration: Local to Global"

1. In mixed groups with classmates from different regions, appoint a facilitator and a notetaker.
2. Each learner briefly shares one experience or fact about migration in their home region (Ghana). Others listen respectfully.
3. Using whole-class prompts, discuss:
   a. One way migration in Ghana is similar to Africa at large
   b. One way Ghana's migration differs from global trends
4. In your groups, list two socio-economic effects of migration (e.g. remittances, skills loss, cultural exchange).
5. Each member names one strength they noticed in a peer's contribution and one feeling about learning from diverse perspectives.
6. Facilitators share one key similarity, one key difference, and one socio-economic implication with the class.

Pedagogical Exemplars

Inquiry-Based Learning

Research from textbooks, the internet and other sources on the socio-economic implications of migration.

1. Provide access to a variety of resources, including textbooks, internet databases, and articles on the socio-economic implications of migration, ensuring accessibility for all learners.

2. Offer scaffolding materials such as guiding questions and checklists to help learners focus their research and ensure comprehensive exploration of the topic.
3. Provide tailored assistance, such as one-on-one guidance or simplified resources, to accommodate varied intellectual abilities and ensure equitable learning opportunities.
4. Conduct workshops on effective research techniques, critical evaluation of sources, and data interpretation to enhance learners' inquiry skills.
5. Promote teamwork and cross-sharing of knowledge within groups, emphasising respect for diverse perspectives and fostering an inclusive environment.
6. Provide constructive feedback on research findings and encourage learners to reflect on their learning process and strategies used.
7. Foster an environment that emphasises empathy, active listening, and respectful dialogue, contributing to social-emotional learning.
8. Encourage learners to recognise that they can accomplish their research goals with hard work, persistence, and effective strategies, reinforcing a growth mindset.
9. Allow learners to present their findings in various formats, such as written reports, presentations, or discussions, accommodating different expression styles.

Talk for learning

- In an all-inclusive setting with a focus on learners from different parts of the country, share your feedback and analyse the differences and similarities between migration in Ghana, Africa and the world.
- Discuss the socio-economic implications of migration.

1. Provide learners with access to available data from sources like the Ghana Statistical Service and the International Organisation for Migration (IOM) to inform discussions on migration.
2. Use scaffolding materials such as guiding questions to help learners focus on analysing differences and similarities in migration trends across Ghana, Africa, and the world.
3. Facilitate an all-inclusive class discussion, encouraging learners from different parts of the country to share their feedback and perspectives.
4. Tailor support by providing varying levels of guidance or resources, such as simplified explanations or advanced data analysis tasks, to accommodate diverse intellectual abilities.
5. Promote a respectful environment where learners feel comfortable expressing their opinions and constructively discussing disagreements.
6. Provide constructive feedback on learners' analyses and encourage reflection on their learning process.
7. Foster an environment that emphasises empathy, active listening, and respectful dialogue, contributing to social-emotional learning.
8. Reinforce the understanding that learners can achieve their goals through hard work, persistence, and effective strategies, fostering a growth mindset.
9. Allow learners to creatively present their analyses, using verbal, written, or digital formats, accommodating different expression styles.

Key Assessment Level 3: Individual Homework

Short Answer Questions

1. Ghana's youthful population presents a potential "demographic dividend". Analyse two distinct policy areas the government must invest in to transform this potential benefit into actual economic growth. Justify why each investment is critical.
2. The content discusses both the negative impact of "brain drain" and the positive impacts of "remittances" and "skill transfer." Evaluate how an African source country can simultaneously experience both a net loss and a net gain from its skilled citizens migrating abroad.
3. **Table 8.1** shows that Ghana's population growth rate is lower than Africa's average but higher than the world's. Based on this intermediate position, analyse one socio-economic challenge Ghana shares with the rest of Africa and one advantage it may have over many other African nations in managing its population.
4. The content identifies "High Unemployment" and "Poor Healthcare and Educational Systems" as major push factors for migration from Africa. Propose a two-part strategy for an African government to reduce the "brain drain" of its skilled professionals, like doctors, by directly addressing these two factors.

Essay Questions

1. a. Explain two push factors that cause the citizens of African countries to migrate to countries in other parts of the world. [6 marks]

   b. Analyse how the migration of Africans affects both the country of origin and the destination, using specific examples. [8 marks]

   c. Propose strategies African governments can implement to reduce the negative impacts of migration and enhance its socio-economic benefits. [6 marks]

   [Total 20 marks] (**DoK 3**)
2. a. Compare and contrast the birth rates, death rates, sex ratio, and life expectancy of Ghana with the rest of Africa

   b. Evaluate how these factors influence and challenge socio-economic development.

   [Total 20 marks] **(DoK 3)**

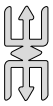
PLC Session 8

45 minutes	Planning & Reviewing the Learning Plan

1. Begin the session by recapping lessons from the previous year/session/week, focusing on how learning was applied.
2. Use your subject specific app to explore the content before planning. Ask the app to
   a. explain the week's concepts in a practical way that will make it easier for learners to understand
   b. identify two or three common misconceptions learners may have on the week's content and how to address them using contexts familiar to Ghanaian learners. (NTS 3a, 3g and 3m).
3. Use your subject specific app to plan your lesson. Ask the app to
   a. suggest the most effective method for teaching the week's concepts to learners with diverse backgrounds.

b. suggest learning activities, differentiation and essential questions based on the method of teaching (NTS 3a-3q)

c. review your prepared learning plan and address any challenging issues you may have identified in your subject area (NTS 3a-3c).



Note

- *Take note of the recap topics linked to Years 1 and 2 while preparing for your lesson.*
- *Refer to the Values Learning Community Handbook and link the values for the week in your lesson to ensure that learners are applying what they learn.*

4. Plan the week's key assessment with your app

   a. The key assessment for the week is ***individual homework***. Chat with your app to pl

   b. an this assessment, indicating what you and your learners will do before, during and after the homework (NTS 3k-3q).

10 minutes **Content Exploration**

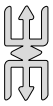
5. As a subject group, select one problem or idea/term in the week's content that is challenging (not a routine procedural question, but one that requires conceptual understanding) and then

   a. use the app, ask it to solve the problem step by step and explain the reasoning behind each step (you may be assisted by a teacher who is strong in the content area)

   b. all teachers in the group work through a similar problem individually for 3–4 minutes

   c. the group then works through the problem together step by step

   d. highlight the most common errors made at each step and discuss (NTS 1c, 1e, 2c, 2e, 3e-3j).



Note

- *This part is not just about 'How do I teach this?' but how do I teach it for learners to understand?*
- *If the group still shares the same content gap, use the app: ask it to solve the problem step by step and explain the reasoning behind each step.*
- *Problems/ideas discussed should be sourced from the Teacher Manual content, not invented separately. This keeps the content exploration directly connected to what teachers will deliver.*

30 minutes **Enactment**

6. Enact a teaching activity based on your learning plan (NTS la-1b, 1e-lg, 2c, 2e, 2f, 3c-3j and 3o).

   a. Colleagues observe with specific attention to clarity of concept explanation, use of familiar Ghanaian examples and how misconceptions are handled if they arise.

   b. After the enactment, ask for structured feedback from the group

      i. was the concept explained in a way that a learner with no prior knowledge could follow?

      ii. were the examples grounded in contexts familiar to Ghanaian learners?

      iii. did any misconceptions surface and if so, how were they addressed?

5 minutes	Reflection

7. Reflect and share your views on the session. One thing that worked well, what did not work well and what you will do differently. (NTS 1a, 1b).
8. Identify a critical friend to observe and provide feedback on your lesson in relation to the PLC Session conducted (NTS 1f, 1g).
9. Remember to
    a. transfer your chats into your learning planner template.
    b. read your Teacher Manual and related Learner Material in preparation for the next session. Take note of the recap weeks, which are linked to Years 1 and 2 (NTS 3a).
    c. integrate National Values, GESI, SEL, and 21st century skills into your learning activities, assessment tasks, and rubrics/mark schemes.

Section 3 Review

The section explored the dynamics of population growth, distribution, and migration in Ghana. It examined how population growth varies across regions. Migration trends, including rural-urban migration, internal displacement, and international movements, were analysed to understand their impact on settlement patterns and population distribution. Additionally, various settlement types and how demographic changes shape spatial organisation in both rural and urban areas were studied. The section concluded with a comparative analysis of Ghana's population growth relative to Africa and the world, highlighting key similarities and differences in demographic trends and the influence this has on socio-economic development.

MARKING SCHEMES FOR THE KEY ASSESSMENTS

WEEK 6

Short Answers

Q1

Marking Scheme

- Identifies the link between female education and fertility (2 marks): Correctly states that increasing female education levels is linked to lower fertility rates.
- Explains the mechanism (2 marks): Explains that educated women tend to marry later and have fewer children due to career aspirations and better knowledge of family planning.
- Analyses the long-term effect (2 marks): Concludes that while the impact is gradual, the policy is likely to contribute to a long-term decline in Ghana's fertility rate and slow the population growth rate.

Total: 6 marks

Sample Answer

The Free SHS policy is likely to slow Ghana's future population growth rate by reducing fertility rates over the long term. The text states that lower female education levels correlate with higher fertility. The Free SHS policy has increased educational access, particularly for girls. As more women receive secondary education, they are more likely to delay marriage and childbearing to pursue careers and have better access to family planning information. While cultural norms still favour large families, this policy will likely lead to a gradual reduction in the total fertility rate, which in turn will slow down the country's population growth.

Q2

Sample Answer

Two key factors explain Ghana's continued rapid population growth despite a falling TFR:

a. **Population Momentum**: Ghana has a very youthful population, with a median age of just 21.1 years. This means a large cohort of young people is constantly entering their reproductive years. Even if these individuals have fewer children each than previous generations (a lower TFR), the sheer number of people having children keeps the overall birth rate and population growth high.

b. **Declining Mortality Rates:** Improvements in healthcare, sanitation, and nutrition have caused a dramatic drop in the Crude Death Rate (CDR), from 19.0 per 1,000 in 1960 to 6.14 in 2022. This means people are living longer and more children are surviving to adulthood. This widens the gap between birth rates and death rates, resulting in a high rate of natural increase that fuels population growth.

Q3

Marking Scheme

- Justification for Greater Accra (3 marks): Prioritises Greater Accra and correctly uses the concept of high density (over 1,200 people/km²) to explain that this ensures the hospital serves the largest number of people in a concentrated area, maximising access and efficiency.
- Analysis of Distribution (2 marks): Explains that population distribution shows where people are located spatially, and since southern coastal regions are the most populated parts of the country, placing the hospital there is logical.
- Critique of using total population (1 mark): Explains that total population alone is misleading because it doesn't show how crowded or spread out the people are, which is critical for service planning.

Total: 6 marks

Sample Answer

I would prioritise building the hospital in the Greater Accra Region. The justification lies in its population density, which is the highest in Ghana at over 1,200 people/km². This high density means a large number of people live in a relatively small, accessible area, so the hospital would serve the maximum number of potential patients efficiently.

Furthermore, population distribution in Ghana shows that most people are concentrated in the southern coastal areas. Placing a single specialised facility in this highly populated zone is more strategic than placing it in a sparsely populated region. Using only total regional population would be misleading, as a large region could have a high total population but a very low density (like the Northern Region), meaning people are too spread out to easily access a single central facility.

Essay Questions

Q1

Structure and Mark Allocation

Part A: Analyse Factors Influencing Population Growth in Ghana (8 marks)

a. **Identification of Factors (4 marks)**

i. Factor 1: Natural Increase (2 marks)

- Identify natural increase as a major factor (high birth rates and declining death rates).
- Provide evidence or data trends from 1960 onwards.

ii. Factor 2: Migration (2 marks)

- Identify migration as a contributing factor (rural-urban migration, immigration).
- Provide examples or data trends supporting this.

iii. Analysis and Explanation (4 marks)

b. **Natural Increase Explanation (2 marks)**

i. Explain how improvements in healthcare and nutrition have led to higher birth rates and lower death rates.

c. **Migration Explanation (2 marks)**

i. Analyse how economic opportunities in urban areas attract people, contributing to population growth.

Part B: Effects on Social Services (12 marks)

a. **Impact on Education (6 marks)**

i. Increased Demand for Educational Facilities (2 marks)

- Discuss how rapid population growth leads to overcrowded classrooms and insufficient educational infrastructure.

ii. Quality of Education (2 marks)

- Analyse the impact on teacher-student ratios and resource allocation.

iii. Example (2 marks)

- Provide a specific example of how a region or city in Ghana has been affected.

b. **Impact on Health Care (6 marks)**

i. Strain on Health Facilities (2 marks)

- Discuss how population growth results in increased demand for healthcare services, leading to overburdened facilities.

ii. Access to Quality Health Care (2 marks)

- Analyse the challenges in accessing timely and quality healthcare services.

iii. Example (2 marks)

- Provide a specific example of how a region or city in Ghana has been affected.

Additional Considerations

- Clarity and Organisation: Ensure that responses are well-structured and clearly articulated, with logical progression of ideas.
- Use of Data and Examples: Specific and relevant data or examples should be used to support points and enhance understanding.
- Depth of Analysis: Demonstrating comprehensive understanding and insightful analysis will result in higher marks.

Q2

Structure and Marks Allocation

a. **Identify 2 regions (2 marks):**

i. Name and population density of each region (2 marks).

b. **Reasons for Population Density of two regions (4 marks):**

i. **Densely Populated Areas (2 marks):**

- Correct identification of economic and historical factors contributing to density (2 marks).

ii. **Sparsely Populated Areas (2 marks):**

- Correct identification of environmental and historical factors influencing sparsity (2 marks).

c. **Impacts of population densities on each of the socio-economic factors (14 marks):**

i. Identifies ONE impact and provides a valid reason as to how HIGH population density has an impact. (1 mark)

ii. Identifies ONE impact and provides a valid reason as to how LOW population density has an impact. (1mark)

Show learners the following example of the type of answer required to achieve DoK 3:

i. One impact of **high population density** on infrastructure development in Ghana is the **strain on urban transportation systems**. Cities like Accra and Kumasi experience **severe traffic congestion** due to rapid urbanisation and a growing population. The high demand for roads, public transportation, and parking spaces often outpaces infrastructure development, leading to overcrowded streets and longer commute times

ii. One impact of **low population density** on infrastructure development in Ghana is the **limited expansion of formal banking services in rural areas**. Traditional banks often struggle to establish branches in sparsely populated regions due to **high operational costs and low customer demand**. As a result, many rural communities lack access to financial services, making economic growth and investment more challenging.

WEEK 7

Shore Answers

Q1

Marking Scheme

- Analysis of Intensified Migration (3 marks): Explains that drought acts as a powerful environmental "push factor", leading to crop failures and loss of agricultural livelihoods, forcing a larger number of people to migrate south in search of economic opportunities.
- Analysis of Challenges for Accra (3 marks): Identifies at least two specific challenges for the destination city, such as increased pressure on already strained housing, transportation, health facilities, and sanitation services, leading to the growth of informal settlements.

Total: 6 marks

Sample Answer

A severe drought would intensify the North-South migration pattern by strengthening the environmental push factors. As described in the text, northern Ghana is prone to erratic rainfall and droughts, which lead to crop failures. A multi-year drought would devastate agricultural livelihoods, forcing a larger-than-usual number of people to move south toward cities like Accra in search of alternative work.

This intensified influx of migrants would create significant new challenges for Accra. It would put immense pressure on the city's infrastructure, leading to housing shortages and the expansion of informal settlements. Furthermore, public services such as transportation, healthcare, and sanitation would become even more strained, potentially worsening issues like traffic congestion and waste management.

Q2

Marking Scheme

- Challenge 1 (3 marks): Identifies and explains the challenge of high infrastructure cost and logistical difficulty, noting that building access roads and extending utilities (water, electricity) to widely scattered households is far more expensive than in a clustered settlement.
- Challenge 2 (3 marks): Identifies and explains the challenge of accessibility and viability, explaining that students and patients would have to travel long distances to reach the facilities, and a single school or clinic may not serve enough people to be sustainable or efficient.

Total: 6 marks

Sample Answer

Two major challenges would be cost and accessibility.

a. High Infrastructure Costs: In a dispersed settlement, where buildings are widely spaced, the cost of infrastructure per household is extremely high. Providing access roads, electricity, and piped water to each scattered compound would be logistically difficult and far more expensive compared to servicing a single nucleated village.

b. Poor Accessibility and Service Viability: The text explicitly states that this pattern "makes provision of public services like schools and clinics more difficult". A centrally located school or clinic would be too far for many residents to travel to daily. Alternatively, building multiple smaller facilities would be inefficient and difficult to staff, as each facility would serve only a small number of people.

Q3

Marking Scheme

- Analysis of First Move (3 marks): Correctly identifies the move from the village to Tamale as intra-regional migration and explains the pull factors were likely initial job opportunities and access to urban amenities within the same region.
- Analysis of Second Move (3 marks): Correctly identifies the move from Tamale (Northern Region) to Accra (Greater Accra Region) as inter-regional migration and explains that the pull factors were likely superior economic opportunities (better job) and access to even better social amenities available in the nation's primary economic hub.

Total: 6 marks

Sample Answer

This person's journey demonstrates two distinct migration types.

The first move from a village to Tamale city is an intra-regional migration, as it is a movement within the same administrative region. The likely pull factors were the search for initial employment and access to regional-level services and amenities that were unavailable in the village.

The second move from Tamale to Accra is inter-regional migration, as it involves moving between two different regions. The pull factor here was a superior economic opportunity (a better job). Accra, as Ghana's largest urban and economic centre, offers more specialised and

higher-paying jobs and better social amenities than regional capitals, acting as a strong pull factor for ambitious individuals.

Q4

Marking Scheme

- Benefit 1 (3 marks): Identifies the injection of capital and skills, explaining that entrepreneurs can establish new businesses (e.g., mango-processing enterprise) that create local jobs, while retirees may bring savings and pensions that boost the local economy.
- Benefit 2 (3 marks): Identifies the transfer of knowledge and experience, explaining that these migrants (like a retired nurse or graduates opening tutorial centres) bring valuable skills and new ideas that can improve local services and spread economic activity more evenly across the country.

Total: 6 marks

Sample Answer

Urban-to-rural migration can positively develop rural communities in two key ways:

a. Economic Investment and Job Creation: Urban migrants, particularly entrepreneurs, often bring capital and new business ideas to rural areas. The document gives the example of a couple leaving Tema to start a mango-processing enterprise. Such ventures create jobs for local residents, stimulate the local economy, and can add value to local agricultural produce.

b. Skill and Knowledge Transfer: Migrants returning from cities bring valuable skills and experience. The examples of a retired nurse returning to her community or graduates opening tutorial centres demonstrate this. This transfer of expertise can improve the quality of local services like healthcare and education, contributing to the overall development and "spreading economic activity and skills more evenly across the country".

Essay Questions

Q1

Part A: Map Drawing to Indicate Migration Routes (12 marks)

Structure and Marks Allocation

a. Accuracy and Completeness (6 marks)

i. Outline of Ghana (2 marks)

- Accurately draw the outline map of Ghana.

ii. Regions and Capitals (2 marks)

- Correctly indicate major regions and their capitals.

iii. Migration Arrows (2 marks)

- Accurately place arrows to show the major migration routes within and among regions.

b. Clarity and Presentation (6 marks)

i. Legibility and Neatness (2 marks)

- The map should be clear, legible, and neatly drawn.

ii. Use of Symbols and Key (2 marks)

- Include a key or legend explaining the symbols/arrows used for migration routes.

iii. Overall Presentation (2 marks)

- The map should be well-organised, with an overall professional appearance.

Part B: Discussion of the reasons for movement. Discussion must be related to identified movement.

Mark Scheme (8 marks total)

1. Economic Opportunities (2 marks)
   - o Identification (1 mark): Movement from rural areas to cities for jobs.
   - o Discussion (1 mark): Urban centres like Accra and Kumasi attract migrants due to higher wages, business opportunities, and industrial growth.
2. Agricultural Challenges (2 marks)
   - o Identification (1 mark): Migration due to poor farming conditions.
   - o Discussion (1 mark): Unpredictable rainfall, soil degradation, and land shortages push people from rural farming communities toward regions with more stable economic prospects.
3. Educational Access (2 marks)
   - o Identification (1 mark): Movement for better education opportunities.
   - o Discussion (1 mark): Many people relocate to areas with well-established schools and universities, such as Accra and Cape Coast, to access quality education.
4. Conflict or Environmental Factors (2 marks)
   - o Identification (1 mark): Migration due to environmental risks or social instability.
   - o Discussion (1 mark): Flooding, deforestation, and local conflicts in certain regions force people to seek safer living conditions elsewhere.

WEEK 8

Short Answers

Q1

Marking Scheme

- Policy Area 1 (3 marks): Identifies Education and Skills Training (1 mark). Justifies that this is critical to ensure the large youth population is productive, innovative, and capable of filling skilled jobs rather than being unemployed. (2 marks)
- Policy Area 2 (3 marks): Identifies Job Creation (1 mark). Justifies that without sufficient employment opportunities, a large youth population can lead to unemployment and social instability instead of economic growth. (2 marks)

Total: 6 marks

Sample Answer

To achieve a demographic dividend, the government must invest in two critical policy areas:

a. Education and Skills Training: A large youth cohort is only a benefit if it is educated and skilled. Investing in quality education and vocational training is critical to equip young

people with the capabilities needed for a modern economy. Without these skills, the youth bulge cannot contribute effectively to economic productivity.

b. Job Creation: It is essential to create enough jobs to absorb the large number of young people entering the workforce. If the economy cannot provide employment, a large youth population can lead to high unemployment and social strain. Therefore, policies promoting entrepreneurship and attracting investment in labour-intensive sectors are critical to turn the potential workforce into an actual economic benefit.

Q2

Marking Scheme

- Explanation of the Net Loss (3 marks): Clearly explains "brain drain" as the loss of highly skilled professionals (e.g., doctors, engineers), which weakens critical public services and hinders domestic development.
- Explanation of the Net Gain (3 marks): Explains that migrating citizens send back remittances, which are a major source of foreign currency that improves living standards and supports local economies. Also mentions that returning migrants can bring back valuable skills and knowledge ("brain gain").

Total: 6 marks

Sample Answer

An African country can experience both a loss and a gain from migration through different mechanisms:

a. The Net Loss (Brain Drain): The country suffers a direct loss when its highly skilled workers, such as doctors, engineers, and academics, emigrate. This "brain drain" weakens critical sectors like healthcare and education, as the nation loses the human capital it invested in, hindering its long-term development capabilities.

b. The Net Gain (Remittances and Skills): The country gains significantly from the financial remittances sent home by migrants. These funds, which totalled around $54 billion for Sub-Saharan Africa in 2023, are a vital source of income that supports families, education, and local investment. Furthermore, if migrants return, they often bring back advanced skills and knowledge, contributing to a "brain gain" that benefits the local economy.

Q3

Marking Scheme

- Shared Challenge (3 marks): Identifies a challenge related to having a growth rate much higher than the world average, such as the strain on resources and the need to create jobs for a youthful population.
- Relative Advantage (3 marks): Identifies an advantage stemming from its growth rate being lower than the African average, such as having a lower fertility rate (3.43 vs. ~4.3 for Africa), which gives the government more time to plan and potentially makes achieving a demographic dividend more manageable.

Total: 6 marks

Sample Answer

a. Shared Challenge: Like much of Africa, Ghana faces the challenge of managing a rapidly growing, youthful population. Its growth rate of ~1.89% is more than double the world

average, which puts significant pressure on infrastructure like schools and healthcare and requires the economy to create a large number of jobs for its youth to prevent unemployment.

b. Relative Advantage: Ghana's advantage over many other African nations is that its population growth is moderating at a faster pace. Its Total Fertility Rate of about 3.43 is below the African average of ~4.3. This slower (though still high) growth rate gives the country a longer "doubling time" (estimated at 36 years), providing more opportunity to invest in education and infrastructure per person and making the goal of harnessing its demographic dividend more attainable than for countries with even higher fertility rates.

Q4

Marking Scheme

- Strategy for Unemployment (3 marks): Proposes a specific and relevant strategy, such as creating public-private partnerships to fund local start-ups in the health-tech sector or offering tax incentives for companies that hire and train local medical professionals.
- Strategy for Poor Services (3 marks): Proposes a specific and relevant strategy, such as increasing government investment in advanced medical training facilities and equipment and improving salaries and working conditions for healthcare workers to make staying in the country a more attractive career option.

Total: 6 marks

Sample Answer

A government could implement the following two-part strategy to reduce the "brain drain" of doctors:

a. Address Unemployment and Create Opportunities: Instead of just having doctors compete for limited public sector jobs, the government could create a fund to provide seed capital for doctors and health professionals to open private clinics or health-tech startups in underserved areas. This addresses the lack of opportunities by fostering entrepreneurship and creating new jobs within the healthcare sector, reducing the incentive to seek employment abroad.

b. Improve Healthcare and Education Systems: The government should increase the budget for healthcare to improve working conditions, raise salaries for doctors to be more competitive, and invest in modern medical equipment for hospitals. Furthermore, establishing local postgraduate medical training programs that are internationally recognised would reduce the need for doctors to go abroad for specialisation, thereby tackling the pull of superior educational systems elsewhere.

Essay Questions

Q1

Structure and Marks Allocation

Part A: Explain Why African Migrants Move to Other Parts of the World (6 marks)

a. **Push Factors (must be linked to a case study) (3 marks each)**

Example 1: Employment Opportunities (3 marks)

- Discuss the search for better job working conditions and higher wages as a primary motivation for migration. (2 marks)

- Case study might be - the migration of doctors, nurses, and carers to the UK or other European nations. (1 mark)

Example 2: Poor infrastructure and investment (3 marks)

- Discuss the need for access to essential services like healthcare and education which can be limited if governments do not have the funds to meet the demand for even basic services. (2 marks)
- Case study might be - Nigerian students often seek higher education in the UK and the US due to limited university capacity and lower academic standards in Nigeria. Many students pursue degrees in medicine, engineering, and business, aiming for better career prospects. (1 mark)

Each must refer to an example or case study from a country in Africa (but not Ghana)

b. **Impacts on country of origin and destination (8 marks)**

i. Impacts on country of origin (4 marks).

Name a country and describe three impacts related to the loss of people due to migration to another country.

Country, for example, Nigeria (one mark)

Impacts could be any three from - Brain drain, Remittances, Skills, Dependency, and Development. Must be fully explained for example: Dependency: Nigeria becomes over-reliant on financial aid and resources sent back by migrants so local industries and job opportunities cannot strengthen the economy.

ii. Impacts on the country of destination (4 marks)

Country for example France (one mark)

Impacts could be any three from cultural impact, labour markets, integration challenges, political influence, and diplomatic relations with countries like Algeria, Morocco, Senegal, and Mali. Must be fully explained, for example Cultural impact: migrants enrich French society with new traditions, cuisine, and languages, shaping the country's multicultural identity.

Each must refer to an example or case study from a country in Africa (but not Ghana)

c. **Mitigation strategies to reduce negative impact and enhance socio-economic benefits (6 marks)**

i. Reduce negative impact (3 marks). Three fully explained from:

Economic Development – Investing in job creation, entrepreneurship, and infrastructure can reduce the need for migration by providing better opportunities at home.

Education & Skills Training – Strengthening education systems and vocational training ensures that citizens have the qualifications to thrive locally, reducing brain drain.

Regional Cooperation – African nations can collaborate on policies that promote intra-African migration, allowing skilled workers to contribute to neighbouring economies instead of leaving the continent.

Improved Governance and Stability – Addressing corruption, political instability, and social inequalities can create a more secure environment, reducing the push factors that drive migration.

ii. enhance socio-economic benefits (3 marks). Three fully explained from:

Skill Development and Recognition – Establishing programs that help migrants gain internationally recognised qualifications ensures they can contribute effectively to host economies.

Bilateral Agreements – Strengthening partnerships between African nations and destination countries can create structured migration pathways that benefit both sides.

Remittance Optimisation – Encouraging investment-friendly policies allows migrants to send money home in ways that support entrepreneurship and economic growth.

Circular Migration Programs – Creating opportunities for migrants to return home with new skills and experiences fosters knowledge transfer and local development.

Q2

Structure and Marks Allocation

Part a.

a. **Introduction (2 marks)**

i. Introduce the topic of population demographics in Ghana and Africa. (1 mark)

ii. State the importance of understanding demographic indicators in socio-economic development. (1 mark)

b. **Comparison and Contrast of Population Characteristics (12 marks)**

i. Birth Rates (3 marks)

- Compare the birth rates of Ghana and Africa, noting similarities and differences. (1 mark)
- Analyse the implications of birth rates on socio-economic development, such as workforce growth and resource allocation. (2 marks)

ii. Death Rates (3 marks)

- Compare the death rates of Ghana and Africa, highlighting trends and contrasts. (1 mark)
- Evaluate the implications of death rates on healthcare systems and longevity-related policies. (2 marks)

i. Sex Ratio (3 marks)

- Discuss the sex ratio in Ghana and Africa, noting any significant disparities. (1 mark)
- Analyse the socio-economic implications, including gender-based policies and labour market impacts. (2 marks)

ii. Life Expectancy (3 marks)

- Compare life expectancy in Ghana and Africa, identifying key factors influencing these figures. (1 mark)

- Discuss implications for social services, pension systems, and quality of life. (2 marks)

Part b

Implications for Socio-Economic Development (4 marks)

i. Evaluate how the combined demographic indicators impact broader socio-economic development in Ghana and Africa. (2 marks)

ii. Explore strategies for addressing demographic challenges and leveraging opportunities for development. (2 marks)

Conclusion (2 marks)

i. Summarise the key points discussed and their implications for future socio-economic policies in Ghana and Africa. (1 mark)

ii. Ensure clarity, logical flow of ideas, and coherence in presenting arguments. (1 mark)

SECTION 4: ECONOMIC ACTIVITIES IN GHANA

STRAND: HUMAN AND ENVIRONMENT

Sub-Strand: Economic Activities

Learning Outcome: *Assess the role of tourism, trade and transportation /communication to the socio-economic development of Ghana*

Content Standard: *Evaluate the tourism, trade and transportation /communication sectors in Ghana*

INTRODUCTION AND SECTION SUMMARY

This section will examine the critical roles of tourism, trade, transportation and communication in Ghana's socio-economic development. It will highlight how these sectors contribute to income generation, employment creation, and national growth. It will also explore the major challenges affecting each sector, such as infrastructure deficits, policy gaps, and market access limitations. Through discussions and case studies, learners will develop analytical skills to assess the contributions and constraints of these sectors and propose practical solutions for their improvement and sustainability.

The weeks and the indicators covered by the section are:

Week 9: Examine the role of tourism in the socio-economic development of Ghana and the challenges facing the tourism sector

Week 10: Assess the role of trade in the socio-economic development of Ghana and the challenges facing the sector

Week 11: Examine the role of transportation and communication in the socio-economic development of Ghana and the challenges facing the *sector*

The section on "Economic Activities in Ghana" in this Year 3 TM builds upon the foundational concepts introduced in Years 1 and 2 within the "Human and Environment" strand, particularly under the sub-strand "Economic Activities." In Year 1, students start by exploring primary economic activities such as agriculture, lumbering, and mining, focusing on their methods, importance, and challenges (1.3.2.LO.1). This foundational knowledge sets the stage for understanding broader economic sectors. In Year 2, the curriculum expands to cover the types, distribution, characteristics, importance, and challenges of manufacturing industries in Ghana (2.3.2.LO.1). Year 3 continues this progression by assessing the role of tourism, trade, and transportation/communication in the socio-economic development of Ghana (3.3.2.LO.1).

SUMMARY OF Pedagogical Exemplars

This section employs a range of inclusive, learner-centred pedagogies to promote critical thinking, collaboration, and practical application of knowledge. Activity-based learning engages learners in interpreting topographical maps, analysing spatial relationships, and calculating gradients. Think-pair-

share and talk-for-learning strategies encourage reflection and discussion on population and migration issues. Collaborative and groupwork approaches, in GESI-responsive and mixed-ability settings, enable learners to explore population dynamics, settlement patterns, and socio-economic sectors such as tourism, trade, transportation, and communication. Experiential learning using real data enhances global and regional comparisons, while inquiry-based learning fosters independent research on migration and development. Project-based learning further deepens understanding by linking concepts to real-world challenges and promoting teamwork. These pedagogies are designed to be inclusive, culturally responsive, and to support meaningful learner engagement.

ASSESSMENT SUMMARY

Indicators	DOK Level	Assessment Strategy and/or Mode
Week 9 *Examine the role of tourism in the socio-economic development of Ghana and the challenges facing the tourism sector*	*4*	***Key Assessments (Group Project)*** *4 short answer questions with marking scheme* *1 project work to be done in groups with a detailed marking scheme showing structure and marks allocation*
Week 10 *Assess the role of trade in the socio-economic development of Ghana and the challenges facing the sector.*	*4*	***Key Assessment (Individual class/homework)*** *4 short answer questions with marking scheme* *2 essay questions, one in the form of case study and the other in discussion form with detailed marking schemes showing structure and mark allocation*
Week 11 *Examine the role of transportation and communication in the socio-economic development of Ghana and the challenges facing the sector*	*3*	***Key Assessment (Individual class/homework)*** *4 short answer questions with marking scheme* *2 essay questions in the form of analysis and comprehensive report writing to be done in groups with a detailed marking scheme showing structure and marks allocation*

Y3 RECAP: Role of Tourism/Trade/ Transportation /Communication in socio-economic development	
YEAR/TOPIC	Activities/Tasks – can be in groups or pairs or individual
Year 1: Economic Activities Related to Physical Features	1. Discuss the importance of climate, vegetation, and soils to socio-economic development. 2. Use collaborative learning to explore how physical features support tourism.
Year 1: Economic Activities in Ghana	1. Discuss the methods and importance of agriculture, lumbering, and mining in Ghana. 2. Explore how these activities support trade.
Year 2: Manufacturing Industries	1. Examine the characteristics and challenges of manufacturing industries in Ghana. 2. Discuss the role of trade and its socio-economic impacts.

WEEK 9

Learning Indicator: *Examine the role of tourism in the socio-economic development of Ghana and the challenges facing the tourism sector*

Focal Area: Tourism in Ghana

Introduction

Tourism, in its simplest form, involves people traveling to and staying in places outside of their everyday lives. The United Nations World Tourism Organisation (UNWTO), a leading authority on the subject, defines tourism as the activities undertaken by individuals traveling to and staying in places outside their usual environment for a period not exceeding one consecutive year, primarily for leisure, business, or other purposes not related to employment within the visited area. A tourist is a person who travels to a place other than where they usually live, for pleasure, relaxation, study, business, or adventure. The part of the service industry that deals with accommodation, food, and recreation for tourists is known as the Hospitality Industry

Primary Forms of Tourism (based on geographical scope)

1. **Domestic Tourism**: Involves residents of a given country traveling only within that country.

   Example: A family living in Accra, Ghana, takes a vacation to Mole National Park in the Savanna Region of Ghana. They are Ghanaian residents traveling only within Ghana.

2. **Inbound Tourism**: Involves non-residents (foreigners) traveling in a given country.

   Example: A tourist from Germany visits Ghana to explore Cape Coast Castle and attend the Panafest festival. They are a non-resident entering Ghana.

3. **Outbound Tourism**: Involves residents of a given country traveling to another country.

   Example: A Ghanaian family travels to Kenya and stays in Nairobi to visit cultural and historical attractions, including the Karen Blixen Museum and the Giraffe Centre.

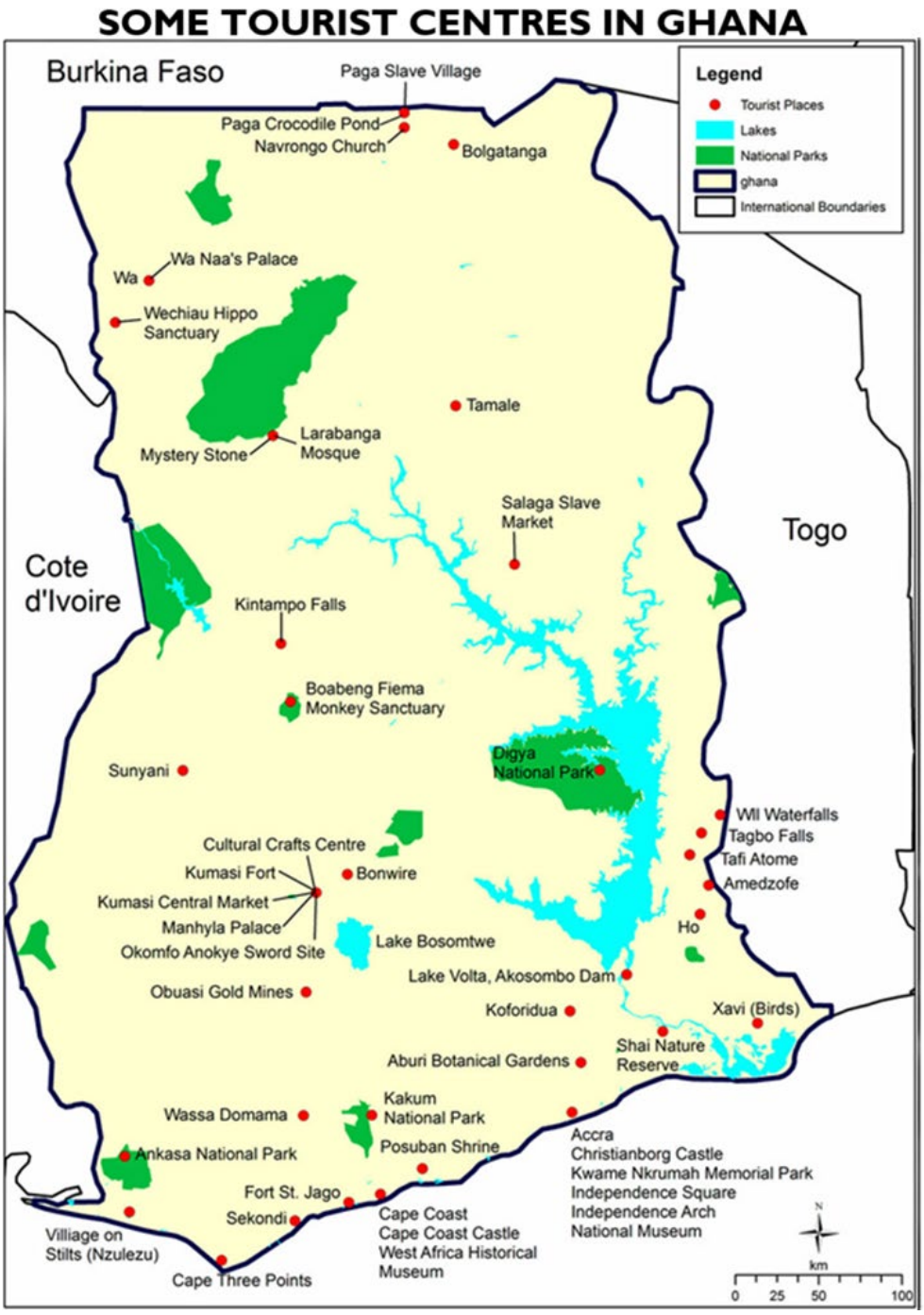


Figure 9.1: *A map of Ghana showing some tourist centres*

To provide a clearer overview Table 9.1 summarises these diverse types of tourism in Ghana.

Table 9.1: *Types of Tourism in Ghana*

Type of Tourism	Description	Examples
Cultural Tourism	Travel to experience different cultures, traditions, heritage, and festivals	Abokyir Festival-Winneba, Akasidae Festival -Kumasi, Damba-Tamale
Heritage Tourism	Focuses on historical sites and the legacy of the past	Cape Coast and Elmina Castles
Ecotourism	Responsible travel to natural areas, conserving the environment	Kakum National Park, Mole National Park, Lake Bosomtwi
Adventure Tourism	Travel involving thrilling or adrenaline-inducing activities	Hiking Mount Afadjato, Paragliding at Kwahu
Recreational Tourism	Travel for leisure and relaxation, including beaches and theme parks	Labadi Beach, Busua Beach
Business Tourism	Travel for professional or corporate purposes	Attending conferences in Accra
Food Tourism	Travel centred around culinary experiences	Visiting local markets, trying traditional dishes
Rural Tourism	Travel to rural areas to experience rural life and natural landscapes	Farm stays, countryside excursions
Medical Tourism	Travel for medical treatment	Seeking specialised medical care
Religious Tourism	Travel for religious purposes	Visiting religious sites, participating in religious events
Event Tourism	Tourism focused on specific events and festivals	Kwahu Easter Paragliding Festival

Ghana's Unique Tourist Attractions: A Journey Through History and Nature

Ghana's appeal as a tourist destination lies in its rich tapestry of historical, cultural, and natural attractions.

Historical and Heritage Sites: The coastal belt of Ghana is dotted with formidable forts and castles, recognised as UNESCO World Heritage Sites, which stand as silent witnesses to the transatlantic slave trade. These sites, including the iconic Cape Coast Castle and Elmina Castle, offer a profound and moving experience, connecting visitors with a significant chapter in human history. Beyond these, other historical landmarks such as the Kwame Nkrumah Memorial Park in Accra, a tribute to Ghana's first president, Independence Square, symbolising the nation's journey to freedom, and the ancient Larabanga Mosque in the savanna region, one of West Africa's oldest mosques, offer further insights into Ghana's rich past. Additionally, the Asante Traditional Buildings near Kumasi, another UNESCO World Heritage Site, showcase the unique architecture and cultural heritage of the once-powerful Asante Kingdom.



Figure 9.2: *The Larabanga Mosque*



Figure 9.3: *Cape Coast Castle*

Natural Attractions: Ghana's landscape boasts a remarkable diversity of natural wonders. The country is home to several national parks and wildlife reserves, including Kakum National Park, famous for its thrilling canopy walkway suspended high above the rainforest, and Mole National Park, the largest wildlife refuge in Ghana, teeming with elephants and other fauna. Scenic waterfalls cascade through the Ghanaian landscape, with Kintampo Falls and Wli Falls being particularly popular for their beauty and natural surroundings. The Atlantic coastline offers stretches of golden beaches, such as the lively Labadi Beach and the serene Busua Beach, providing opportunities for relaxation and recreation. Other notable natural attractions include the unique Lake Bosomtwi, formed by a meteorite impact, and the lush Aburi Botanical Gardens, offering a tranquil escape into nature.



Figure 9.4: *Mole National Park*

Cultural Events and Festivals: The cultural heartbeat of Ghana is vibrant, with numerous traditional festivals celebrated throughout the year. These events offer a colourful and immersive experience into the traditions and customs of various ethnic groups. Examples include Homowo, a harvest festival celebrated by the Ga people in the Greater Accra Region, Odwira, a purification and harvest festival of the Akwapim people, Bakatue, marking the beginning of the fishing season in Elmina, Aboakyer, a traditional deer-hunting festival in Winneba, Fetu Afahye in Cape Coast, Damba, a festival celebrated in the northern regions, and the exhilarating Kwahu Easter Paragliding Festival.



Figure 9.5: *The Homowo festival*



Figure 9.6: *The Damba festival*

The Role of Tourism in the Socio-economic Development of Ghana

1. **Foreign Exchange Earnings:** Tourism generates significant foreign currency inflows, strengthening Ghana's economy. The "Year of Return" campaign in 2019 attracted over 750,000 visitors, primarily from the African diaspora, contributing approximately $1.5 billion through spending on accommodation, food, and souvenirs (Ghana Tourism Authority, 2019).
2. **Job Creation**: The tourism sector provides direct and indirect employment opportunities across various industries, including hospitality, transportation, and retail. The Elmina Beach Resort in the Central Region employs local residents in roles such as housekeeping, catering, and tour guiding, supporting livelihoods in the community.
3. **Stimulating Local Businesses:** Increased tourist activity boosts demand for local goods and services, benefiting small and medium-sized enterprises (SMEs). Artisans in Bonwire, Ashanti Region, renowned for Kente cloth production, see higher sales as tourists purchase these traditional textiles, enhancing local economic activity.
4. **Cultural Preservation and Exchange:** Tourism promotes Ghana's cultural heritage, ensuring traditions are maintained and shared globally. The Panafest and Emancipation Day celebrations in Cape Coast draw international visitors, highlighting Ghana's history with the transatlantic slave trade and fostering cultural pride.
5. **Community Empowerment:** Community-based tourism initiatives enable locals to participate in and benefit from tourism revenue. At the Tafi Atome Monkey Sanctuary in the Volta Region, residents manage guided tours to see Mona monkeys, with proceeds funding community projects like schools and clinics.
6. **Education and Skills Development**: Tourism creates demand for skilled workers, encouraging training and education in related fields. Institutions like the Ghana Institute of Management and Public Administration (GIMPA) and the University of Cape Coast (UCC) offer tourism and hospitality courses, preparing Ghanaians for jobs in the sector.
7. **Improved Transportation and Accessibility**: Tourism necessitates investments in transportation infrastructure, benefiting both visitors and locals. The expansion of Kotoka International Airport with Terminal 3, completed in 2018, has increased Ghana's capacity to welcome tourists, improving connectivity.
8. **Conservation of Natural Resources**: Eco-tourism initiatives support the protection of Ghana's biodiversity and natural landscapes. Kakum National Park's canopy walkway generates revenue from visitors, which is reinvested to conserve the rainforest and its wildlife.

9. **Sustainable Tourism Practices**: Tourism encourages environmentally friendly practices to preserve resources for the future. The Collaborative Actions for Sustainable Tourism (COAST) project promotes waste management and marine conservation along Ghana's coastlines.

The challenges facing the tourism sector in Ghana

1. **Inadequate Transportation Networks:** Poor road conditions and limited public transportation make it difficult for tourists to access key destinations, especially in rural areas. The roads to Mole National Park, a major wildlife attraction in northern Ghana, are often in disrepair, particularly during the rainy season, hindering tourist access.
2. **Insufficient Accommodation Facilities:** Outside major cities like Accra and Kumasi, there is a shortage of high-quality hotels and lodges, limiting options for visitors. In the Volta Region, despite attractions like Wli Waterfalls and Mount Afadja, tourists often rely on basic guesthouses due to the lack of mid-range or luxury accommodations.
3. **Unreliable Utilities:** Frequent power outages and water shortages negatively affect the quality of tourist experiences. Hotels in Cape Coast, a popular tourist hub, often face electricity cuts, disrupting essential services like air conditioning and Wi-Fi for international travellers.
4. **Limited Global Visibility**: Ghana struggles with inadequate international marketing, resulting in low awareness of its attractions compared to countries like Kenya or South Africa. Despite the success of the 2019 "Year of Return" campaign, Ghana's eco-tourism and cultural heritage offerings remain under-promoted globally.
5. **Weak Digital Presence:** Many tourist sites and businesses lack professional websites or active social media, making information hard to access. The official website for Kakum National Park offers limited details on visitor amenities or guided tours, reducing its appeal to eco-conscious travellers.
6. **Over-Reliance on Diaspora Tourism:** The sector heavily depends on diaspora visitors, limiting efforts to attract diverse markets. In 2024, diaspora tourists accounted for over 60% of international arrivals, while outreach to non-diaspora markets like Europe or Asia remains underdeveloped.
7. **Shortage of Skilled Personnel:** A lack of trained professionals in hospitality, tour guiding, and customer service impacts the quality of tourist experiences. At Elmina Castle, many tour guides lack formal training in storytelling or multilingual skills, reducing engagement for non-English-speaking visitors.
8. **Inadequate Training Institutions:** Existing tourism training programs are insufficient to meet industry demands. The Ghana Institute of Management and Public Administration (GIMPA) offers tourism courses, but low enrolment and a lack of practical training limit their impact.
9. **Brain Drain:** Skilled workers often leave Ghana for better opportunities in countries with more developed tourism sectors. Experienced hotel managers and chefs frequently migrate to the Middle East or Europe, where salaries and career prospects are higher.
10. **Environmental Degradation:** Unregulated tourism activities, such as littering and deforestation, threaten Ghana's natural attractions. At Ada Foah, a coastal hotspot, plastic waste from beach resorts pollutes the Volta Estuary, harming marine life and the area's appeal.
11. **Climate Change Impact:** Rising sea levels and extreme weather events endanger coastal tourism infrastructure. Coastal erosion in Keta has damaged beachfront properties, threatening future tourism development along Ghana's eastern coastline.

12. **Overcrowding at Popular Sites:** High visitor numbers at key attractions cause wear and tear, compromising sustainability. The canopy walkway at Kakum National Park often faces overcrowding during peak seasons, raising safety and environmental concerns.
13. **Security Concerns:** Perceptions of safety, including crime and political stability, can deter tourists. Although Ghana is generally safe, isolated petty crimes in tourist areas like Osu, Accra, have been reported, affecting its reputation.

Recommended solutions to the challenges facing the tourism sector in Ghana

1. **Inadequate Transportation Networks:** Partner with private investors through public-private partnerships (PPPs) to rehabilitate and maintain roads leading to rural tourist sites. Offer tax incentives or subsidies to attract investment. Prioritise road upgrades to Mole National Park by securing funding from international development banks or eco-tourism grants, ensuring year-round accessibility.
2. **Insufficient Accommodation Facilities**: Encourage the construction of mid-range and luxury accommodations in rural areas by providing tax breaks and low-interest loans to local entrepreneurs. Launch a "Rural Hospitality Initiative" to support eco-lodge development near Wli Waterfalls and Mount Afadja, with technical assistance from the Ghana Investment Promotion Centre (GIPC).
3. **Unreliable Utilities:** Promote renewable energy adoption, like solar panels, for hotels and tourist sites to reduce reliance on the national grid. Invest in water harvesting and recycling systems. Pilot solar energy projects in Cape Coast hotels, funded by grants from the African Development Bank (AfDB), to ensure consistent power supply.
4. **Limited Global Visibility:** Develop a national tourism marketing strategy involving partnerships with international travel agencies and participation in global tourism fairs. Collaborate with airlines like Emirates or British Airways to offer package deals promoting Ghana's eco-tourism and cultural heritage, boosting global awareness.
5. **Weak Digital Presence**: Create a centralised, user-friendly tourism portal with comprehensive details on attractions, accommodations, and booking options. Provide digital marketing training for local businesses. Revamp the Ghana Tourism Authority website and launch a mobile app with virtual tours of Kakum National Park to attract tech-savvy travellers.
6. **Over-Reliance on Diaspora Tourism**: Diversify marketing to target new segments like eco-tourists from Europe and adventure travellers from Asia. Participate in tourism expos in Germany and Japan, showcasing hiking at Mount Afadja or eco-tours in the Volta Estuary to broaden the visitor base.
7. **Shortage of Skilled Personnel:** Expand vocational training in hospitality and tourism, emphasising practical skills like multilingual guiding and customer service. Partner with Switzerland's hotel schools for exchange programs, training Ghanaian guides to enhance storytelling and engagement at historical sites.
8. **Inadequate Training Institutions:** Strengthen existing institutions by introducing industry-led courses and increasing enrolment through scholarships. Launch a "Tourism Skills Development Fund" to subsidise practical training for guides at Elmina Castle and other key sites.
9. **Brain Drain**: Offer competitive salaries and career growth incentives through a "Tourism Talent Retention Program," including housing allowances or profit-sharing. Establish mentorship programs where experienced professionals guide young talent, fostering loyalty within Ghana's tourism industry.

10. **Environmental Degradation:** Enforce strict waste management regulations at tourist sites and promote eco-friendly practices among businesses and visitors. Launch a "Plastic-Free Tourism" campaign at Ada Foah, providing biodegradable alternatives and waste bins to protect the Volta Estuary.
11. **Climate Change Impact:** Invest in climate-resilient infrastructure, such as seawalls or elevated buildings, in vulnerable coastal areas. Secure funding from the Green Climate Fund to protect Keta's tourism assets and develop eco-friendly beachfronts.
12. **Overcrowding at Popular Sites:** Introduce timed entry slots and expand guided tour options to manage visitor flow. Develop nearby attractions to distribute tourists. Implement a reservation system for the canopy walkway and promote lesser-known trails in Kakum National Park.
13. **Security Concerns:** Increase police presence in tourist zones and launch a "Safe Tourism Campaign" to educate visitors on safety measures. Deploy tourist police units in Osu and establish a 24/7 helpline for visitors, modelled after successful initiatives in Thailand.

Learning Tasks

"Collaborative Enquiry into the Tourism Sector"

1. In your mixed gender/mixed ability group, research on the following from various reliable sources;
    a. Economic Contributions: Employment opportunities, GDP impact, infrastructure development.
    b. Social Contributions: Cultural preservation, community development, empowerment of marginalised groups.
    c. Challenges: Infrastructure deficits, high taxation, policy gaps, environmental concerns.
2. Develop a report or presentation addressing:
    a. Key findings on tourism's role in socio-economic development.
    b. Identified challenges and potential solutions.
3. Present your work using one of the following formats:
    a. Oral Presentation: Supported by visual aids.
    b. Poster: Combining text and images.
    c. Role-Play or Skit: Dramatising key points.
    d. Digital Presentation: Using slides or videos.
4. **Extension Task:** Visit a local tourist site to observe real-world applications; or invite a tourism industry professional to share experiences.

Pedagogical Exemplar

Collaborative Learning

In GESI-responsive groups, research about the role of tourism in the socio-economic development of Ghana and the challenges facing the sector. Write a report based on your findings.

1. Form GESI-responsive groups that reflect gender, ability, and regional diversity to promote inclusion and equal participation.
2. Assign differentiated roles (e.g., researcher, writer, editor, presenter) based on learners' strengths and learning needs.
3. Provide clear, step-by-step research guidelines and reporting templates to support all ability levels.
4. Use a variety of accessible sources (videos, texts, charts) to cater to different learning styles and literacy levels.
5. Offer sentence starters, graphic organisers, and vocabulary lists to support learners with language difficulties.
6. Encourage peer mentoring where higher-ability learners support those who need extra help.
7. Monitor group dynamics to ensure respectful communication, equal voice, and emotional safety.
8. Set collaborative goals and celebrate teamwork to build SEL skills like empathy, cooperation, and responsibility.
9. Offer regular check-ins and feedback to guide group progress and address any challenges.
10. Encourage groups to share findings creatively (e.g., posters, presentations) to enhance engagement.
11. These strategies ensure all learners actively engage, feel valued, and successfully complete the tourism research and report.

Key Assessment Level 4: Group Project

Short Answer Questions

1. Inadequate Transportation Networks" is a major challenge for tourism in Ghana, especially for reaching rural attractions like Mole National Park. Propose a comprehensive strategy to address this specific challenge and analyse how its successful implementation would boost tourism in a remote region.
2. The document highlights both community-based "Ecotourism" (e.g., Tafi Atome Monkey Sanctuary) and state-managed "Heritage Tourism" (e.g., Elmina Castle). A tour operator wants to create a new tour package that provides the most direct economic benefit to the local population living near the attraction. Evaluate which of these two tourism types would be the better choice and justify your reasoning with evidence.
3. The "Year of Return" campaign was a major success, contributing approximately $1.5 billion to Ghana's economy. However, the text warns about an "Over-Reliance on Diaspora Tourism". Analyse how Ghana can build on the success of the "Year of Return" while also addressing the challenge of over-reliance on this single market segment.
4. "Brain Drain" is a key human resource challenge, with skilled hotel managers and chefs leaving Ghana for better opportunities abroad. Propose a two-pronged strategy that a large hotel chain in Accra could implement to retain its experienced staff, justifying why each part of your strategy would be effective.

Essay Questions (Group Project)

1. Using an atlas, digital map (e.g., Google Maps) and internet resources, find a tourist centre outside the region of your school's location that you would like to visit. Your task is to analyse what the tourist centre has to offer and provide prospective visitors with an evaluation of what makes it worth a visit.

   [Total 20 marks] (**DoK 4**)

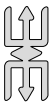
   Prepare a fact file which will be presented to the class giving details such as:

   a. Location & Access (4 marks)
      i. Name of the Tourist Centre and historical/cultural significance.
      ii. Full address and contact numbers
      iii. How to get there (e.g., major roads, public transportation options from major cities, estimated travel time)
      iv. Booking information including safety, rules and regulations,
   b. Operational Information (4 marks)
      i. Opening Hours
      ii. Entrance Fees (including any varying rates for adults, children, seniors, residents/ non-residents, group discounts)
      iii. Best time of the season to visit (considering weather, crowds, specific events)
      iv. How long tourists can typically spend at the centre
   c. Attractions & Activities (4 marks)
      i. Main Attractions/Highlights
      ii. Other activities/sceneries available (e.g., hiking trails, cultural performances, wildlife viewing, boat tours, nearby points of interest)
      iii. Amenities available (e.g., restrooms, food and beverage options, gift shop, parking, accessibility for disabled visitors, Wi-Fi, first aid)
      iv. Accommodation options nearby (e.g., hotels, guesthouses, campsites)
   d. Persuade visitors why the tourist centre is worth visiting. Present the following points to your audience to explain why you think the tourist location you chose should not be missed (8 Marks)
      i. Unforgettable Experiences – describe its breathtaking landscapes, rich history, or adrenaline-pumping activities, explain what your destination offers for once-in-a-lifetime adventures.
      ii. Cultural Events – Dive into vibrant local traditions, savour unique cuisines, and connect with people who bring the place to life.
      iii. The Perfect Escape – Whether you seek relaxation or excitement, this spot provides the ideal getaway from daily routine.
      iv. Stunning Scenery – From awe-inspiring natural wonders to iconic landmarks, every corner is a feast for the eyes.

PLC Session 9

45 minutes | **Planning & Reviewing the Learning Plan**

1. Begin the session by recapping lessons from the previous year/session/week, focusing on how learning was applied.
2. Use your subject specific app to explore the content before planning. Ask the app to
   a. explain the week's concepts in a practical way that will make it easier for learners to understand
   b. identify two or three common misconceptions learners may have on the week's content and how to address them using contexts familiar to Ghanaian learners. (NTS 3a, 3g and 3m).
3. Use your subject specific app to plan your lesson. Ask the app to
   a. suggest the most effective method for teaching the week's concepts to learners with diverse backgrounds.
   b. suggest learning activities, differentiation and essential questions based on the method of teaching (NTS 3a-3q)
   c. review your prepared learning plan and address any challenging issues you may have identified in your subject area (NTS 3a-3c).



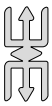
Note

- *Take note of the recap topics linked to Years 1 and 2 while preparing for your lesson.*
- *Refer to the Values Learning Community Handbook and link the values for the week in your lesson to ensure that learners are applying what they learn.*

4. Plan the week's key assessment with your app
   a. The key assessment for the week is ***group project***. Chat with your app to plan this assessment, indicating what you and your learners will do before, during and after the project (NTS 3k-3q).

10 minutes | **Content Exploration**

5. As a subject group, select one problem or idea/term in the week's content that is challenging (not a routine procedural question, but one that requires conceptual understanding) and then
   a. use the app, ask it to solve the problem step by step and explain the reasoning behind each step (you may be assisted by a teacher who is strong in the content area)
   b. all teachers in the group work through a similar problem individually for 3–4 minutes
   c. the group then works through the problem together step by step
   d. highlight the most common errors made at each step and discuss (NTS 1c, 1e, 2c, 2e, 3e-3j).



Note

- *This part is not just about 'How do I teach this?' but how do I teach it for learners to understand?*
- *If the group still shares the same content gap, use the app: ask it to solve the problem step by step and explain the reasoning behind each step.*

- *Problems/ideas discussed should be sourced from the Teacher Manual content, not invented separately. This keeps the content exploration directly connected to what teachers will deliver.*

30 minutes	Enactment

6. Enact a teaching activity based on your learning plan (NTS la-1b, 1e-lg, 2c, 2e, 2f, 3c-3j and 3o).
   a. Colleagues observe with specific attention to clarity of concept explanation, use of familiar Ghanaian examples and how misconceptions are handled if they arise.
   b. After the enactment, ask for structured feedback from the group
      i. was the concept explained in a way that a learner with no prior knowledge could follow?
      ii. were the examples grounded in contexts familiar to Ghanaian learners?
      iii. did any misconceptions surface and if so, how were they addressed?

5 minutes	Reflection

7. Reflect and share your views on the session. One thing that worked well, what did not work well and what you will do differently. (NTS 1a, 1b).
8. Identify a critical friend to observe and provide feedback on your lesson in relation to the PLC Session conducted (NTS 1f, 1g).
9. Remember to
   a. transfer your chats into your learning planner template.
   b. read your Teacher Manual and related Learner Material in preparation for the next session. Take note of the recap weeks, which are linked to Years 1 and 2 (NTS 3a).
   c. integrate National Values, GESI, SEL, and 21st century skills into your learning activities, assessment tasks, and rubrics/mark schemes.

WEEK 10

Learning Indicator: *Assess the role of trade in the socio-economic development of Ghana and the challenges facing the sector*

Focal Area: Trade in Ghana

Introduction

At its core, trade refers to the organised system of buying and selling goods and services. It can involve the direct exchange of items (barter) or, more commonly today, the use of money as a medium of exchange. Trade is a fundamental pillar of economic activity, acting as a crucial link that connects producers of goods and services with consumers who need or desire them. This exchange happens at various scales – from a small local market in a village to a global marketplace involving numerous countries. The primary goal of trade is to ensure that goods and services are available efficiently to those who demand them, wherever and whenever they are needed.

Key Terms

1. **Barter**: An ancient form of trade where goods or services are directly exchanged for other goods or services without the use of money. While less common in modern formal economies, it still occurs in some local or informal settings.
2. **Commerce**: This is a broader term that encompasses not just trade (buying and selling) but also all the auxiliary activities that facilitate the exchange of goods. These include vital services like transportation (moving goods), banking (financial transactions), insurance (managing risks), and advertising (informing consumers).
3. **Market**: This refers to any place or system, whether physical (like a bustling market square) or virtual (like an online shopping platform), where buyers and sellers interact to engage in buying and selling activities. Markets are where prices are determined by the forces of supply and demand.
4. **Commodity**: A raw material or primary agricultural product that can be bought and sold. Commodities are often uniform in quality across different producers, making them easily tradable. Examples in Ghana include gold, cocoa, crude oil, and maize.
5. **Exports**: Goods and services produced domestically (in Ghana) and sold to other countries. Exports bring foreign currency into Ghana.
6. **Imports**: Goods and services produced in other countries and bought by consumers or businesses in Ghana. Imports require Ghana to spend foreign currency.
7. **Balance of Trade:** It is the difference between the value of a country's exports and the value of its imports over a certain period of time, usually a year.

Types of Trade

Trade can be categorised based on its geographical scope: Domestic Trade and International Trade.

Domestic/Internal Trade

Domestic trade, also known as internal or home trade, involves the exchange of goods and services within the geographical boundaries of Ghana. It is about moving products from where they are produced to where they are consumed, connecting different regions, towns, and communities across the country.

Domestic trade typically involves two main segments

1. **Wholesale Trade:** This is where goods are sold in large quantities, often in bulk, by producers or distributors to retailers, other businesses, or institutional buyers. Wholesalers act as intermediaries, bridging the gap between large-scale production and numerous retail outlets.
2. **Retail Trade:** This involves the sale of goods and services in smaller quantities directly to the final consumers for their personal use. Retailers are the most visible face of trade to the general public, ranging from small roadside vendors to large supermarkets.

Examples of Commodities Involved in Internal Trade in Ghana

1. **Agricultural Goods:** These form the backbone of internal trade, with a vast array of produce moved across the country. Examples include staples like maize, yam, cassava, plantain, rice, and popular vegetables and fruits such as tomatoes, onions, garden eggs, pineapples, and mangoes. Ghana's traditional export crop, cocoa, also has a significant internal trade component as it moves from farms to collection points.
2. **Fish and Meat Products:** Given Ghana's coastline and inland water bodies, smoked fish, tilapia, herrings, and other seafood are widely traded. Beef, chicken, goat meat, and mutton from various regions (especially the Northern parts) are also distributed throughout the country.
3. **Manufactured Goods**: As Ghana's industrial base grows, locally manufactured items like soap, detergents, plastic wares, cooking utensils, simple electronics (e.g., radios), beverages, and clothing (including factory-made garments) are increasingly traded internally.
4. **Handicrafts:** These unique products, showcasing Ghana's rich cultural heritage, are popular in local markets and among tourists. Examples include intricate baskets, vibrant beads, the iconic Kente cloth (from Ashanti and Volta regions), wood carvings, and traditional pottery.
5. **Other Goods:** Building materials like cement, iron rods, sand, and gravel, as well as everyday household items, are also widely traded.

Popular Trading Centres in Ghana

These markets are not just places of commerce; they are vibrant cultural hubs and major economic drivers in their respective regions.

1. **Makola Market (Accra):** Located in the heart of the capital, Makola is arguably Ghana's most famous market. It's a bustling hub for almost every conceivable consumer good, from fabrics and cosmetics to foodstuffs and household items.



Figure 10.1: *Bird eye view of Makola market*

2. **Kumasi Central Market (Kejetia)**: Often cited as one of the largest open-air markets in West Africa, Kejetia is an enormous marketplace dealing in a vast array of goods, including gold, textiles, foodstuffs, and crafts. It's a major distribution point for goods coming from and going to other parts of Ghana and even neighbouring countries.



Figure 10.2: *Kumasi Central Market*

3. **Tamale Market**: The principal market in Northern Ghana, plays a vital role in the trade of agricultural produce from the northern regions, particularly shea butter, groundnuts, cereals, and livestock. It also serves as a gateway for trade with Burkina Faso.



Figure 10.3: *Tamale Market*

4. **Takoradi Market Circle:** A distinctive circular market structure, it is a major trading centre in the Western Region, known for its fresh seafood, agricultural produce, and manufactured goods. Its proximity to Takoradi Port also influences its trade activities.



Figure 10.4: *Takoradi Market Circle*

5. **Techiman Market:** Located in the Bono East Region, Techiman is renowned as a significant agricultural trade hub. Farmers and traders from across Ghana and even neighbouring countries converge here for its huge market days, dealing primarily in staples like yams, maize, plantains, and vegetables.



Figure 10.5: *Techiman Market*

6. **Agbogbloshie Market (Accra):** While infamous for electronic waste, Agbogbloshie is also a massive market for foodstuffs, particularly onions, tomatoes, and other vegetables, serving as a major food distribution point for Accra.

Factors Influencing Domestic Trade

1. **Transportation Networks:** The efficiency of roads, railways, and water transportation routes (like the Volta Lake) directly impacts the cost and speed of moving goods. Good logistics and diverse transportation options improve market reach. The ongoing development of highways and interchanges significantly impacts this.
2. **Availability of Goods and Demand**: Trade naturally flows from areas of surplus production to areas of high demand. For instance, yams from the Bono and Northern regions move to urban centres, while manufactured goods from industrial areas move to rural markets.

3. **Population Density and Distribution**: Trade flourishes in densely populated areas, which provide a large consumer base. Urbanisation trends in Ghana (e.g., growth of Accra, Kumasi, Takoradi) continuously influence trade patterns.
4. **Security and Safety**: Traders prioritise stable and secure environments to conduct business. Incidents of theft, violence, or market fires can severely disrupt trade flows and deter investment.
5. **Cultural and Religious Practices:** Specific cultural events like traditional festivals, weddings, or religious celebrations (e.g., Christmas, Eid al-Fitr) can significantly boost demand for particular goods, influencing trade volumes and patterns. Weekly market days are also deeply ingrained in local cultures.
6. **Government Policy and Regulation:** Taxes (e.g., VAT, market tolls), levies, licensing requirements, and trade incentives (e.g., support for local businesses) directly affect the ease and profitability of domestic trade. Policies that promote a favourable business environment are crucial.
7. **Information Flow:** Access to real-time information on prices, supply, and demand helps traders make informed decisions, reducing exploitation and improving efficiency.

Advantages of Domestic Trade

1. **Creates Extensive Employment:** The domestic trade sector is a major employer, providing livelihoods for millions of Ghanaians as farmers, traders, market porters, drivers, storekeepers, artisans, and various support service providers.
2. **Supports Local Industries:** By providing a ready and accessible market for locally produced goods (whether agricultural or manufactured), domestic trade stimulates local production, encourages investment, and fosters industrial growth.
3. **Facilitates Regional Integration and Resource Distribution:** It enables the efficient movement of goods from producing regions (e.g., agricultural belts) to consuming regions (e.g., urban centres), ensuring equitable distribution of resources across the country.
4. **Generates Revenue for Local Assemblies:** Market tolls, permits, and property rates from trading activities contribute significantly to the revenue base of Metropolitan, Municipal, and District Assemblies (MMDAs), which in turn helps fund local development projects.
5. **Encourages Entrepreneurship and Self-Employment:** Trade offers a relatively low barrier to entry for many individuals, fostering a strong culture of entrepreneurship, particularly among women and youth, empowering them economically.
6. **Preserves Cultural Heritage:** The trade of traditional crafts, fabrics like Kente, and local foodstuffs helps preserve and promote Ghana's rich cultural diversity.

Problems of Domestic Trade

1. **Poor Transportation Infrastructure:** A significant challenge, especially in rural areas, where bad roads make it difficult, time-consuming, and expensive to transport goods to markets, leading to post-harvest losses and higher consumer prices.
2. **Inadequate Storage and Market Facilities:** Lack of proper warehouses, cold storage facilities, and well-organised market structures leads to substantial spoilage of perishable goods (like tomatoes, garden eggs, and fish), particularly during bumper harvests. Market congestion also hinders smooth operations.

3. **High Cost of Doing Business:** Traders often face multiple layers of taxes, levies (some official, some unofficial), and occasional demands for bribes, which increase operational costs and can erode profits. High utility costs (electricity, water) also contribute.
4. **Limited Access to Credit and Loans:** Small-scale traders and farmers, who form the majority, often lack the collateral or formal documentation required to access affordable loans from traditional banks, hindering their ability to expand or invest.
5. **Market Congestion and Poor Sanitation:** Many popular markets, especially in urban areas, suffer from severe overcrowding, poor waste management, and inadequate sanitation facilities, posing health risks and hindering the efficient movement of goods.
6. **Insecurity:** Traders face risks of theft, robbery, and occasional market fires that can lead to devastating losses. Poor security measures in some markets exacerbate these problems.
7. **Exploitation by Middlemen:** In some supply chains, particularly for agricultural produce, intermediaries can exploit farmers by buying their goods at very low prices and selling them at significantly higher prices in urban markets, leaving farmers with minimal profits.
8. **Lack of Value Addition:** Most agricultural produce is sold in its raw form, meaning Ghana loses out on the higher revenue that comes from processing and packaging.

Solutions to Problems of Domestic Trade

1. **Government Investment in Infrastructure:** Prioritise the construction and maintenance of robust road networks, particularly feeder roads connecting farms to markets. Invest in modern, well-planned market infrastructure with adequate stalls, proper drainage, and efficient waste management systems. Construct more cold storage facilities and silos in producing regions.
2. **Provide Microcredit and Soft Loans:** Establish and expand financial inclusion programs, microfinance institutions, and agricultural development banks that offer affordable, easily accessible loans with flexible repayment terms to small and medium-scale traders and farmers.
3. **Streamline Taxes and Levies**: Rationalise the multiple taxes and levies imposed on traders by various authorities to reduce the overall cost of doing business and enhance profitability. Implement clear, transparent fee structures.
4. **Improve Sanitation and Safety in Markets:** Implement strict urban planning and market management strategies to ensure proper waste disposal, regular cleaning, and improved security measures (e.g., lighting, surveillance, fire safety equipment) in markets.
5. **Strengthen Trade Associations:** Empower and support existing trade associations to play a more effective role in advocating for their members, providing training, managing disputes, and setting ethical trading standards.
6. **Promote Value Addition:** Encourage and incentivise local processing of agricultural produce (e.g., turning tomatoes into paste, cassava into gari or flour, fruits into juices) to increase shelf life, reduce post-harvest losses, and fetch higher prices.
7. **Enhance Market Information Systems:** Leverage technology (e.g., mobile apps, SMS services, community radio) to provide farmers and traders with real-time information on market prices, demand, and supply conditions across different regions.
8. **Address Middlemen Exploitation:** Promote cooperative societies among farmers to enable them to collectively market their produce, bypass exploitative intermediaries, and negotiate better prices.

9. **Invest in Human Capital:** Provide training programs for traders in areas such as business management, financial literacy, hygiene, and modern marketing techniques.

International Trade

International trade involves the exchange of goods and services between Ghana and other sovereign nations. It is a crucial aspect of globalisation, allowing Ghana to specialise in producing what it does best (exports) and acquire goods and services it cannot efficiently produce domestically (imports).

Major Trading Partners of Ghana:

Ghana maintains diverse trading relationships globally. Key partners include:

1. **China:** A dominant trading partner, largely due to its competitive manufacturing sector. Ghana imports a wide range of goods from China, including electronics, machinery, textiles, construction materials, and consumer goods. China is also a growing market for Ghana's raw materials.
2. **European Union (EU) Countries:** Collectively, the EU remains a very significant trading bloc for Ghana. Individual prominent members include:
    a. **Netherlands**: A major importer of Ghanaian cocoa and horticultural products (fruits, vegetables).
    b. **Germany**: Exports a lot of engineering goods, vehicles, and specialised equipment to Ghana.
    c. **United Kingdom**: A traditional partner still imports Ghanaian gold, cocoa, and timber.
3. **United States:** A key market for Ghana's major exports, like gold and cocoa. Ghana imports significant amounts of oil, machinery, and various manufactured goods from the US.
4. **India:** A growing trading partner, with strong trade in pharmaceuticals, rice, machinery, and textiles.
5. **Nigeria:** As a large West African neighbour, Nigeria is crucial for regional trade, especially in petroleum products and some food items. Ghana is also a market for Nigerian goods.
6. **South Africa:** Important for bilateral trade in areas like mining equipment, processed foods, and beverages.
7. **United Arab Emirates (UAE):** Becoming increasingly important for trade in petroleum products and as a re-export hub.

Major Export Items of Ghana (What Ghana sells to other countries)

These are the primary sources of Ghana's foreign exchange earnings.

1. **Gold**: Consistently Ghana's largest foreign exchange earner, exported mainly in its raw or semi-processed form to countries like Switzerland, UAE, India, and China.
2. **Cocoa Beans and Products:** Ghana is the world's second-largest producer of cocoa beans, a significant global commodity. Exports include raw beans, cocoa paste, cocoa butter, and cocoa liquor to the Netherlands, Belgium, Germany, and the USA.
3. **Crude Oil:** With commercial production starting in 2010, crude oil has become a major export, primarily to Asia (e.g., China, India) and Europe.
4. **Timber and Wood Products:** Exports include various forms of processed timber such as plywood, veneer, sawn timber, and, to a lesser extent, raw logs, to European markets and Asia.

5. **Manganese and Bauxite:** These are important industrial raw materials, exported to countries that use them in steel production (manganese) and aluminium production (bauxite).
6. **Cashew Nuts:** An increasingly important non-traditional agricultural export, with growing demand from India and Vietnam for processing.
7. **Fruits and Vegetables:** Fresh produce like pineapples, mangoes, yams, and garden eggs are exported, mainly to European markets, driven by demand for exotic and off-season produce.
8. **Seafood:** Including tuna (often processed into canned tuna), and other varieties of fish and shrimp.
9. **Non-Traditional Exports (NTEs):** This category is crucial for diversifying Ghana's export base and includes a wide variety of items like shea butter, handicrafts, processed foods, alcoholic and non-alcoholic beverages, and textiles (e.g., Kente products).

Major Import Items into Ghana (What Ghana buys from other countries)

These are goods and services that Ghana either does not produce or cannot produce efficiently enough to meet domestic demand.

1. **Machinery and Equipment:** Essential for Ghana's industrialisation and development, including agricultural machinery, construction equipment, industrial plants, and spare parts, imported from China, Germany, and the USA.
2. **Refined Petroleum Products:** Despite being a crude oil producer, Ghana still heavily relies on imports of refined fuels like petrol, diesel, and aviation fuel, as its refining capacity is limited.
3. **Vehicles and Spare Parts:** A significant import, encompassing cars, buses, trucks, motorcycles, and their components, primarily from Asia (Japan, China, South Korea) and Europe.
4. **Food Items:** To supplement local production and meet dietary preferences, Ghana imports large quantities of staple foods like rice, wheat, sugar, poultry products (chicken), and some processed foods.
5. **Pharmaceuticals and Medical Supplies:** Essential for the healthcare sector, including drugs, vaccines, and medical equipment, mainly from India, China, and Europe.
6. **Textiles and Clothing:** Both new and used clothing (popularly known as "*obroni wawu*") are significant imports, primarily from China, Europe, and the USA.
7. **Electronics:** A wide range of electronic gadgets and appliances, such as televisions, mobile phones, refrigerators, and computers, predominantly from China and other Asian countries.
8. **Iron and Steel Products:** Raw materials and finished products used in construction and manufacturing.
9. **Plastics and Chemical Products:** Used across various industries and for household purposes.

The Role of Trade in the Socio-Economic Development of Ghana

Trade is not merely about buying and selling; it is a powerful engine for socio-economic transformation.

Importance of Trade

1. **Employment Creation:** Trade, both domestic and international, is a massive job creator. It supports livelihoods across the entire supply chain, from farmers and factory workers to transporters, market traders, bankers, customs officials, and retail assistants. This extensive employment reduces poverty and improves living standards.

2. **Revenue Generation for the Government:** Taxes, customs duties (import and export duties), and levies collected from trading activities form a substantial portion of government revenue. This revenue is crucial for funding national development projects like infrastructure (roads, hospitals, schools), social services, and public administration.
3. **Market for Goods and Services / Stimulates Production:** Trade provides a reliable outlet for goods and services produced within Ghana. This market access encourages farmers to grow more, manufacturers to produce more, and service providers to innovate, ultimately stimulating economic growth and promoting industrialisation.
4. **Facilitates Technology Transfer and Innovation:** Through international trade, Ghana gains access to advanced machinery, equipment, software, and innovative production methods from other countries. This technology transfer can significantly improve productivity, efficiency, and competitiveness in various sectors.
5. **Foreign Exchange Earnings:** Exports are vital for earning foreign currencies (like the US Dollar, Euro, British Pound). These foreign exchange reserves are essential for Ghana to pay for its imports, service its foreign debts, and maintain the stability of the Ghanaian Cedi. Without sufficient foreign exchange, Ghana would struggle to buy essential goods and services from abroad.
6. **Boosts Entrepreneurship:** Trade offers numerous opportunities for individuals to start and grow their own businesses, fostering an entrepreneurial spirit. It encourages self-reliance and innovation among the populace.
7. **Improves Standard of Living:** Trade increases the variety and availability of goods and services in the market. Competition from imports can also lead to lower prices and better quality products for consumers, thereby enhancing their standard of living and providing more choices.
8. **Infrastructure Development:** The demands of trade often necessitate significant investments in infrastructure. This includes developing and upgrading seaports (Tema, Takoradi), airports (Kotoka International Airport), road networks, railways, and communication systems, all of which contribute to overall national development.
9. **Promotes Regional Integration and Cooperation:** Engaging in regional trade blocs like the Economic Community of West African States (ECOWAS) and the African Continental Free Trade Area (AfCFTA) fosters economic cooperation, political stability, and mutual development among member states.

Challenges Facing the Trade Sector in Ghana:

Despite its importance, Ghana's trade sector faces significant hurdles:

1. **Over-Dependence on Imports**: Ghana still heavily relies on imports for many essential goods, including food items (like rice and poultry) and manufactured products. This can lead to a drain on foreign exchange, stifle local industries, and make the economy vulnerable to global price fluctuations.
2. **Unfavourable Balance of Trade**: Ghana often experiences a trade deficit, meaning the value of its imports exceeds the value of its exports. This continuous outflow of foreign currency can weaken the Cedi, increase external debt, and impact economic stability.
3. **Poor Infrastructure**: While improvements are being made, inadequate infrastructure (especially feeder roads, rail networks, and modern port facilities) continues to hinder efficient movement of goods, increasing transportation costs and delivery times.

4. **Price Volatility of Major Exports**: Ghana's economy is highly susceptible to fluctuations in the global prices of its primary exports (gold, cocoa, crude oil). A sharp drop in these prices can significantly reduce government revenue and foreign exchange earnings, leading to economic instability.
5. **Corruption and Smuggling**: These illicit activities undermine legitimate trade, distort prices, reduce government revenue through evaded taxes and duties, and create unfair competition for law-abiding businesses.
6. **Complex Trade Regulations and Bureaucracy**: Overly complex customs procedures, multiple regulatory agencies, and bureaucratic bottlenecks can create delays, increase costs, and deter both local and international investors and traders.
7. **Low Processing of Raw Materials** (Lack of Value Addition): A major challenge is that Ghana largely exports its primary commodities (gold, cocoa, timber, crude oil) in their raw or minimally processed form. This means Ghana misses out on the higher revenue, employment, and industrial growth associated with value-added processing.
8. **Limited Diversification of Exports**: While efforts are being made, Ghana's export basket is still heavily concentrated on a few primary commodities, making the economy vulnerable to shocks in those specific markets.
9. **Competition from Cheaper, Substandard Imports**: Local industries often struggle to compete with mass-produced, sometimes lower-quality and cheaper imports, which can lead to the collapse of domestic businesses and job losses.
10. **Inadequate Access to Finance**: Many businesses, especially SMEs involved in export-oriented trade, struggle to access adequate and affordable credit to scale up their operations, invest in technology, or meet international quality standards.

Solutions to the Challenges

Addressing these challenges requires a multi-faceted and coordinated approach:

1. **Promote Value Addition and Industrialisation:** Ghana should implement strategic industrial policies that encourage the local processing of raw materials such as cocoa into chocolate, gold into jewellery, bauxite into aluminium, and cassava into starch or flour. This can be supported by offering incentives like tax holidays, subsidies, and affordable credit to businesses that invest in processing facilities. Also, developing a skilled workforce through training in industrial techniques, quality control, packaging, and export management will ensure the sustainability and competitiveness of these industries.
2. **Invest Heavily in Infrastructure:** Ghana must invest heavily in infrastructure by expanding and improving the national and feeder road networks to link agricultural areas with processing centres and ports. Modernising seaports like Tema and Takoradi will enhance efficiency, reduce clearance times, and lower operational costs. Reviving and expanding the railway system will provide a cost-effective and efficient option for transporting bulk goods. Additionally, ensuring a stable and affordable electricity supply is crucial to sustaining industrial and commercial activities across the country.
3. **Encourage and Protect Local Industries:** Ghana should intensify "Buy Ghana" campaigns to promote the consumption of locally made products and services. The government can further support this by providing targeted subsidies or tax incentives to promising local industries with potential for import substitution or export growth. Strengthening regulatory bodies like the Ghana

Standards Authority to enforce quality standards and certification will ensure fair competition, enhance consumer confidence, and promote the competitiveness of Ghanaian products.

4. **Diversify Exports and Markets:** Ghana should support non-traditional exports (NTEs) by offering technical and financial assistance to producers and exporters of products like cashew, shea butter, horticultural goods, handicrafts, and services such as tourism and ICT. Furthermore, investing in market research and actively promoting Ghanaian products through international trade fairs and diplomatic missions will help identify and penetrate new global markets, reducing reliance on a few traditional exports.
5. **Simplify Trade Procedures and Fight Corruption:** Ghana should fully implement and enhance the National Single Window system at ports to streamline customs processes, reduce human interaction, and limit corruption. Simplifying complex trade regulations, permits, and licensing requirements through regulatory reforms will also ease the cost of doing business. Additionally, enforcing strict measures against smuggling, illegal mining, and illicit financial flows will promote fair competition and increase government revenue.
6. **Promote Regional and Continental Trade:** Ghana should actively leverage the African Continental Free Trade Area (AfCFTA) by developing strategic plans to access wider African markets. Strengthening economic integration within the ECOWAS region will further enhance intra-regional trade, reduce reliance on external markets, and create new opportunities for local businesses across West Africa.
7. **Strengthen Trade Policies and Access to Finance:** Ghana should establish or enhance export-import banks and credit guarantee schemes to offer affordable financing for businesses involved in international trade. Providing training on trade finance instruments and international payment systems will equip businesses with the knowledge needed to engage competitively in global markets. Moreover, maintaining a stable and consistent trade policy framework will create a predictable environment that encourages investment and boosts trader confidence.
8. **Digitalisation of Trade:** Ghana should promote the development and use of e-commerce platforms to expand market access for local businesses both domestically and internationally. In addition, encouraging the adoption of secure and efficient digital payment systems will enhance transaction convenience, boost consumer confidence, and support a more modern and inclusive trading environment.

Learning Tasks

"Investigating Trade in Ghana"

1. In an all-inclusive group, research on the following from various reliable sources;
   a. The types of trade in Ghana: internal vs. external.
   b. The socio-economic benefits of trade
   c. The challenges facing trade
2. Choose ONE of the following accessible formats for presenting your findings:
   a. Poster or Infographic (for visual learners)
   b. Role-play or Short Skit (for kinaesthetic learners)
   c. Digital Slideshow (for tech-savvy learners)
   d. Radio Talk Show Simulation (for verbal and auditory learners)

3. Write a Short Group Report:
    a. Use bullet points and visuals where helpful.
    b. Summarise key findings and group reflections.
    c. Include at least one suggestion for improving trade in Ghana.

Pedagogical Exemplar

Collaborative Learning

In GESI-responsive groups, research about the role of trade in the socio-economic development of Ghana and the challenges facing the sector. Write a report based on your findings

1. Form GESI-responsive groups that include learners of diverse genders (male & female), abilities, and backgrounds to ensure inclusion and equity.
2. Assign roles within groups (e.g., note-taker, researcher, timekeeper, presenter) based on learners' strengths and learning preferences.
3. Provide differentiated research materials (e.g., simplified texts, videos, data tables) to accommodate varied intellectual abilities and learning styles.
4. Use scaffolding tools like research guides, graphic organisers, and report-writing templates to support structured learning.
5. Encourage peer support and mentoring to help lower-ability learners contribute meaningfully.
6. Allow learners to express their findings in multiple formats (e.g., written, oral, visual) to promote inclusivity.
7. Promote respectful communication, active listening, and equal participation to build collaboration and SEL skills.
8. Facilitate regular check-ins with each group to monitor progress, provide feedback, and address challenges.
9. Encourage reflection on group dynamics to strengthen empathy, responsibility, and teamwork.
10. Celebrate group achievements to boost confidence and promote a sense of belonging.

Key Assessment Level 4: Individual Classwork

Short Answer Questions

1. Inadequate storage and Lack of value addition are some of the major problems in Ghana's domestic agricultural trade. Imagine a farming cooperative in Techiman that primarily grows tomatoes. Propose a two-part strategy for this cooperative to address both problems and analyse how this strategy would increase their income.
2. Ghana's major exports are primary commodities like gold and cocoa, while its major imports include machinery and refined petroleum. Analyse how this specific trade structure makes Ghana's economy vulnerable to an "unfavourable balance of trade" and external shocks.
3. Studies recommend that Ghana should "actively leverage the African Continental Free Trade Area (AfCFTA)". Evaluate how successfully participating in AfCFTA could help Ghana overcome the challenge of "over-dependence on imports" from non-African partners like China and the EU.

4. Poor transportation infrastructure, particularly bad feeder roads, as a problem for domestic trade. Analyse how this specific domestic challenge could hinder Ghana's ambition to increase its export of non-traditional agricultural products, such as pineapples and mangoes, to the European market.

Essay Questions (DoK4)

1. Analyse the role of markets as key trading centres in Ghana. With reference to a market in your community, explain how it supports local agricultural trade and contributes to the socio-economic development of its surrounding community.

   [Total 20 marks] **(DoK 4)**

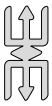
2. With specific examples, discuss the challenges facing Ghana's domestic trade sector and propose strategies for addressing these challenges.

   [Total 20 marks]. **(DoK 4)**

PLC Session 10

45 minutes | **Planning & Reviewing the Learning Plan**

1. Begin the session by recapping lessons from the previous year/session/week, focusing on how learning was applied.
2. Use your subject specific app to explore the content before planning. Ask the app to
   a. explain the week's concepts in a practical way that will make it easier for learners to understand
   b. identify two or three common misconceptions learners may have on the week's content and how to address them using contexts familiar to Ghanaian learners. (NTS 3a, 3g and 3m).
3. Use your subject specific app to plan your lesson. Ask the app to
   a. suggest the most effective method for teaching the week's concepts to learners with diverse backgrounds.
   b. suggest learning activities, differentiation and essential questions based on the method of teaching (NTS 3a-3q)
   c. review your prepared learning plan and address any challenging issues you may have identified in your subject area (NTS 3a-3c).



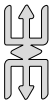
Note

- *Take note of the recap topics linked to Years 1 and 2 while preparing for your lesson.*
- *Refer to the Values Learning Community Handbook and link the values for the week in your lesson to ensure that learners are applying what they learn.*

4. Plan the week's key assessment with your app
   a. The key assessment for the week is ***individual classwork***. Chat with your app to plan this assessment, indicating what you and your learners will do before, during and after the classwork (NTS 3k-3q).

10 minutes **Content Exploration**

5. As a subject group, select one problem or idea/term in the week's content that is challenging (not a routine procedural question, but one that requires conceptual understanding) and then
   a. use the app, ask it to solve the problem step by step and explain the reasoning behind each step (you may be assisted by a teacher who is strong in the content area)
   b. all teachers in the group work through a similar problem individually for 3–4 minutes
   c. the group then works through the problem together step by step
   d. highlight the most common errors made at each step and discuss (NTS 1c, 1e, 2c, 2e, 3e-3j).



Note

- *This part is not just about 'How do I teach this?' but how do I teach it for learners to understand?*
- *If the group still shares the same content gap, use the app: ask it to solve the problem step by step and explain the reasoning behind each step.*
- *Problems/ideas discussed should be sourced from the Teacher Manual content, not invented separately. This keeps the content exploration directly connected to what teachers will deliver.*

30 minutes **Enactment**

6. Enact a teaching activity based on your learning plan (NTS la-1b, 1e-lg, 2c, 2e, 2f, 3c-3j and 3o).
   a. Colleagues observe with specific attention to clarity of concept explanation, use of familiar Ghanaian examples and how misconceptions are handled if they arise.
   b. After the enactment, ask for structured feedback from the group
      i. was the concept explained in a way that a learner with no prior knowledge could follow?
      ii. were the examples grounded in contexts familiar to Ghanaian learners?
      iii. did any misconceptions surface and if so, how were they addressed?

5 minutes **Reflection**

7. Reflect and share your views on the session. One thing that worked well, what did not work well and what you will do differently. (NTS 1a, 1b).
8. Identify a critical friend to observe and provide feedback on your lesson in relation to the PLC Session conducted (NTS 1f, 1g).
9. Remember to
   a. transfer your chats into your learning planner template.
   b. read your Teacher Manual and related Learner Material in preparation for the next session. Take note of the recap weeks, which are linked to Years 1 and 2 (NTS 3a).
   c. integrate National Values, GESI, SEL, and 21st century skills into your learning activities, assessment tasks, and rubrics/mark schemes.

WEEK 11

Learning Indicator: *Examine the role of transportation and communication in the socio-economic development of Ghana and the challenges facing the sector*

Focal Area: Transportation and Communication in Ghana

Introduction

Transportation and communication are vital parts of Ghana's economy, helping people and goods move across the country and allowing information to be shared easily. Ghana has roads, railways, air and waterways that link different areas and support businesses and tourism. Mobile phones and the internet help people stay connected and make business easier. However, there are problems like poor infrastructure, high costs, and limited access in rural areas. Solving these problems is important for growing the economy, improving people's lives, and bringing regions together.

Transportation refers to the organised movement of people, goods, and services from one location to another, utilising various modes to meet economic and social needs. Communication, on the other hand, involves the exchange of information through established channels, facilitating connectivity and coordination.

Transportation Systems

Ghana's transportation system is diverse, with each mode playing a unique role in national development. Table 11.1 shows the major transportation systems in Ghana.

Table 11.1: *Major Transportation Systems in Ghana*

Mode	Current Status	Key Example/Initiative
Road	Dominant, handling ~95% of passenger and freight traffic. Over 70,000 km of roads, with urban highways in good condition but rural feeder roads often impassable during rainy seasons.	The "Year of Roads" campaign (2020-2022) rehabilitated feeder roads in the Volta and Ashanti Regions, improving access to markets. The Accra-Kumasi motorway remains a critical trade route.
Rail	Limited network (~947 km, with 160 km operational by 2020), mostly in southern Ghana. Phased expansion underway to support bulk cargo transportation.	The Tema-Mpakadan standard-gauge railway (completed 2021) enhances cargo movement, with plans for a Burkina Faso link to boost regional trade.
Air	Kotoka International Airport in Accra is the main hub, with regional airports in Kumasi, Sunyani, Ho, Wa, Tamale, and Takoradi. Air travel supports trade and tourism but is costly for most Ghanaians.	The 2023 expansion of Tamale International Airport has increased northern Ghana's connectivity, supporting commerce and tourism.

Water	Tema and Takoradi ports handle international trade, while Lake Volta ferries and river barges support inland transportation.	The MV Dente ferry service connects Kete Krachi and Yeji, with proposals for expanded inland waterway trade on Lake Volta to reduce road congestion.

Communication Systems

1. **Telecommunication:** Ghana boasts over 120% SIM penetration (more SIMs than people due to multiple subscriptions), with 40 million subscribers by 2023. The sector, valued at $1.9 billion in 2022, expects a 3.1% CAGR to 2027. 4G is widespread in urban areas, with 5G trials in Accra and Kumasi by 2024.
2. **Internet**: The National Fibre Backbone Project connects all 16 regions, supporting 53% internet penetration by 2023. Community Wi-Fi in schools, part of the Digital Ghana Agenda, enhances educational access, though rural areas lag with only 30% reliable connectivity.
3. **Postal Services:** GhanaPost operates 360 post offices, shifting to digital solutions like GhanaPost GPS, a digital addressing system that assigns unique codes to locations. In partnership with other courier services, they provide modern delivery service.

Role of Transportation and Communication in Socio-Economic Development

Transportation and communication systems are pivotal to Ghana's socio-economic progress, as outlined below:

1. **Facilitation of Trade and Commerce:** Efficient transportation infrastructure, like the expanded Tema Port (30% increased throughput since 2020), reduces ship-waiting times, boosting exports of cocoa, gold, and oil. Commercial drivers, such as *Trotro,* provide affordable transportation, enabling small-scale traders to access market days in peri-urban towns like Nsawam Feyiase and Kpongu. Mobile money platforms, with transactions reaching GHS 1.2 trillion in 2023, have streamlined trade by reducing cash dependency.
2. **Contribution to GDP and Employment:** The transportation and communication sectors contribute ~12% to Ghana's GDP. It employs thousands of Ghanaians as drivers, telecom technicians, and port workers. App-based ride services like Bolt and Uber have created over 10,000 jobs for urban youth since their introduction, while telecom expansions support roles in network maintenance and customer service.
3. **Attraction of Foreign Investment:** Improved infrastructure attracts foreign direct investment (FDI). The expansion of Kotoka's Terminal 3 has drawn international airlines, enhancing Ghana's status as a regional hub. High-speed fibre connectivity in Accra's Inner City has attracted European call-centre investors, with companies like Teleperformance establishing operations in 2024. The Tema Free Zone benefits from road and port upgrades, hosting manufacturing firms.

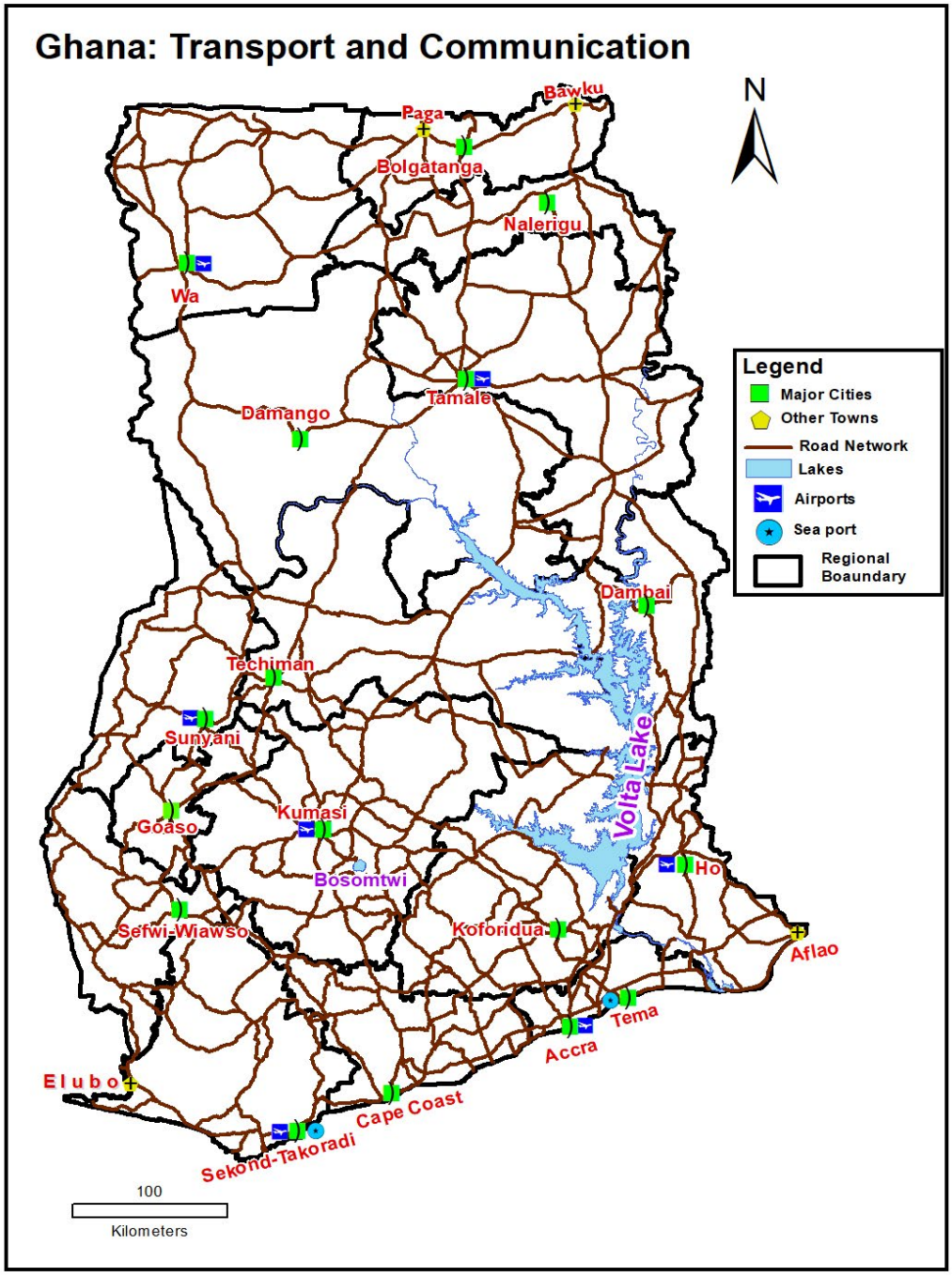


Figure 11.1: *Map of Ghana showing Transportation and Communication Systems*

4. **Improvement in Access to Education and Healthcare:** Transportation networks enable rural students to reach schools, while e-learning platforms, like those used during COVID-19, connected over 2 million students to remote lessons. The Mobile Telemedicine Pilot in the Ashanti Region allows patients in Obuasi to consult specialists via basic phones, reducing travel needs. The Wireless Ghana initiative has rebuilt power supplies for internet nodes, enhancing rural service delivery.

5. **Enhancement of Cultural Exchange and Integration:** Road networks facilitate travel to cultural festivals like *Homowo* in Greater Accra and *Panafest* in Cape Coast, drawing national and international visitors. Social media platforms, amplified by hashtags like *GhanaFest*, unite Ghanaians abroad with homeland events, fostering cultural pride and integration across diverse ethnic groups.

6. **Development of Infrastructure:** The Eastern Corridor Road Project (Koforidua–Ho–Aflao), funded by the World Bank, improves connectivity in eastern Ghana, supporting trade and tourism. Takoradi Port's deepening accommodates larger vessels, boosting the oil and gas sector in the Western Region. The Pokuase Interchange (completed 2021) has reduced congestion in Greater Accra, enhancing urban mobility.
7. **Expansion of Telecommunication Networks:** The Ghana Rural Telephony Project has extended mobile coverage to over 200 underserved communities, while private-sector agreements, like MTN's $1 billion investment by 2025, expand 4G to peri-urban areas. 5G trials in Accra and Kumasi promise faster data speeds, supporting innovations like IoT-driven logistics.

Challenges Facing the Sector

The transportation and communication sectors face significant challenges that hinder their efficiency and inclusivity.

Table 11.2: *Challenges of transportation and communication sector*

Challenge	Impact	Illustrative Scenario
1. Poor Road Conditions	Increased vehicle maintenance costs and delayed goods delivery, leading to economic losses.	Cassava farmers in the Eastern Region lose 20% of their yield due to delays on unpaved feeder roads during the rainy season.
2. Inadequate Rail Network	Over-reliance on roads causes congestion and pollution, raising transportation costs.	Transportation of Cocoa from the regions to Tema relies on lorries, increasing costs compared to potential rail transportation.
3. Limited Rural Access	Isolates communities, limiting access to schools, clinics, and markets, contributing to brain-drain.	Remote and inaccessible villages struggle to retain teachers and healthcare workers.
4. Slow Internet and High Data Costs	Widens the digital divide, hindering online entrepreneurship and education.	Start-ups in some urban centres like Tamale face unreliable video conferencing, deterring investors due to slow internet.
5. Obsolete Communication Technology	Inefficient emergency and government services reduce responsiveness.	Police in some districts rely on outdated analogue radio dispatch, delaying emergency responses.
6. Policy Inconsistency	Deters investors, delaying infrastructure projects.	Fluctuating telecom license fees in 2023 delayed tower rollouts by AirtelTigo, affecting service quality.
7. Limited Funding	Causes project delays or cancellations, stalling development.	The proposed Tema-Accra light-rail project was shelved in 2024 due to budgetary constraints.

Success Stories of transportation and communication in Ghana

1. **Zipline Medical Drone Service**: Since 2021, Zipline's drones have delivered blood, vaccines, and medical supplies to remote clinics in the Western and Central Regions, reducing delivery times from hours to minutes. By 2024, over 1 million deliveries were completed, saving lives in areas like Sefwi-Wiawso.
2. **GhanaPostGPS in Action:** During the 2022 national census, GhanaPostGPS improved door-to-door data collection accuracy by 40%, enabling precise mapping of households in rural areas like the Northern Region. This system also supports e-commerce by providing reliable delivery addresses.
3. **Huni Valley-Takoradi Railway Upgrade:** Completed in 2025 with Swiss support, this 100-km railway enhances freight and passenger transportation in the Western Region, reducing road congestion and supporting oil and gas logistics.

Learning Tasks

"Connecting Ghana: How Transportation and Communication Shape Our Nation"

1. In your mixed gender/mixed ability group, investigate the following using multiple sources such as textbooks, videos, newspaper articles, interviews (teachers/parents/community members), and the internet (where available).
   a. How road, rail, air, and water transportation support trade, education, healthcare, and tourism in Ghana.
   b. The importance of ICT, mobile phones, radio, and internet in communication.
   c. Challenges: Poor infrastructure, high costs, rural access, digital divide, etc.
2. In your group, design and submit one of the following project formats (select based on group strengths and interests):

Format	Description
📸 *Poster or Infographic*	*Use visuals to explain how transportation/communication helps Ghana and highlight key challenges.*
🗣️ *Role-play or Skit*	*Act out a scenario showing how poor roads or bad networks affect daily life.*
🛠️ *Model Building*	*Create a 3D model (using clay, cardboard, or local materials) of a transportation system or communication tower.*
📰 *Mini-News Report*	*Record a short news-style presentation discussing the issues and offering solutions.*
🗺️ *Community Map*	*Create a map showing how transportation /communication systems are laid out in your local area.*

3. Submit a short-written report or mind map (1–2 pages or poster-sized) summarising:
   a. The role of transportation/communication
   b. The challenges facing the sector

c. Suggestions to improve the system in Ghana

4. Present your project to the class using their chosen format.

Pedagogical Exemplar

Project-based Learning

In GESI-responsive groups, discuss the role of transportation/communication in the socio-economic development of Ghana and the challenges facing the sector.

1. Create GESI-responsive groups that reflect gender, ability, and socio-cultural diversity to ensure inclusive participation.
2. Assign project roles (e.g., discussion leader, researcher, recorder, presenter) based on learners' strengths and interests.
3. Provide clear project guidelines, timelines, and success criteria to support all learners in managing tasks.
4. Offer a variety of accessible resources (videos, maps, articles, infographics) to accommodate different learning styles and intellectual abilities.
5. Use graphic organisers, checklists, and scaffolding tools to guide research and discussion.
6. Encourage collaborative discussions where all learners' voices are heard and respected to promote SEL.
7. Support language-diverse and lower-literacy learners with sentence starters, keyword banks, and visual aids.
8. Monitor group interactions and provide regular feedback to maintain positive dynamics and task focus.
9. Promote peer teaching, allowing confident learners to support others in understanding complex ideas.
10. Allow flexible presentation formats (posters, slideshows, role-plays) to showcase findings in inclusive and engaging ways.

Key Assessment Level 3: Individual Homework

Short Answer Questions

1. Limited rural access due to poor road conditions is a major challenge in Ghana's transportation sector. Analyse how the Zipline medical drone service acts as an innovative strategic solution to overcome this specific infrastructure problem for the healthcare sector.
2. The government has a limited budget and must prioritise between two major projects: a further expansion of Kotoka International Airport to attract more foreign investors, or a widespread rehabilitation of rural feeder roads. Evaluate which project would likely have a more immediate and direct impact on the livelihoods of a larger number of Ghanaians and justify your choice.
3. Slow internet and high data costs as a challenge that widens the digital divide. Analyse how this specific communication challenge could undermine Ghana's efforts to attract foreign investment in modern, service-based industries.

4. Ghana's rail network is inadequate, leading to an "over-reliance on roads," which causes congestion and pollution. Propose a two-part strategy for the government to not only expand the railway but also encourage businesses to use it for transportation ing bulk cargo like cocoa and manganese.

Essay Questions (DoK 3)

1. a. Choose a community that has challenges with transportation network. Interact with the community members to understand how the challenges affect the following:

   i. economic opportunities

   ii. access to essential services

   iii. quality of life

   [12 marks]

   b. Propose some solutions to manage the community's poor road transportation system

   [8 marks]

   [Total 20 marks] **(DoK 3)**

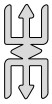
2. In groups, develop a comprehensive report on the role of transportation and communication in Ghana's socio-economic development. Your report should include an analysis of current transportation modes, challenges, and the popularity of road transportation, along with recommendations for improvement. Present your findings through a mix of written content, visual aids, and a group presentation.

   [Total 20 marks] **(DoK 3)**

PLC Session 11

45 minutes | **Planning & Reviewing the Learning Plan**

1. Begin the session by recapping lessons from the previous year/session/week, focusing on how learning was applied.
2. Use your subject specific app to explore the content before planning. Ask the app to
   a. explain the week's concepts in a practical way that will make it easier for learners to understand
   b. identify two or three common misconceptions learners may have on the week's content and how to address them using contexts familiar to Ghanaian learners. (NTS 3a, 3g and 3m).
3. Use your subject specific app to plan your lesson. Ask the app to
   a. suggest the most effective method for teaching the week's concepts to learners with diverse backgrounds.
   b. suggest learning activities, differentiation and essential questions based on the method of teaching (NTS 3a-3q)
   c. review your prepared learning plan and address any challenging issues you may have identified in your subject area (NTS 3a-3c).



Note

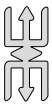
- *Take note of the recap topics linked to Years 1 and 2 while preparing for your lesson.*

- *Refer to the Values Learning Community Handbook and link the values for the week in your lesson to ensure that learners are applying what they learn.*

4. Plan the week's key assessment with your app
   a. The key assessment for the week is ***individual homework***. Chat with your app to plan this assessment, indicating what you and your learners will do before, during and after the homework (NTS 3k-3q).

10 minutes **Content Exploration**

5. As a subject group, select one problem or idea/term in the week's content that is challenging (not a routine procedural question, but one that requires conceptual understanding) and then
   a. use the app, ask it to solve the problem step by step and explain the reasoning behind each step (you may be assisted by a teacher who is strong in the content area)
   b. all teachers in the group work through a similar problem individually for 3–4 minutes
   c. the group then works through the problem together step by step
   d. highlight the most common errors made at each step and discuss (NTS 1c, 1e, 2c, 2e, 3e-3j).



Note

- *This part is not just about 'How do I teach this?' but how do I teach it for learners to understand?*
- *If the group still shares the same content gap, use the app: ask it to solve the problem step by step and explain the reasoning behind each step.*
- *Problems/ideas discussed should be sourced from the Teacher Manual content, not invented separately. This keeps the content exploration directly connected to what teachers will deliver.*

30 minutes **Enactment**

6. Enact a teaching activity based on your learning plan (NTS la-1b, 1e-lg, 2c, 2e, 2f, 3c-3j and 3o).
   a. Colleagues observe with specific attention to clarity of concept explanation, use of familiar Ghanaian examples and how misconceptions are handled if they arise.
   b. After the enactment, ask for structured feedback from the group
      i. was the concept explained in a way that a learner with no prior knowledge could follow?
      ii. were the examples grounded in contexts familiar to Ghanaian learners?
      iii. did any misconceptions surface and if so, how were they addressed?

5 minutes **Reflection**

7. Reflect and share your views on the session. One thing that worked well, what did not work well and what you will do differently. (NTS 1a, 1b).
8. Identify a critical friend to observe and provide feedback on your lesson in relation to the PLC Session conducted (NTS 1f, 1g).
9. Remember to

a. transfer your chats into your learning planner template.

b. read your Teacher Manual and related Learner Material in preparation for the next session. Take note of the recap weeks, which are linked to Years 1 and 2 (NTS 3a).

c. integrate National Values, GESI, SEL, and 21st century skills into your learning activities, assessment tasks, and rubrics/mark schemes.

Section 4 Review

In this section, tourism, trade, transportation, and communication contribute to Ghana's socio-economic development were explored. The benefits of tourism in job creation and foreign exchange, while recognising challenges such as poor infrastructure and limited promotion. Trade was assessed as a driver of income generation and market expansion, hindered by inadequate storage, transportation, and trade policies. The role of transportation and communication in connecting people, goods, and services was also explored, alongside challenges like poor road networks and limited rural access. Throughout the section, emphasis was placed on the development of 21st-century skills such as critical thinking, collaboration, digital literacy, and effective communication through group discussions, presentations, and analysis of real-world data.

MARKING SCHEMES FOR THE KEY ASSESSMENTS

WEEK 9

Short Answers

Q1

Marking Scheme

- Proposes a viable strategy (2 marks): Suggests a specific, relevant strategy mentioned or implied in the text, such as creating public-private partnerships (PPPs) to fund road upgrades.
- Explains the implementation (2 marks): Explains how the strategy would work, for example, by offering tax incentives to private companies to invest in rehabilitating and maintaining the roads.
- Analyses the impact on tourism (2 marks): Concludes how better, all-weather roads would increase visitor numbers, improve the tourist experience, and stimulate local economies around the park.

Total: 6 marks

Sample Answer

A comprehensive strategy would be to establish a public-private partnership (PPP) to upgrade and maintain the roads leading to Mole National Park. The government could offer tax incentives to private construction firms to rehabilitate the roads, ensuring they are accessible year-round.

Successful implementation would significantly boost tourism. Better roads would reduce travel time and cost for tourists, making the park a more attractive destination. This would lead to increased visitor numbers, longer stays, and more spending on local services like accommodation, food, and tour guiding, thereby stimulating the economy of the entire region.

Q2

Marking Scheme

- Selects a tourism type (1 mark): Chooses one type of tourism (e.g., Ecotourism).
- Provides a clear justification (3 marks): Argues that community-based ecotourism models often provide more direct financial benefits because the revenue is managed and retained by the community itself.
- Uses textual evidence (2 marks): Supports the argument using the specific example of Tafi Atome, where residents manage tours and proceeds fund community projects like schools and clinics.

Total: 6 marks

Sample Answer

Ecotourism, specifically a community-based model, would be the better choice for providing direct economic benefits to the local population. While both tourism types create jobs, community-based ecotourism ensures that a larger portion of the revenue stays within the community.

There is a clear example with the Tafi Atome Monkey Sanctuary, where the local "residents manage guided tours with proceeds funding community projects like schools and clinics". This model empowers the community directly. In contrast, revenue from a large, state-managed site like Elmina Castle, while supporting local jobs, may primarily go to the central government for national distribution rather than being reinvested directly into the immediate local economy.

Q3

Marking Scheme

- Acknowledges the core issue (1 mark): Recognises the need to maintain diaspora engagement while diversifying the market.
- Proposes a diversification strategy (2 marks): Suggests a clear strategy, such as targeting new tourist segments from different geographical regions.
- Explains the implementation and benefit (3 marks): Explains how this can be done (e.g., marketing campaigns, attending international expos) and why it is beneficial (reduces economic risk, opens new revenue streams, showcases different aspects of Ghana's tourism offerings).

Total: 6 marks

Sample Answer

Ghana can build on the success of the "Year of Return" by using the global attention it generated as a platform to diversify its tourism market. While continuing to engage the diaspora, the Ghana Tourism Authority should simultaneously "target new segments like eco-tourists from Europe and adventure travellers from Asia".

This can be achieved by participating in international tourism fairs in Germany and Japan to promote attractions beyond heritage sites, such as hiking at Mount Afadjato or wildlife tours at Mole National Park. This strategy addresses the challenge of over-reliance by creating multiple streams of tourist income, making the sector more resilient to shifts in any single market and showcasing the full range of Ghana's attractions.

Q4

Marking Scheme

- Strategy 1 (3 marks): Proposes a specific financial or benefits-based incentive (e.g., competitive salaries, housing allowance, or profit-sharing) and justifies how it addresses the financial pull from abroad.
- Strategy 2 (3 marks): Proposes a specific career development incentive (e.g., mentorship programs, partnerships for local training) and justifies how it provides a non-financial reason to stay by fostering career growth and loyalty.

Total: 6 marks

Sample Answer

To combat brain drain, a large hotel chain could implement the following two-pronged strategy:

a. Introduce Competitive Financial Incentives: The hotel could implement a "Tourism Talent Retention Program" that includes offering competitive salaries that are closer to regional benchmarks and providing benefits like housing allowances or a profit-sharing scheme. This

would be effective because it directly addresses the primary pull factor of higher pay abroad, making it more financially rewarding for skilled staff to remain in Ghana.

b. Establish Clear Career Growth Pathways: The hotel could create mentorship programs where senior managers guide junior talent and partner with international hospitality schools to offer advanced training and certification programs in Ghana. This would be effective because it shows employees that they can achieve their long-term career goals and advance professionally without having to emigrate, fostering loyalty to the company and industry.

Essay Question

Structure and Marks Allocation

a. **Location & Access (4 marks)**

i. Name of the Tourist Centre and historical/cultural significance: (1 mark)

ii. Full Address and contact numbers: (1 mark)

iii. How to get there: Explanation of major roads, public transportation options from major cities, and estimated travel time. (1 mark)

iv. Booking information including safety, rules and regulations (1 mark)

b. **Operational Information (4 marks)**

i. Opening Hours: (1 mark)

ii. Entrance Fees: Details including varying rates for adults, children, seniors, residents/ non-residents, and group discounts. (1 mark)

iii. Best time of the season to visit: Considering weather, crowds, and specific events. (1 mark)

iv. How long tourists can typically spend at the centre: (1 mark)

c. **Attractions & Activities (4 marks)**

i. Main Attractions/Highlights: (1 mark)

ii. Other activities/sceneries available: E.g., hiking trails, cultural performances, wildlife viewing, boat tours, and nearby points of interest. (1 mark)

iii. Amenities available: E.g., restrooms, food and beverage options, gift shop, parking, accessibility for disabled visitors, Wi-Fi, and first aid. (1 mark)

iv. Accommodation options nearby: E.g., hotels, guesthouses, campsites. (1 mark)

d. **Amplification and Presentation of reasons why the site should be visited (8 marks)**

i. 2 marks per point. For example, one mark for naming an unforgettable experience and one mark for explaining why it is unforgettable. The audience might have chosen a visit to the Masai Mara Reserve in Kenya to witness the Great Migration. A 2 marks response would be something like: Visiting the Masai Mara National Reserve will be an unforgettable experience because of the Great Migration, one of the most spectacular wildlife events on Earth. Witnessing millions of wildebeest, zebras, and gazelles thunder across the plains, braving crocodile-infested rivers, and evading predators like lions and cheetahs is a breathtaking display of nature's drama. It's a once-in-a-lifetime sight that showcases the raw beauty and intensity of the African wilderness.

Other responses must be based on the research.

WEEK 10

Short Answers

Q1

Marking Scheme

- Strategy for Value Addition (3 marks): Proposes a specific strategy, like processing tomatoes into paste (1 mark). Explains this increases shelf-life and fetches a higher price than raw tomatoes (2 marks).
- Strategy for Storage (3 marks): Proposes a related strategy, like investing in canning/bottling facilities for the paste (1 mark). Explains this solves the storage problem for the processed goods, allowing them to sell year-round and avoid seasonal price drops (2 marks).

Total: 6 marks

Sample Answer

A two-part strategy for the tomato cooperative would be:

a. Invest in Value Addition: The cooperative should process a portion of its raw tomatoes into tomato paste. As the text suggests, value addition allows products to "fetch higher prices" and "reduce post-harvest losses". Tomato paste has a longer shelf-life and is more valuable than fresh tomatoes, which are highly perishable.

b. Develop Appropriate Storage: By canning or bottling the tomato paste, the cooperative solves the storage problem. This allows them to hold their inventory and sell it during the off-season when prices are higher, instead of being forced to sell all their fresh produce at low prices during a bumper harvest. This combination directly increases their income by reducing waste and commanding better market prices.

Q2

Marking Scheme

- Analysis of Exports (3 marks): Explains that the prices of primary commodities like gold and cocoa are volatile on the global market. A sudden price drop can drastically reduce Ghana's export earnings.
- Analysis of Imports (3 marks): Explains that machinery and refined fuel are essential, high-value imports. Ghana has little control over their prices and must continue buying them, creating a consistent outflow of foreign currency. This combination of uncertain export income and high, fixed import costs leads to an unfavourable balance of trade and economic vulnerability.

Total: 6 marks

Sample Answer

This trade structure makes Ghana's economy vulnerable for two main reasons.

Firstly, by relying on exporting raw commodities like gold and cocoa, Ghana's income is subject to "price volatility" on the world market. A sharp fall in the price of cocoa, for example, can significantly reduce the nation's foreign exchange earnings unexpectedly.

Secondly, Ghana's reliance on importing high-value, essential manufactured goods like machinery and refined petroleum means it has a consistently high import bill. When the income

from volatile exports is less than the cost of expensive imports, it leads directly to an "unfavourable balance of trade," which can weaken the cedi and strain the economy.

Q3

Marking Scheme

- Identifies Opportunity for Import Substitution (3 marks): Explains that AfCFTA creates a larger African market, allowing Ghana to source some of its needed goods (e.g., processed foods, textiles, pharmaceuticals) from other African countries instead of from Europe or Asia.
- Identifies Opportunity for New Export Markets (3 marks): Explains that AfCFTA provides a new, large market for Ghana's own locally produced goods, particularly value-added products. This would boost local industries, making Ghana less reliant on selling raw materials to traditional partners and using the revenue to pay for imports.

Total: 6 marks

Sample Answer

Successfully participating in AfCFTA could help Ghana reduce its over-dependence on imports from China and the EU in two ways. First, it enables import substitution within the continent. Instead of importing items like pharmaceuticals or processed foods exclusively from Asia or Europe, Ghana could source them from other African industrial hubs like South Africa or Nigeria, keeping the currency within Africa.

Second, AfCFTA provides a massive new market for Ghana's own manufactured and value-added products. By promoting its non-traditional exports within Africa, Ghana can strengthen its local industries and create a more balanced trade profile. This reduces the need to rely solely on exporting raw materials to non-African countries to earn the foreign exchange required to pay for its imports.

Q4

Marking Scheme

- Identifies the initial problem (2 marks): Explains that bad feeder roads make it difficult and time-consuming to transportation perishable goods from rural farms to ports or airports.
- Analyses the effect on quality and quantity (2 marks): Links the transportation delays and poor road conditions to product damage (bruising) and spoilage, reducing the quantity of high-quality, export-grade produce available.
- Concludes on the impact on export competitiveness (2 marks): Concludes that because of these quality and consistency issues, Ghanaian exporters would struggle to meet the strict standards and reliable supply schedules demanded by European supermarkets, thus hindering export growth.

Total: 6 marks

Sample Answer

Poor feeder roads create a critical bottleneck that directly hinders the export of perishable goods like pineapples and mangoes. The journey from a rural farm to a port like Tema is the first step in the export chain. Bad roads cause significant delays, and the rough transit damages the delicate fruits, leading to bruising and spoilage.

This has two major impacts. Firstly, it reduces the volume of produce that is of high enough quality to meet the strict cosmetic and safety standards of European markets. Secondly, it makes supply chains unreliable. European importers require a consistent and timely supply, which is impossible to guarantee if trucks are getting stuck or produce is spoiling on bad roads. This inability to ensure quality and reliability makes it very difficult for Ghanaian exporters to compete internationally.

Essay Questions

Q1

Structure and Marks Allocation

a. **Introduction to Markets in Ghana (4 marks)**

   i. Definition and general role of markets as key trading centres (2 marks).

   ii. Overview of their importance in the Ghanaian economy (2 marks).

b. **Detailed Analysis of One Major Market (6 marks)**

   i. Selection and brief description of a major market (e.g., Kumasi Central Market, Makola Market) (1 mark).

   ii. Explanation of how the selected market functions as a hub for agricultural trade (2 marks).

   iii. Description of the types of goods traded and the market's structure (2 marks).

   iv. Mention of any historical or cultural significance of the market (1 mark).

c. **Impact on Local Agricultural Trade (5 marks)**

   i. Discussion of how the market supports local farmers and producers (2 marks).

   ii. Explanation of the supply chain and distribution processes facilitated by the market (2 marks).

   iii. Examples of agricultural products predominantly traded in the market (1 mark).

d. **Socio-Economic Contributions (5 marks)**

   i. Analysis of the market's role in job creation and employment opportunities (2 marks).

   ii. Contribution to local and national economic growth, including any GDP impact (1 mark).

   iii. Impact on infrastructure development and improvement of local facilities (1 mark).

   iv. Role in fostering social interactions and community cohesion (1 mark).

Additional Notes

- Clarity and Structure: Responses should be well-organised, with an introduction, main body, and conclusion. Up to 2 marks can be deducted for poor organisation or unclear writing.
- Use of Data and Examples: Inclusion of specific data points, statistics, or case studies enhances the analysis. Up to 2 marks can be added for exceptional use of evidence.

Q2

Structure and Marks Allocation

a. **Introduction to Ghana's Domestic Trade Sector (3 marks)**

i. Overview of the domestic trade sector in Ghana, highlighting its importance to the economy and daily life (2 marks).

ii. Brief mention of key goods and services involved in domestic trade (1 mark).

b. **Identification and Explanation of Challenges (8 marks)**

i. Identification of specific challenges facing the domestic trade sector, such as infrastructure issues, market access, and regulatory challenges (2 marks).

ii. Detailed explanation of each challenge, supported by specific examples or case studies (4 marks).

iii. Mention of any recent developments or trends impacting these challenges (2 marks).

c. **Proposed Strategies for Improvement (6 marks)**

i. Suggestion of practical and feasible strategies to overcome the identified challenges (3 marks).

ii. Justification of proposed strategies with logical reasoning and potential benefits (3 marks).

d. **Conclusion and Implications (3 marks)**

i. Summary of key points discussed (1 mark).

ii. Discussion of potential implications of successfully addressing these challenges on Ghana's economy and society (2 marks).

Additional Notes

- Clarity and Structure: The response should be well-organised, with a clear introduction, body, and conclusion. Up to 2 marks can be deducted for poor organisation or unclear writing.
- Use of Data and Examples: Inclusion of specific data points, statistics, or real-world examples enhances the discussion. Up to 2 marks can be added for exceptional use of evidence.

WEEK 11

Short Answers

Q1

Marking Scheme

- Identifies the core problem being solved (2 marks): Explains that poor roads make the physical delivery of medical supplies to remote clinics slow and unreliable.
- Explains how Zipline bypasses the problem (2 marks): Analyse that by using air (drones), Zipline completely bypasses the need for road transportation, thus overcoming the barrier of physical inaccessibility.
- Analyses the strategic impact (2 marks): Concludes that this innovation drastically reduces delivery times "from hours to minutes", saves lives by delivering critical supplies like blood and vaccines quickly, and improves healthcare equity for rural areas.

Total: 6 marks

Sample Answer

The Zipline medical drone service acts as a strategic solution by fundamentally changing the mode of transportation for critical medical supplies. The core problem is that poor roads make it slow and difficult to reach remote clinics, especially during rainy seasons. Zipline overcomes this by using autonomous drones to fly directly to these clinics, completely bypassing the inadequate road network.

The impact of this strategy is transformative. It reduces delivery times for life-saving supplies like blood and vaccines "from hours to minutes". This speed and reliability directly solve the challenge of "Limited Rural Access" for the healthcare sector, ensuring that patients in remote communities receive timely care that would otherwise be impossible due to transportation delays.

Q2

Marking Scheme

- States a clear choice (1 mark): Selects one project (e.g., rehabilitation of feeder roads).
- Justifies the choice with evidence (3 marks): Argues that since the road sector handles ~95% of passenger and freight traffic and poor roads cause farmers to lose crop yield, improving them directly impacts the income and food security of the large rural population.
- Evaluates the alternative (2 marks): Acknowledges the airport's importance for attracting FDI but explains its economic benefits are less direct and impact a smaller segment of the population in the short term compared to the broad-based impact of improved rural roads.

Total: 6 marks

Sample Answer

The rehabilitation of rural feeder roads would have a more immediate and direct impact on the livelihoods of a larger number of Ghanaians. The document states that roads handle approximately 95% of all passenger and freight traffic in Ghana. Improving feeder roads directly benefits the large agricultural population by reducing post-harvest losses, lowering transportation costs, and ensuring their produce can reach markets. This has an immediate effect on the income and food security of millions.

While expanding the airport is crucial for attracting foreign investment and long-term growth, its benefits are less direct for the majority of the population. The economic impact of new foreign investment takes time to spread, whereas improved roads provide an instant benefit to farmers, traders, and rural communities across the country.

Q3

Marking Scheme

- Identifies the needs of service-based industries (2 marks): Explains that industries like call centres, software development, and online support services depend entirely on fast, reliable, and affordable internet connectivity to operate.
- Analyses the negative impact of the challenge (2 marks): Explains that slow and costly internet makes business operations inefficient, unreliable, and expensive, directly discouraging investment.
- Concludes on Ghana's competitiveness (2 marks): Concludes that foreign companies will choose to invest in other countries with better digital infrastructure, causing Ghana to lose out on high-value jobs and economic diversification opportunities.

Total: 6 marks

Sample Answer

Slow and expensive internet directly undermines Ghana's ability to attract foreign investment in service-based industries. These modern industries, such as the call centres mentioned in the text, are entirely dependent on high-speed, stable, and cost-effective internet to serve their global customers.

When investors see that Ghana suffers from "slow internet and high data costs", it signals high operational risk and lower profitability. For example, a call centre cannot function with unreliable video conferencing or slow data transfer. Consequently, these investors are likely to choose competing countries with superior digital infrastructure, causing Ghana to lose valuable foreign direct investment and the associated skilled jobs**.**

Q4

Marking Scheme

- Strategy 1: Infrastructure Expansion (3 marks): Proposes the continued strategic expansion of the rail network to connect resource-producing areas to ports, and justifies this as creating a viable alternative to road transportation.
- Strategy 2: Economic Incentives (3 marks): Proposes providing financial incentives (e.g., freight subsidies, tax breaks) for businesses that use the railway. Justifies this by explaining that it must be economically more attractive for companies to switch from the flexibility of road transportation to rail.

Total: 6 marks

Sample Answer

A two-part strategy to boost rail usage for cargo would be:

a. Strategic Infrastructure Expansion: The government must continue to expand the rail network to connect key production zones with the ports of Tema and Takoradi, similar to the Tema-Mpakadan and Huni Valley-Takoradi lines. This is a necessary first step because businesses cannot use a railway that does not exist or does not go where they need it to.

b. Provide Financial Incentives for Rail Freight: Simply building the railway is not enough. The government must make it economically attractive for businesses to use it. This could be done by offering subsidies on rail freight charges for bulk commodities like cocoa and manganese, or by providing tax rebates to companies that transportation a certain percentage of their goods by rail. This incentive is crucial to overcome the convenience of road transportation and encourage the shift to rail.

Essay Questions

Q1

Structure and Marks Allocation

a. **Selection and Introduction of the Community (3 marks)**

   i. Clear identification of a community facing transportation network challenges (1 mark).

   ii. Brief description of the community, including relevant background information (2 marks).

b. **Impact on Economic Opportunities (3 marks)**

i. Explanation of how transportation challenges affect local businesses and employment opportunities (1 mark).

ii. Use of specific examples to illustrate economic impacts (1 mark).

iii. Mention of any long-term economic implications for the community (1 mark).

c. **Impact on Access to Essential Services (3 marks)**

i. Discussion of how transportation issues limit access to essential services like healthcare, education, and markets (1 mark).

ii. Use of specific examples to demonstrate these impacts (1 mark).

iii. Consideration of the broader social implications of limited access (1 mark).

d. **Impact on Quality of Life (3 marks)**

i. Explanation of how transportation challenges affect residents' daily lives and well-being (1 mark).

ii. Use of examples to illustrate changes in quality of life (1 mark).

iii. Mention of any psychological or social impacts (1 mark).

e. **Proposed Solutions to Manage Transportation Challenges (8 marks)**

i. Suggestion of practical solutions to improve the transportation network, such as infrastructure development or policy changes (4 marks).

ii. Justification of proposed solutions with logical reasoning and potential benefits (4 marks).

Q2

Structure and Marks Allocation

a. **Report Structure and Content (5 marks)**

i. Well-organised report with clear sections (introduction, analysis, challenges, case studies, recommendations).

ii. Comprehensive coverage of the topic.

b. **Analysis of Current Transportation Modes (5 marks)**

i. Detailed analysis of transportation and communication modes in Ghana.

ii. Use of data and examples to support analysis.

c. **Identification of Challenges (3 marks)**

i. Clear identification and explanation of challenges facing the sectors.

d. **Why Road Transportation is Popular (4 marks)**

i. Advantages of road transportation over other modes of transportation.

ii. Why Ghanaians prefer road transportation.

e. **Strategic Recommendations (3 marks)**

i. Practical and well-reasoned recommendations for improving the sectors.

SECTION 5: CLIMATE CHANGE

STRAND: THE EARTH AND ITS NEIGHBOURHOOD

Sub-Strand: The Earth's Atmosphere

Learning Outcome: *Discuss the causes and evidence of climate change, its impacts and the adaptation and mitigation strategies in Ghana.*

Content Standard: *Demonstrate knowledge of climate change and its impacts on the environment and socio-economic development.*

INTRODUCTION AND SECTION SUMMARY

Climate change in Ghana, fuelled by deforestation, fossil fuel use, and industrial activities, manifests through rising temperatures, shifting rainfall patterns, and frequent extreme weather events. These changes profoundly affect Ghana's socio-economic fabric, disrupting agriculture, water availability, public health, and infrastructure, while also causing environmental harm like biodiversity loss, desertification, and coastal erosion. Beyond Ghana, such impacts ripple globally, exacerbating resource challenges. To counter these effects, Ghana employs adaptation strategies, including reforestation, sustainable farming, renewable energy adoption, and policies aimed at cutting greenhouse gas emissions. This section explores the causes and evidence of climate change in Ghana, its socio-economic and environmental consequences, and the proactive measures being taken to mitigate its impact, offering a comprehensive look at this pressing issue.

The weeks and the indicators covered by the section are:

Week 12:

- Discuss the causes and evidence of climate change in Ghana
- Discuss the socio-economic and environmental impacts of climate change in Ghana and beyond

Week 13: Discuss adaptation strategies and remedies for climate change in Ghana

The section on "Climate Change" in this Year 3 TM builds upon foundational knowledge from Year 1 and Year 2 within the "The Earth and Its Neighbourhood" strand, specifically under the sub-strand "The Earth's Atmosphere." In Year 1, students begin by analysing the physical structure and composition of the Earth's atmosphere and understanding the terms weather and climate (1.1.3.LO.1). This foundational knowledge is crucial for grasping the concepts of climate change. In Year 2, the curriculum examines factors influencing climate elements and explores world climatic zones and associated vegetation (2.1.3.LO.1), further enhancing the understanding of atmospheric dynamics and their impact on climate. Year 3 continues this progression by discussing the causes and evidence of climate change, its socio-economic and environmental impacts, and adaptation and mitigation strategies in Ghana (3.1.3.LO.1).

SUMMARY OF Pedagogical Exemplars

This section adopts learner-centred and inclusive teaching methods to foster critical thinking, collaboration, and creativity in exploring climate change. Through inquiry-based learning, students actively research and identify evidence of climate change in Ghana using diverse sources. Activity-based approaches engage learners in creating visual tools, such as charts, to illustrate key climate concepts. Collaborative learning, organised in Gender Equality and Social Inclusion (GESI)-responsive and mixed-ability groups, promotes rich discussions on the socio-economic and environmental impacts of climate change, alongside adaptation and mitigation strategies. Students from varied climatic regions share personal experiences, brainstorm practical solutions, and design posters to raise awareness about combating climate change. These dynamic strategies ensure active participation, teamwork, and contextual understanding, empowering learners with the knowledge, skills, and attitudes to address climate challenges effectively in Ghana and globally.

ASSESSMENT SUMMARY

Indicators	DOK Level	Assessment Strategy and/or Mode
Week 12 3. Discuss the causes and evidence of climate change in Ghana. 4. Discuss the socio-economic and environmental impacts of climate change in Ghana and beyond economic development in Ghana	3	Key Assessment Practice Paper 1 (Individual class/homework) • 3 short answer questions with marking scheme. • essay questions with discussion/ analysis/case study and evaluation sections with a detailed marking scheme showing structure and marks allocation
Week 13 1. Discuss adaptation strategies and remedies for climate change in Ghana	3	Key Assessment (Individual class/ homework) • 2 short answer questions with marking scheme • 1essay question to be done in a group with a detailed marking scheme showing structure and mark allocation.

Y3 RECAP: Causes And Evidence of Climate Change, Its Impacts and the Adaptation and Mitigation Strategies in Ghana	
YEAR/TOPIC	**Activities/Tasks – can be in groups or pairs or individual**
Year 1 Physical Setting of Ghana	1. Draw maps of Ghana showing climatic regions. 2. Discuss the characteristics and importance of these climatic zones.
Year 2 Climate Change and Environmental Impact	1. Research climate change causes and evidence in Ghana. 2. Develop charts showcasing evidence of climate change

Year 1 Environmental Challenges	1. Identify challenges posed by climatic conditions and discuss potential solutions. 2. Discuss the socio-economic importance and challenges of climate.

WEEK 12

Learning Indicators

1. *Discuss the causes and evidence of climate change in Ghana*
2. *Discuss the socio-economic and environmental impacts of climate change in Ghana and beyond*

Focal Area 1: The Concept of Climate Change

Introduction

Climate change is a global topical and environmental issue which has received wide publicity due to its impact on the environment and humans. Climate change refers to long-term shifts in temperatures and weather patterns. It includes a continuous long-term change in the climate of an area, such as a region, country, or the globe. These changes may be caused by both natural factors, such as volcanic eruptions and solar activity, and human activities, including deforestation and greenhouse gas emissions. The effects of climate change are already being felt worldwide, through rising sea levels, extreme weather events, declining agricultural productivity, and threats to biodiversity and human health.

Causes of Climate Change

Climate change in Ghana and elsewhere is caused by the following human and natural factors:

1. **Human Factors**
    a. **Greenhouse gas emissions**: Human activities such as burning fossil fuels for transportation, electricity, and cooking release large amounts of carbon dioxide and other greenhouse gases into the atmosphere. These gases trap heat, leading to global warming and climate change.
    b. **Deforestation**: Cutting down forests for farming, logging, or settlement reduces the number of trees that absorb carbon dioxide from the air. This increases greenhouse gas levels in the atmosphere, contributing to climate change.
    c. **Industrial activities**: Factories and mining operations release greenhouse gases and other pollutants through the burning of fuel and chemical processes. These emissions contribute to global warming and reduce air quality.
    d. **Bush burning**: The widespread practice of burning grasslands and farms releases carbon dioxide and other greenhouse gases. It also destroys vegetation that would otherwise absorb atmospheric carbon.
    e. **Urban pollution**: Emissions from vehicles, waste burning, and household energy use in cities release harmful gases into the atmosphere. This pollution not only reduces air quality but also intensifies the greenhouse effect, contributing to climate change.
2. **Natural Factors**
    a. **Solar activity**: The Sun's energy output is not constant and varies in cycles, such as the 11-year solar cycle. Increased solar radiation can cause short-term warming of the Earth's surface, while decreased solar activity can lead to temporary cooling periods. Though not a major driver of current climate change, these natural fluctuations have historically influenced global climate patterns.

b. **Volcanic eruptions**: When volcanoes erupt, they emit large quantities of ash, sulphur dioxide, and other gases into the atmosphere. These particles can block sunlight and cause temporary cooling of the Earth's surface, although the effect is usually short-lived. However, if eruptions are frequent or massive, with carbon dioxide, they have the potential to promote global warming and can contribute to longer-term climate shifts.

c. **Changes in Earth's orbit**: Over thousands of years, the Earth's orbit around the Sun changes shape (eccentricity), its axis tilts (obliquity), and it wobbles (precession), in what are known as Milankovitch cycles. These variations affect how much solar energy different parts of the Earth receive, influencing long-term climate patterns such as the onset of ice ages and interglacial periods.

Evidence of Climate Change in Ghana

In Ghana, the following are some of the evidence of climate change:

1. **Rising temperatures:** Average temperatures in Ghana have steadily increased over the past decades, with hotter and longer dry seasons becoming more common. This rise in temperature has led to heat stress in both humans and livestock, affecting health and agricultural productivity.
2. **Declining and erratic rainfall**: Ghana is experiencing reduced annual rainfall and increasingly unpredictable rain patterns. This has disrupted planting seasons and reduced crop yields, particularly in rain-fed farming communities.
3. **Rising sea levels and coastal floods**: Some coastal areas in Ghana, such as Keta, Ada and Teshie, are facing increasing sea levels that lead to frequent tidal floods and the destruction of homes and farmlands. These rising waters have also caused severe coastal erosion, threatening livelihoods and displacing communities.
4. **Extreme weather events such as drought**: Periodic droughts in northern Ghana have become more intense and prolonged, drying up water sources and damaging crops. These events increase food insecurity and put pressure on rural livelihoods and natural resources.

In all, the changes in Ghana's climate are particularly impacting agriculture, food security, and coastal communities. Rising temperatures, coupled with erratic rainfall, are leading to crop failures and reduced yields in major staple crops.

Learning Tasks

"Is Our Climate Changing? Evidence from Ghana"

1. In mixed gender/ability brainstorm and refine an inquiry question, such as:
   a. What are the visible signs of climate change in Ghana?
   b. How has the weather pattern in Ghana changed over the past 30 years?
   c. How is climate change affecting farming or water supply in our communities?
2. Use multiple sources (printed, digital, and human) to gather information:

   Internet (e.g. Ghana Meteorological Agency, EPA Ghana)
   a. Textbooks and class notes
   b. Newspapers and magazine articles

c. Interviews with elders/farmers/community members

d. Videos and documentaries (with teacher guidance)

3. Focus on areas such as;

a. Changes in rainfall patterns or temperature

b. Droughts, floods, bushfires, sea level rise

c. Impact on agriculture, water, health, or livelihoods

4. Choose one accessible format to present their inquiry

Format	Best For
Infographic or poster	Visual learners
Short video or photo story	Tech-savvy learners
Role-play or skit	Kinaesthetic and drama-loving learners
Map with climate-related symbols	Spatial learners
Interview podcast or radio show	Auditory learners
Illustrated report or storybook	Linguistic/reading learners

5. In your group, create a brief reflection on:

a. What surprised us most?

b. What evidence did we find in Ghana?

c. How can we help reduce the effects of climate change?

This can be presented as:

a. A short-written summary

b. A poster with bullet points and visuals

c. A recorded note or video message

"Picture the Change: Visualising Climate Change in Ghana"

1. Teacher to present pictures and short video clips (showing floods, droughts, bushfires, drying lakes, rising sea levels) to stimulate class discussion in the following areas:

a. What do we see in the pictures?

b. How do these clips show climate is changing in Ghana?

c. What are the main causes of Ghana's climate change?

d. What can be done to address what is shown in the clips?

Teacher to adopt all-inclusive techniques

2. In an all-inclusive group, choose one focus area of climate change to illustrate through a chart with pictures and brief explanations:

Chart Topic Options	Description
🌪️ Causes of Climate Change	E.g. deforestation, emissions, bush burning
🌊 Effects of Climate Change	E.g. flooding, droughts, food insecurity
🧍♀️ Local Evidence in Ghana	E.g. disappearing rivers, rainfall changes
🛠️ Solutions/Adaptations	E.g. tree planting, use of clean energy

Chart Guidelines

a. Use pictures (printed, drawn, or cut from newspapers).

b. Add labels, arrows, symbols, and colour to enhance understanding.

c. Include simple captions or explanations using large, clear writing.

d. At least one element must be interactive (e.g. flip cards, pop-ups, or removable pieces).

e. Allow multiple forms of contribution: drawing, pasting, colouring, explaining.

3. As a group, present your chart to the class.

Pedagogical Exemplars

Inquiry learning

- Conduct research from various sources including the internet on climate change.
- Identify evidence of climate change in Ghana.

1. Guide learners to form diverse, inclusive groups that reflect varied abilities, gender, and backgrounds.
2. Provide a list of credible and accessible sources (websites, videos, articles) tailored to different reading and comprehension levels.
3. Use guiding questions and research templates to help structure the inquiry process for all learners.
4. Offer differentiated tasks (e.g., summarising, analysing, presenting) based on learners' strengths and abilities.
5. Support learners with limited digital skills by offering tutorials or pairing them with tech-savvy peers.
6. Provide visual aids, simplified texts, and audio resources for learners with reading difficulties or language barriers.
7. Foster a safe, respectful classroom environment that encourages open dialogue and values all contributions.
8. Promote collaboration and empathy through peer discussions and shared responsibilities.
9. Conduct regular check-ins to provide feedback, encouragement, and emotional support.
10. Allow learners to present findings in different formats (e.g., posters, presentations, reports) to enhance inclusivity and creativity.

Activity-Based Learning

Develop charts on climate change using relevant pictures

1. Group learners inclusively, considering gender, ability levels, and learning styles to ensure GESI responsiveness.
2. Provide visual aids, sample charts, and step-by-step instructions to guide learners through the activity.
3. Offer differentiated roles (e.g., picture selector, chart designer, caption writer, presenter) based on learners' strengths and interests.
4. Use a variety of picture sources (printouts, magazines, digital images) to cater to different access needs and abilities.
5. Support learners with low literacy by allowing oral explanations or using symbols and keywords.
6. Encourage peer collaboration and mentoring, allowing learners to support one another during the activity.
7. Use graphic organisers and templates to help structure the chart development process.
8. Create a safe space for learners to express ideas, ask questions, and make mistakes without judgment.
9. Provide positive feedback to build confidence, teamwork, and a sense of achievement.
10. Allow for flexible presentation methods (e.g., wall displays, group presentations) to celebrate all contributions.

Focal Area 2: Impacts of Climate Change

Climate change has social, economic and environmental effects. These are discussed below;

Socio-economic impacts of climate change

Climate change impacts socio-economic development in the following ways:

1. **Increasing existing inequalities**: Climate change disproportionately affects vulnerable groups such as the poor, women, and rural communities, who have limited resources to adapt. This deepens social and economic inequalities across regions and populations in Ghana.
2. **Hindering economic growth**: Climate-related disasters like floods and droughts damage infrastructure and reduce agricultural output, straining national resources. These impacts slow economic development and increase the cost of recovery and adaptation.
3. **Affects various sectors like agriculture, public health, and infrastructure**: Unpredictable rainfall and rising temperatures reduce crop yields, spread diseases such as malaria, and damage roads and buildings. This weakens the performance of key sectors and increases the burden on public services.
4. **Reduces productivity**: High temperatures and poor weather conditions affect the physical capacity of workers, especially in outdoor sectors like farming and construction. This leads to lower work output and income losses.
5. **Havoc on people's livelihoods and communities**: Flooding, droughts, and coastal erosion destroy homes, farmlands, and businesses, forcing people to relocate or abandon their livelihoods. These disruptions threaten food security and social stability in many communities.

Environmental impacts of climate change

1. **Drought**: Climate change increases the frequency and severity of droughts by reducing rainfall and accelerating evaporation. This leads to water shortages, land degradation, and reduced vegetation cover.
2. **Storms**: Warmer temperatures contribute to more intense and frequent storms, including heavy rainfall and strong winds. These storms cause erosion, flooding, and damage to natural ecosystems.
3. **Heat waves**: Prolonged periods of extreme heat are becoming more common due to global warming. Heat waves stress plants and animals, dry up water bodies, and increase the risk of wildfires.
4. **Rising sea levels**: Melting polar ice and thermal expansion of seawater cause sea levels to rise. This leads to coastal erosion, saltwater intrusion, and the submergence of low-lying areas.
5. **Melting glaciers**: Increasing global temperatures are causing glaciers and ice caps to melt at an accelerated rate. This reduces freshwater availability and contributes to rising sea levels.
6. **Warming oceans**: Oceans absorb much of the Earth's excess heat, leading to higher sea surface temperatures. This disrupts marine ecosystems, causes coral bleaching, and alters ocean currents and weather patterns.

Adaptation strategies

Such measures include;

1. **Planting crop varieties that are more resistant to drought:** Using drought-resistant crops helps farmers maintain yields during dry spells and unpredictable rainfall. This strategy enhances food security and supports livelihoods in climate-vulnerable areas.
2. **Cultivating early maturing crops:** Early maturing crops require less time to reach harvest, reducing the risk of crop failure due to shortened or erratic growing seasons. This helps farmers adapt to changing rainfall patterns and temperature fluctuations.
3. **Practicing regenerative agriculture:** Regenerative agriculture techniques such as composting, mulching, and crop rotation restore soil health and improve resilience to climate stress. These practices also enhance carbon sequestration and biodiversity.
4. **Improving water storage:** Building dams, rainwater harvesting systems, and reservoirs helps store water for use during droughts or dry seasons. This ensures a reliable water supply for farming, domestic use, and livestock.
5. **Reduce wildfire risks:** Strategies such as controlled burning, clearing dry vegetation, and enforcing fire management policies help lower the likelihood and intensity of wildfires. These actions protect ecosystems, farms, and communities from fire-related damage.
6. **Building stronger defences against extreme weather like floods and heat waves:** Constructing flood barriers, improving drainage systems, and developing heat-resistant infrastructure reduces vulnerability to climate hazards. These measures protect lives, property, and economic activities from extreme weather impacts.

Learning Tasks

"Climate in Crisis: Impacts and Responses in Ghana"

1. **Warm-Up Brainstorm (Whole Class)**

   a. The teacher prompts learners with visual aids (charts, news clippings, photos of floods, droughts, displaced people, poor crop yields, etc.) and questions:

      i. What changes are we seeing in the environment?

      ii. How are people affected socially, economically, and environmentally?

      iii. What are people doing to adapt?

   b. Teacher forms GESI and mixed ability group, and each group receives a set of guiding questions or scenario cards (with visuals/simplified text as needed):

Discussion Topics (choose or assign):

Focus Area	Sample Questions
🌾 Agriculture	How does climate change affect food crops in Ghana? What are farmers doing in response?
🏘️ Communities	What happens to people when floods or droughts occur? Who is most affected?
🌍 Environment	What environmental changes are caused by climate change (e.g. deforestation, desertification)?
💰 Economy	How does climate change affect jobs, income, and local businesses?
🧰 Adaptation Strategies	What can communities, schools, or the government do to reduce the effects?

   c. Group Task: Discuss your topic and answer the questions using textbooks or pre-selected articles, Internet (if available), Posters, news articles, pictures and support materials at different reading levels.

2. **Create and Share – "Our Group's Climate Story"**

   a. Each group chooses one presentation format to summarise their discussion:

Format	What It Involves
🎭 Role-play/skit	Act out a story of how climate change impacts a community and how they adapt
🗺️ Poster/Chart	Draw and label the impacts and solutions (with visuals and short notes)
📻 Radio Show	Record or perform a pretend radio show with interviews and expert advice
📰 Newspaper Page	Create a front-page article and pictures showing the issue and solutions
📸 Picture collage + voice-over	Use photos/drawings with recorded narration

Each learner should contribute based on their ability and strength (drawing, speaking, designing, writing, etc.).

3. **Presentation and Peer Feedback**
   a. Groups present their work to the class.
   b. Use a simple, inclusive feedback tool:
      i. "We liked..."
      ii. "We learned that..."
      iii. "Next time you could add..."

Allow non-verbal or written feedback from learners who are shy or struggle with speech.

Key Assessment: Practice Paper 1

Short-answer Questions

1. Studies have identified both "deforestation" as a cause and "declining and erratic rainfall" as evidence of climate change in Ghana. Analyse how these two factors can create a reinforcing cycle of environmental degradation in a region like northern Ghana.
2. The focal area states that climate change "disproportionately affects vulnerable groups". Using evidence of climate change in Ghana, analyse why a coastal fishing community in Keta and a subsistence farming community in the Upper East Region are particularly vulnerable to these impacts.
3. It is a fact that both natural factors (e.g., volcanic eruptions) and human factors (e.g., burning fossil fuels) as causes of climate change. A student argues that since natural factors have always changed the climate, human activities are not the main concern. Critique this argument.

Essay Questions (DoK 3)

1. Examine the socio-economic and environmental impacts of climate change on coastal communities in Ghana, using Keta as a case study. In your essay, discuss the evidence of climate change observed in Keta, the challenges faced by the community, and the adaptation strategies being implemented to mitigate these impacts. Support your analysis with specific examples and data where applicable.

   [Total 20 marks] **(DoK 3)**

   Teachers should provide the following guidelines for learners:

   a. Introduction to climate change and its relevance to coastal areas.
   b. Detailed examination of the evidence of climate change in Keta (e.g., rising sea levels, coastal erosion).
   c. Socio-economic impacts, such as displacement, loss of livelihoods, and infrastructure damage.
   d. Environmental impacts, including habitat loss and increased flooding.
   e. Discussion of adaptation strategies, such as building sea defences and community relocation.
   f. Conclusion summarising the findings and suggesting further actions.
2. Discuss the various adaptation strategies that Ghana should adopt to effectively combat the impacts of climate change on agriculture and food security. In your discussion, evaluate the effectiveness

of these strategies and suggest improvements or alternative approaches. Consider the socio-economic and environmental contexts in your response.

[Total 20 marks] (**DoK 3**)

These guidelines should be provided by the teacher:

a. Introduction explaining the link between climate change, agriculture, and food security.

b. Overview of current adaptation strategies (e.g., drought-resistant crops, regenerative agriculture).

c. Evaluation of the effectiveness of these strategies, considering factors like cost, scalability, and sustainability.

d. Suggestions for improvements or alternative strategies, such as increased investment in research or community-based initiatives.

e. Consideration of socio-economic factors and how they influence the success of adaptation measures.

f. Conclusion with a summary of key points and potential future directions.

HINT



*Conduct **Practice Paper 1**. It should cover the contents taught from Years 1 to 3. Refer to the **Table of Specification and Structure of the Paper** at the end of this section to guide you. Learners' papers should be marked immediately, and scores entered into the SAP.*

PAPER 1-MULTIPLE CHOICE QUESTIONS TABLE OF SPECIFICATION

STRAND	SUB-STRAND	LEARNING INDICATOR	DoK LEVELS			TOTAL
			1	2	3	
THE EARTH AND ITS NEIGHBOURHOODS	**The Earth and its features**	Explain Geography and its branches	-	-	1	1
		Describe the solar system and its constituents	1	-	-	1
		Discuss evidence of the shape of the earth	-	1	-	1
		Use latitudes and longitudes to locate places on the earth's surface	-	1	-	1
		Calculate distances using latitudes and time using longitudes	1	-	-	1
		Sketch, label and describe the internal structure of the Earth	-	1	-	1

		Explain the concepts of continental drift and discuss the supporting evidence	1	–	–	1
		.Identify the different types of mountains (e.g. volcanic, fold and block), their characteristics, the processes that create them and their importance	1	1	–	2
		Describe the types of plains (e.g. structural, erosional and depositional), their characteristics, the processes that create them and their importance	–	–	1	1
		Describe the development of river channels and associated landforms	1	1	–	2
		Examine the importance of river landforms to the socio-economic development in Ghana	–	–	1	1
	Rocks, weathering and mass wasting	Discuss the three types of rocks, their characteristics, formational processes and their importance	1	–	–	1
		Explain weathering and the factors affecting its processes	–	1	–	1
		Evaluate the three weathering processes (physical, chemical and biological weathering processes)	–	–	1	1
		Differentiate between the soil types and discuss the importance of soil	–	1	–	1
		Examine the type of mass wasting	–	1	–	1

	The Earth's atmosphere	Discuss the physical structure and composition of the Earth's atmosphere and their importance	1	–	–	1
		Explain the differences between the weather and climate and the factors that affect them	–	1	–	1
		Calculate the annual and mean rainfall and temperature data of a station with appropriate instruments for measuring the various elements of weather	–	1	–	1
		Discuss the factors influencing the various elements of climate	1	–	–	1
		Discuss the socio-economic and environmental impacts of climate change in Ghana and beyond	–	–	1	1
NAVIGATING OUR ENVIRONMENT	**Maps, their elements and analyses**	Explain the concepts of map scale and convert from one scale type to another	1	1	–	2
		Measure distance and areas on maps	–	1	–	1
		Analyse the interrelationship between natural and cultural features on map	1	1	1	3
	Geospatial Data Collection, Representation and Interpretation	Discuss the method of collecting geospatial data (surveying, remote sensing, Global Positioning System, etc.)	1	–	1	2
		Collect and map geospatial data using Computer and Mobile Apps, GIS and GPS	1	1	–	2
		Analyse and interpret geospatial data using dot maps	–	1	–	1

HUMAN AND ENVIRONMENT	**Physical setting and People**	Discuss the major relief and drainage features of Ghana and their importance and challenges to development	1		1	2
		Dis Describe the relief, drainage, climate and vegetation of West Africa and Africa	-	1	-	1
		Examine population growth and distribution in Ghana	-	-	1	1
		Discuss migration trends, settlement types and patterns in Ghana	-	-	1	1
	Economic Activities	Discuss the characteristics of subsistence and commercial agriculture and their importance and challenges in Ghana	-	1	-	1
		Examine the methods, importance and problems of lumbering and mining in Ghana	-	-	1	1
		Discuss the distribution, types and characteristics of manufacturing industries in Ghana	1	-	1	2
		Examine the role of tourism in the socio-economic development of Ghana and the challenges facing the tourism sector	-	1	-	1
		Examine causes and measures for preventing/ mitigating water pollution in Ghana	1	-	-	1
	Environmental Degradation	Discuss the causes of land degradation, its effects and management strategies in Ghana	-	1	-	1

		Discuss the effects of improper waste management or disposal in your community and Ghana	-	-	1	1
	Environmental Hazards and their management	Differentiate between hazards and disasters	-	1	-	1
		Examine the measures for managing floods in Ghana	-	-	1	1
		Examine measures for the prevention /mitigation of landslides	-	-	1	1
TOTAL			15	20	15	50

PAPER 2-HUMAN AND ENVIRONMENT TABLE OF SPECIFICATION

STRAND	SUB-STRAND	LEARNING INDICATOR	DoK LEVELS			TOTAL
			1	2	3	
HUMAN AND ENVIRONMENT	**Physical setting and People**	Draw the outline map of Ghana and describe the location and size, and indicate the administrative regions (SECTION A)	-	1		1
		Discuss the climate, vegetation and soil types in Ghana and their importance and challenges to socio-economic development (SECTION A)	-	1		1
		Describe the relief, drainage, climate and vegetation of West Africa and Africa (SECTION B)	-	1		1
		Compare Ghana's population growth to that of Africa and the world (SECTION B)	-	1		1

		Explore the socio-economic implications of migration from Africa to the rest of the world (SECTION B)	-	1	1
	Economic Activities	Examine the methods, importance and problems of lumbering and mining in Ghana (SECTION A)	-	1	1
	Environmental Degradation	Discuss the effects of improper waste management or disposal in your community and Ghana (SECTION A)	-	1	1
		Examine causes and measures for preventing/ mitigating water pollution in Ghana (SECTION A)	-	1	1
TOTAL			-	8	8

PAPER 3- THE EARTH AND ITS NEIGHBOURHOODS AND NAVIGATING OUR ENVIRONMENT
TABLE OF SPECIFICATION

STRAND	SUB-STRAND	LEARNING INDICATOR	DoK LEVELS			TOTAL
			1	2	3	
THE EARTH AND ITS NEIGHBOURHOODS	**The Earth and its features**	Discuss evidence of the shape of the earth	1			1
		Use latitudes and longitudes to locate places on the earth's surface	1			1
		Describe the development of river channels and associated landforms	1			1
	Rocks, weathering and mass wasting	Explain weathering and the factors affecting its processes	1			1
		Evaluate the three weathering processes (physical, chemical and biological weathering processes)				

	The Earth's atmosphere	Explain the differences between the weather and climate and the factors that affect them	1		1
		Calculate the annual and mean rainfall and temperature data of a station with appropriate instruments for measuring the various elements of weather			
NAVIGATING OUR ENVIRONMENT	**Maps, their elements and analyses**	Explain the concepts of map scale and convert from one scale type to another	–	1	1
		Measure distance and areas on maps			
		Analyse the interrelationship between natural and cultural features on map			
	Geospatial Data Collection, Representation and Interpretation	Discuss the method of collecting geospatial data (surveying, remote sensing, Global Positioning System, etc.)	–	1	1
		Analyse and interpret geospatial data using dot maps	–	1	1
TOTAL			8		8

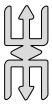
PLC Session 12

45 minutes **Planning & Reviewing the Learning Plan**

1. Begin the session by recapping lessons from the previous session, focusing on how learning was applied.
2. Use your subject specific app to explore the content before planning. Ask the app to
   a. explain the week's concepts in a practical way that will make it easier for learners to understand.
   b. identify three common misconceptions learners may have on the week's content and how to address them using contexts familiar to Ghanaian learners (NTS 3a, 3g and 3m).
3. Use your subject specific app to plan your lesson. Ask the app to
   a. suggest the most effective method for teaching the week's concepts to learners with diverse backgrounds.

b. suggest learning activities, differentiation and essential questions based on the method of teaching (NTS 3a-3q).

c. review your prepared learning plan and address any challenging issues you may have identified in your subject area (NTS 3a-3c).



Note

- *Take note of the recap topics linked to Years 1 and 2 while preparing for your lesson.*
- *Refer to the Values Learning Community Handbook and link the values for the week in your lesson to ensure that learners are applying what they learn.*

4. Use your app to plan and administer the mode of assessment for the Student Assessment Portal (SAP)

   a. The key assessment for the week is ***practice paper***. Chat with your app to plan this assessment by reviewing or developing the assessment items/tasks and marking schemes/rubrics for the practice paper (NTS 3k-3q).

10 minutes **Content Exploration**

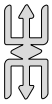
5. As a subject group, select one problem or topic/idea/term in the week's content that is challenging (not a routine procedural question, but one that requires conceptual understanding) and then

   a. use the app, ask it to solve the problem step by step and explain the reasoning behind each step (you may be assisted by a teacher who is strong in the content area)

   b. all teachers in the group work through the problem individually for 3–4 minutes

   c. the group then works through it together the problem, step by step

   d. highlight the most common errors made at each step (NTS 1c, 1e, 2c, 2e, 3e-3j).



Note

- *This part is not 'How do I teach this?' but how do I teach it for learners to understand?*
- *If the group still shares the same content gap, use the app: ask it to solve the problem step by step and explain the reasoning behind each step.*
- *Problems/ideas discussed should be sourced from the Teacher Manual content, not invented separately. This keeps the content exploration directly connected to what teachers will deliver.*

30 minutes **Enactment**

6. Enact a teaching activity based on your learning plan (NTS la-1b, 1e-lg, 2c, 2e, 2f, 3c-3j and 3o).

   a. Colleagues observe with specific attention to clarity of concept explanation, use of familiar Ghanaian examples and how misconceptions are handled if they arise.

   b. After the enactment, ask for structured feedback from the group

      i. was the concept explained in a way that a learner with no prior knowledge could follow?

      ii. were the examples grounded in contexts familiar to Ghanaian learners?

      iii. did any misconceptions surface and if so, how were they addressed?

5 minutes	Reflection

7. Reflect and share your views on the session. One thing that worked well, what did not work well and what you will do differently. (NTS 1a, 1b).
8. Identify a critical friend to observe and provide feedback on your lesson in relation to the PLC Session conducted (NTS 1f, 1g).
9. Remember to
    a. transfer your chats into your learning planner template.
    b. read your Teacher Manual and related Learner Material in preparation for the next session. Take note of the recap weeks, which are linked to Years 1 and 2 (NTS 3a).
    c. integrate National Values, GESI, SEL, and 21st century skills into your learning activities, assessment tasks, and rubrics/mark schemes.

WEEK 13

Learning Indicator: *Discuss adaptation strategies and remedies for climate change in Ghana*

Focal Area: Remedies to Impacts of Climate Change

Introduction

As discussed in the previous lessons, climate change poses significant threats to ecosystems, human health, and economies worldwide, driven primarily by greenhouse gas emissions and unsustainable practices. Remedies to its impacts focus on mitigation strategies like reducing carbon emissions and adaptation measures such as improving climate-resilient infrastructure and sustainable land use. These remedies are elaborated below.

1. **Promoting Renewable Energy:** Transitioning to renewable energy sources such as solar, wind, and hydro power can significantly reduce reliance on fossil fuels, thus decreasing greenhouse gas emissions.
2. **Improving Agricultural Practices**: Implementing improved farming technologies, such as modern agricultural tools, improved seed varieties, and efficient irrigation systems, can enhance agricultural productivity and resilience against climate change.
3. **Policy and Infrastructure Development:** Governments can support climate adaptation through infrastructure investments in roads, storage facilities, and irrigation systems, which help mitigate the effects of climate change on agriculture and rural communities.
4. **Adoption of Green Technologies:** Supporting industries in adopting green technologies and cleaner production processes can reduce pollution and minimise harm to the environment. This includes initiatives to reduce vehicle emissions by promoting public transportation and electric vehicles.
5. **Research and Development:** Investing in research and development is crucial for discovering new methods and technologies to combat climate change. This includes developing high-yield, disease-resistant crop varieties and effective pest and disease management strategies.
6. **Public Awareness Campaigns:** Creating educational materials such as posters and videos can help raise public awareness about climate change and encourage collective action to combat its effects.

Learning Tasks

"Our Climate, Our Solutions"

1. **Group Brainstorm – What Can We Do?**
    a. Use a climate solutions prompt sheet (provided by the teacher) with ideas at varying literacy levels. Learners discuss and share their experiences:
        i. Local and global ways to fight climate change:
            - Tree planting
            - Renewable energy (solar, wind)
            - Sustainable farming

- Recycling and waste reduction
- Education and advocacy
- Using less plastic
- Saving water and electricity

2. **Poster Creation – "Climate Change Remedies"**
   a. Each group designs a poster to show at least 3 remedies for climate change. Posters must include:
      i. A title (e.g. Act Now! or Cool the Earth)
      ii. Simple text (slogans, labels)
      iii. Visuals (drawings, cut-outs, symbols, or collage)
      iv. A message of action and hope
3. **Gallery Walk & Presentation**
   a. Each group presents their poster briefly during a "gallery walk" where all posters are displayed around the room.
      i. Learners walk around, view each group's poster, and place a **green sticker** or draw a 🌱 beside the ones they find powerful or inspiring.
      ii. After the walk, groups reflect:
      "What did we learn from others?"
      "Which solutions can we apply in our own communities?"

Pedagogical Exemplar

Collaborative learning

- In manageable GESI responsive and mixed ability groups of learners from different climatic regions, discuss the remedies to combat climate change.
- Create posters on how to combat climate change.

1. Form manageable GESI-responsive groups with diverse gender, ability levels, and regional backgrounds to promote inclusive collaboration.
2. Assign roles (e.g., discussion leader, note-taker, artist, presenter) based on learners' strengths and interests to ensure active participation.
3. Provide discussion prompts and guiding questions to help structure the conversation on climate change remedies.
4. Use visual aids, keywords, and sample posters to support learners with varied literacy levels and learning styles.
5. Encourage peer mentoring where stronger learners support those who need additional help.
6. Allow the use of local languages or code-switching during group discussions to ensure clarity and inclusion.

7. Provide materials such as templates, drawing tools, and climate-related images to inspire creativity and support lower-ability learners.
8. Monitor group interactions to ensure respectful communication, empathy, and equal voice.
9. Offer emotional encouragement and praise effort to boost confidence and team spirit.
10. Allow groups to present posters in flexible ways (orally, visually, or digitally) to honour diverse expression.

Key Assessment Level 3: Homework

Short Answer Questions

1. Research proposes several remedies for climate change in Ghana, including "Improving Agricultural Practices" and "Policy and Infrastructure Development". Propose an integrated plan for the Ministry of Agriculture that combines these two remedies to enhance food security in drought-prone northern Ghana. Justify why both parts of your plan are necessary for success.

Essay Questions

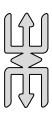
Group Work Assignment

1. Assess the use of modern irrigation systems and drought-resistant crop varieties as strategies for adapting to changing rainfall patterns in agricultural regions in Ghana. Explain how these techniques can be implemented effectively to ensure food security in Ghana. [Total 20 marks] (**DoK3**)

PLC Session 13

45 minutes | **Planning & Reviewing the Learning Plan**

1. Begin the session by recapping lessons from the previous year/session/week, focusing on how learning was applied.
2. Use your subject specific app to explore the content before planning. Ask the app to
   a. explain the week's concepts in a practical way that will make it easier for learners to understand
   b. identify two or three common misconceptions learners may have on the week's content and how to address them using contexts familiar to Ghanaian learners. (NTS 3a, 3g and 3m).
3. Use your subject specific app to plan your lesson. Ask the app to
   a. suggest the most effective method for teaching the week's concepts to learners with diverse backgrounds.
   b. suggest learning activities, differentiation and essential questions based on the method of teaching (NTS 3a-3q)
   c. review your prepared learning plan and address any challenging issues you may have identified in your subject area (NTS 3a-3c).



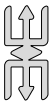
Note

- *Take note of the recap topics linked to Years 1 and 2 while preparing for your lesson.*
- *Refer to the Values Learning Community Handbook and link the values for the week in your lesson to ensure that learners are applying what they learn.*

4. Plan the week's key assessment with your app
    a. The key assessment for the week is ***homework***. Chat with your app to plan this assessment, indicating what you and your learners will do before, during and after the homework (NTS 3k-3q).

10 minutes **Content Exploration**

5. As a subject group, select one problem or idea/term in the week's content that is challenging (not a routine procedural question, but one that requires conceptual understanding) and then
    a. use the app, ask it to solve the problem step by step and explain the reasoning behind each step (you may be assisted by a teacher who is strong in the content area)
    b. all teachers in the group work through a similar problem individually for 3–4 minutes
    c. the group then works through the problem together step by step
    d. highlight the most common errors made at each step and discuss (NTS 1c, 1e, 2c, 2e, 3e-3j).



Note

- *This part is not just about 'How do I teach this?' but how do I teach it for learners to understand?*
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6. Enact a teaching activity based on your learning plan (NTS la-1b, 1e-lg, 2c, 2e, 2f, 3c-3j and 3o).
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c. integrate National Values, GESI, SEL, and 21st century skills into your learning activities, assessment tasks, and rubrics/mark schemes.

Section 5 Review

In this section, learners explored the causes and evidence of climate change in Ghana, including rising temperatures, changing rainfall patterns, and deforestation. They examined its socio-economic and environmental impacts, such as food insecurity, health risks, and loss of biodiversity. Through discussions, they evaluated adaptation strategies like climate-smart agriculture, afforestation, and policy interventions. In the process, learners developed 21st-century skills such as critical thinking, problem-solving, and collaboration, especially during group tasks. They also enhanced Social and Emotional Learning (SEL) skills, including empathy—by understanding the effects of climate change on vulnerable communities—and responsible decision-making through proposing realistic adaptation measures.

MARKING SCHEMES FOR THE KEY ASSESSMENTS

WEEK 12

Short Answers

Q1

Marking Scheme

- Explains the initial link (2 marks): Explains how deforestation (cutting trees for firewood or farming) reduces the amount of moisture recycled into the atmosphere through transpiration, which can contribute to less rainfall.
- Explains the reverse link (2 marks): Explains how declining and erratic rainfall leads to drought conditions, which can kill more trees and degrade vegetation cover, thus worsening the initial problem.
- Analyses the reinforcing cycle (2 marks): Concludes that this creates a feedback loop where less rain leads to more deforestation (as vegetation dies off), and more deforestation leads to even less rain, accelerating land degradation and desertification.

Total: 6 marks

Sample Answer

Deforestation and erratic rainfall create a reinforcing cycle of degradation. Initially, widespread deforestation for farming and charcoal reduces the number of trees that absorb carbon dioxide and release moisture through transpiration. This reduction in atmospheric moisture can contribute to the "declining and erratic rainfall" observed in Ghana.

This leads to the second part of the cycle: as rainfall becomes more unpredictable and droughts become more frequent, more trees and vegetation die off, and the land becomes drier. This forces communities to cut down even more of the remaining trees for survival. This continuous loop, where deforestation worsens drought and drought worsens deforestation, accelerates environmental degradation and pushes areas toward desert-like conditions.

Q2

Marking Scheme

- Analysis of Keta's vulnerability (3 marks): Links the evidence of "rising sea levels and coastal floods" to the direct threats faced by the fishing community, such as the destruction of homes and fishing infrastructure, and saltwater intrusion affecting freshwater sources.
- Analysis of Upper East's vulnerability (3 marks): Links the evidence of "declining and erratic rainfall" and "periodic droughts" to the threats faced by farmers, such as crop failure, food insecurity, and loss of livelihood due to their high dependency on rain-fed agriculture.

Total: 6 marks

Sample Answer

These two communities are particularly vulnerable because their livelihoods are directly tied to environmental conditions that climate change is disrupting.

The coastal fishing community in Keta is vulnerable to "rising sea levels and coastal floods". This leads to the physical destruction of their homes and damages boats and fishing gear. It also causes coastal erosion, which destroys the landing sites they depend on, directly threatening their primary source of income and food.

The farming community in the Upper East Region is vulnerable to "declining and erratic rainfall" and "periodic droughts". As subsistence farmers, their survival depends on predictable rains for their crops. When rains fail or patterns shift, it leads to widespread crop failure, which results in food insecurity and a complete loss of their livelihood, as they have limited resources to adapt by installing irrigation or buying drought-resistant seeds.

Q3

Marking Scheme

- Acknowledges natural factors (1 mark): Correctly states that natural factors like volcanic eruptions and changes in the Earth's orbit do influence the climate.
- Critiques the argument by explaining the timescale (3 marks): Explains that major natural climate shifts, like those from orbital changes (Milankovitch cycles), occur over "thousands of years", whereas the current warming is happening much more rapidly.
- Emphasises the role of human factors (2 marks): Concludes that the current, accelerated climate change is primarily driven by human activities like "greenhouse gas emissions" from burning fossil fuels and "deforestation", which have drastically increased heat-trapping gases in the atmosphere in a very short period.

Total: 6 marks

Sample Answer

The argument that human activities are not the main concern is flawed because it ignores the timescale and magnitude of current changes. While it is true that natural factors like volcanic eruptions and changes in the Earth's orbit cause climate change, the document explains that these occur over very long periods. For instance, Milankovitch cycles, which influence ice ages, happen over "thousands of years".

The critical difference today is the unprecedented speed of warming. This is primarily caused by human factors, especially the massive increase in "greenhouse gas emissions" from burning fossil fuels since the Industrial Revolution. The sheer volume of CO2 released by human activity is trapping heat at a rate far faster than these slow, natural cycles, making human factors the dominant driver of the climate change we are currently experiencing.

Essay Question

Q1

Structure and mark allocation

a. Introduction **(3 Marks)**

   i. Clearly defines climate change and its relevance to coastal communities. (1 mark)

   ii. Introduces Keta as the case study. (1 mark)

   iii. Outlines the main points to be discussed in the essay. (1 mark)

b. Evidence of Climate Change in Keta **(4 Marks)**

i. Describes specific evidence of climate change observed in Keta (e.g., rising sea levels, increased erosion). (2 marks)

ii. References to scientific studies or data supporting these observations. (2 marks)

c. **Challenges Faced by the Community (4 Marks)**

i. Discusses socio-economic challenges (e.g., loss of livelihoods, displacement). (2 marks)

ii. Discusses environmental challenges (e.g., habitat destruction, salt water intrusion). (2 marks)

d. **Adaptation Strategies (4 Marks)**

i. Describes current adaptation strategies being employed (e.g., sea defence walls, community relocation). (2 marks)

ii. Evaluates the effectiveness of these strategies with examples. (2 marks)

e. **Supporting Examples and Data (3 Marks)**

Provides relevant examples of adaptations or impacts with supporting data or case studies. (3 marks)

f. **Conclusion (2 Marks)**

i. Summarises the key points discussed in a clear and precise way. (1 mark)

ii. Offers a thoughtful insight or recommendation for future action. (1 mark)

Q2

Structure and Marks Allocation

a. **Introduction (3 Marks)**

i. Clearly introduces the topic of climate change and its impact on agriculture and food security in Ghana. (1 mark)

ii. States the purpose of the essay (strategies) and outlines the key points to be discussed. (2 marks)

b. **Adaptation Strategies (6 Marks)**

i. Identifies and describes at least **three** adaptation strategies (e.g., climate-resilient crops, improved irrigation techniques, conservation agriculture). (3 marks)

ii. Explains how these strategies address specific climate change impacts on agriculture and food security. (3 marks)

c. **Evaluation of Effectiveness (6 Marks)**

i. Critically evaluates the effectiveness of the three identified adaptation strategies with examples or data. (3 marks)

ii. Discusses any limitations or challenges in implementing these strategies. (3 marks)

d. **Suggestions for Improvements or Alternatives (3 Marks)**

i. Proposes improvements and/or an alternative approach to ONE of the current strategies. (1 mark)

ii. Explains the socio-economic and environmental impact of the improvements or alternative approach. (2 marks)

e. **Conclusion (2 Marks)**

i. Summarises the key points discussed in the essay in a clear and concise way. (1 mark)

ii. Provides at least one thoughtful insight or recommendation for future action. (1 mark)

WEEK 13

Short Answers

Q1

Marking Scheme

- Proposes Specific Agricultural Practices (3 marks): Suggests implementing farmer-level strategies like distributing "drought-resistant crop varieties" and promoting "rainwater harvesting systems" to conserve water. Justifies this as empowering farmers with immediate, on-the-ground tools to cope with less rainfall.
- Proposes Supporting Policy/Infrastructure (3 marks): Suggests government-level support such as investing in "irrigation systems" (e.g., small dams) and building better "storage facilities". Justifies this as creating the essential enabling environment that makes the improved farming practices viable and profitable on a larger scale.

Total: 6 marks

Sample Answer

An integrated plan would combine farmer-level actions with government support.

a. Improving Agricultural Practices: The Ministry should distribute improved seed varieties that are drought-resistant and early maturing to farmers. Alongside this, they should train farmers in regenerative agriculture and techniques for improving water storage on their farms, like rainwater harvesting. This is necessary because it directly equips the farmer to produce more food with less predictable rainfall.

b. Policy and Infrastructure Development: Simultaneously, the government must invest in larger-scale infrastructure that individual farmers cannot build, such as constructing dams for community-level irrigation systems and better roads and storage facilities to reduce post-harvest losses. This is necessary because farmer-level efforts can only go so far without reliable, large-scale water sources and a way to get surplus food to market safely. The combination ensures both immediate farm resilience and long-term regional food security

Essay Questions

Structure and Marks Allocation

Depending on the resources available the assignment can be presented using digital slides, as a booklet or poster.

Teachers should discuss allocating roles and responsibilities within groups including writers, researchers, image collectors and presenters. Contributions of each group member should be recorded by the teacher as the work progresses.

a. **Introduction (2 Marks)**

i. Introduces the topic of climate change impacts on agriculture in Ghana. (1 mark)

ii. Provides an overview of the importance of adaptation strategies such as modern irrigation systems and drought-resistant crop varieties. (1 mark)

b. **Assessment of Modern Irrigation Systems (5 Marks)**

i. Describes the types of modern irrigation systems suitable for Ghana (e.g., drip irrigation, sprinkler systems). (2 marks)

ii. Discusses the potential benefits of these systems in addressing changing rainfall patterns. (2 marks)

iii. Identifies challenges or limitations in implementing these systems effectively. (1 mark)

c. **Assessment of Drought-Resistant Crop Varieties (5 Marks)**

i. Explains the concept of drought-resistant crop varieties and their relevance to Ghanaian agriculture. (2 marks)

ii. Discusses how these crops varieties can contribute to food security amidst climate change. (2 marks)

iii. Identifies any challenges or limitations associated with their use. (1 mark)

d. **Implementation Strategies (4 Marks)**

i. Proposes strategies for effectively implementing irrigation systems and drought-resistant crops in Ghana. (2 marks)

ii. Considers socio-economic and environmental contexts in the implementation strategies. (2 marks)

e. **Conclusion (2 Marks)**

i. Summarises the key points discussed in the group work. (1 mark)

ii. Provides a thoughtful insight or recommendation for future improvements. (1 mark)

f. **Group Collaboration and Presentation (2 Marks)**

i. Evidence of effective collaboration and participation by all group members. (1 mark)

ii. Clarity and coherence of the group's presentation or report. (1 mark)

SECTION 6: REPRESENTATION OF GEOSPATIAL DATA THROUGH DOT MAPS AND FLOW CHARTS

STRAND: NAVIGATING OUR ENVIRONMENT

Sub-Strand: Geospatial Data Collection, Representation and Interpretation

Learning Outcome: *Represent geospatial data using dot maps and flow charts.*

Content Standard: *Demonstrate skills in basic geospatial data representation and interpretation using diagrams.*

INTRODUCTION AND SECTION SUMMARY

This section helps to analyse and interpret geospatial data, using dot maps and flow charts. It helps to understand how these visual tools represent spatial patterns, distributions, and movements of people, goods, or services across space. Learners will also develop and inculcate the ability to read and draw inferences from these maps and charts to support geographical inquiry and decision-making. It indicates how to be equipped with essential data interpretation and presentation skills relevant to geographic studies and real-world applications.

The weeks and the indicators covered by the section are:

Week 14: Analyse and interpret geospatial data using dot maps

Week 15: Analyse and interpret geospatial data using flow charts

The section on "Representation of Geospatial Data through Dot Maps and Flow Charts" in this Year 3 TM builds upon the foundational skills introduced in Years 1 and 2 within the "Navigating Our Environment" strand, specifically under the sub-strand "Geospatial Data Collection, Representation, and Interpretation." In Year 1, students begin by learning to collect geospatial data using both traditional and modern methods, such as remote sensing and GPS (1.2.2.LO.1), which forms the basis for understanding how to represent and interpret data. Year 2 further develops these skills by introducing students to advanced data collection methods and mapping using emerging technologies like Geographic Information Systems (GIS) (2.2.2.LO.1). The Year 3 curriculum continues this progression by focusing on representing geospatial data using dot maps and flow charts (3.2.2.LO.1), enabling students to analyse spatial patterns and distributions effectively.

SUMMARY OF Pedagogical Exemplars

This section applies activity-based learning in GESI-responsive and inclusive classroom settings to enhance learners' understanding of geospatial data. Learners actively engage in analysing and interpreting data using dot maps and flow charts, promoting spatial thinking and visual literacy. By working collaboratively, they identify patterns and relationships within the datasets, encouraging critical thinking and data interpretation skills. These pedagogical approaches cater to diverse learning

needs and backgrounds, ensuring equitable participation. The hands-on and visual nature of the activities deepens comprehension, promotes inclusivity, and fosters communication and teamwork. Ultimately, these strategies improve learning outcomes by making abstract geographical concepts more concrete, relatable, and applicable to real-world contexts.

ASSESSMENT SUMMARY

Indicators	DOK Level	Assessment Strategy and/or Mode
Week 14 3. Analyse and interpret geospatial data using dot maps	4	• 2 short answer questions with a marking scheme as well as essay-type questions with a marking guide.
Week 15 1. Analyse and interpret geospatial data using flow charts	4	• 2 short answer questions with a marking scheme • One project-based question with a marking guide

Y3 RECAP: Analyse and interpret geospatial data using dot maps	
YEAR/TOPIC	**Activities/Tasks – can be in groups or pairs or individual**
Year 2: Methods of Collecting Geospatial Data	1. Compare and contrast field survey methods and remote sensing as tools for collecting geospatial data. 2. As a professional driver entrusted with the safe delivery of products to an unfamiliar location, explain how geospatial data can assist you in successfully reaching the destination and completing the delivery.
Year 2: Mapping Geospatial Data	1. What is Geospatial data? 2. State any three (3) ways of applying geospatial data. 3. State three (3) advantages and limitations of both traditional and modern methods of collecting geospatial data. 4. Discuss three (3) potential sources of error in GPS data and how these errors can be corrected. 5. Critically assess how remote sensing methods can be used to monitor the spread of urban areas in Ghana.

WEEK 14

Learning Indicator: *Analyse and interpret geospatial data using dot maps*

Focal Area 1: Analysing Geospatial Data Using Dot Maps

Introduction

In Years 1 and 2, geospatial data collection was introduced. As a recap, geospatial data refers to information that includes a geographical component, meaning it describes objects or phenomena located on the Earth's surface. Examples include the location of towns, the distribution of population, or the spread of diseases. These data can be represented or visualised in different ways. One of such is dot maps.

Dot maps are a type of thematic map that uses dots to indicate the presence, quantity, or distribution of a particular phenomenon across a geographical area. Each dot represents a specific unit or quantity of the mapped phenomenon. For example, one dot might represent 100 people, 5 farms, or 1 factory.

Why use dot maps?

1. Dot maps clearly show the distribution of a phenomenon across a geographical area.
2. They help identify areas of concentration and sparsity easily.
3. They are visually effective and easy to understand.
4. Dot maps can represent large quantities of data in a simplified way.
5. They allow for comparisons between regions based on dot patterns.
6. They are flexible—each dot can represent any chosen value depending on the data size.
7. Dot maps can be used to reveal patterns and trends, such as clustering or gaps.
8. They are useful for showing both the spatial presence and absence of a phenomenon.
9. They are ideal for thematic mapping in subjects like population, agriculture, and disease spread.
10. When carefully designed, they provide a realistic picture of spatial variation.

Representing Geospatial Data Using Dot Maps

Creating an effective dot map involves several key steps

1. **Understanding Your Data**

   Before the mapping process, it is vital to understand the geospatial data with which you are working.

   a. What phenomenon are you mapping? (e.g., population, livestock, crime incidents, disease cases)

   b. What is the total quantity of the phenomenon? (e.g., total number of cattle)

   c. Is the data aggregated by administrative units? (e.g., districts, regions, or provinces)

2. **Choosing a Suitable Dot Value**

   This is a critical step. The **dot value** determines how much of the phenomenon each dot represents.

   How to choose?

   a. **Consider the total quantity**: Large totals require higher dot values to prevent overcrowding; smaller totals can use smaller dot values.

   b. **Aim for visual clarity**: Enough dots should be used to reveal spatial patterns without making the map appear cluttered or empty.

   c. **Trial and error**: Testing different dot values often helps identify the most effective representation.

   Example:

   a. A population of 1,000,000 people:

      i. Dot value of 1,000 people per dot = 1,000 dots

      ii. Dot value of 10,000 people per dot = 100 dots

3. **Determining Dot Placement**

   a. **Random placement**: For general distribution (e.g., population), dots are randomly placed within administrative units using GIS software.

   b. **Precise placement**: When exact coordinates are available (e.g., crime incidents), dots are located precisely, offering a more accurate representation.

   c. **Proportional distribution**: With supplementary data (e.g., land use), dots may be more densely placed in specific zones where the phenomenon is known to be concentrated.

4. **Adding Essential Map Elements**

   All maps should include the following components:

   a. **Title**: Clearly states what the map represents (e.g., *Population Distribution in Ghana, 2024*).

   b. **Legend**: Indicates the dot value (e.g., *One dot represents 5,000 people*).

   c. **Scale**: Provides context for distance.

   d. **North Arrow**: Indicates direction.

   e. **Source**: States where the data came from.

   f. **Border/Neat line**: Frames the map area.

Worked Example

Table 14.1: Annual cattle production of Region P for the year 2020.

Town	Annual Cattle Production
A	45
B	35
C	55
D	30
E	50
F	40
G	25
H	60

a. Using the base map provided (**Map T**) and a dot value of **1 dot to represent 5 cattle,** plot a dot map to represent the data in Table 14.1. [8 marks]

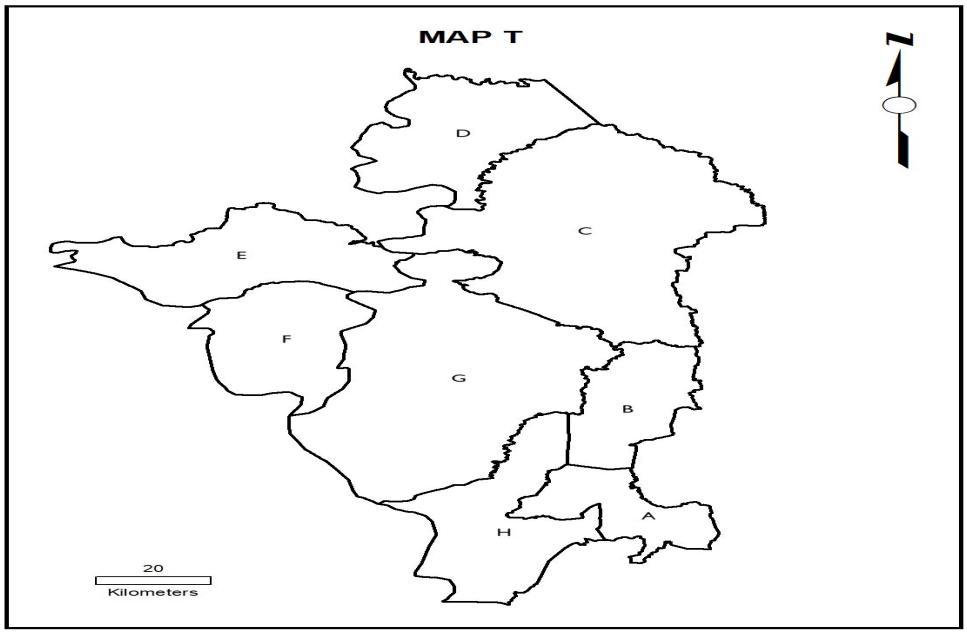


Figure 14.1: *Map T*

b. Based on the dot map, analyse the distribution of cattle production in Region P. Research and discuss how factors like climate, access to water, or transportation infrastructure might have influenced this distribution in 2020, and propose a plan to support towns with lower production. [12 marks]

Solution for a: Plotting dot maps [8 marks]

Determining dot value

If 1 dot = 5 cattle

Therefore, Town A = × = 9 dots

Town B = = 7 dots

Town C = = 11 dots

Town D = = 6 dots

Town E = = 10 dots

Town F = = 8 dots

Town G = = 5 dots

Town H = = 12 dots

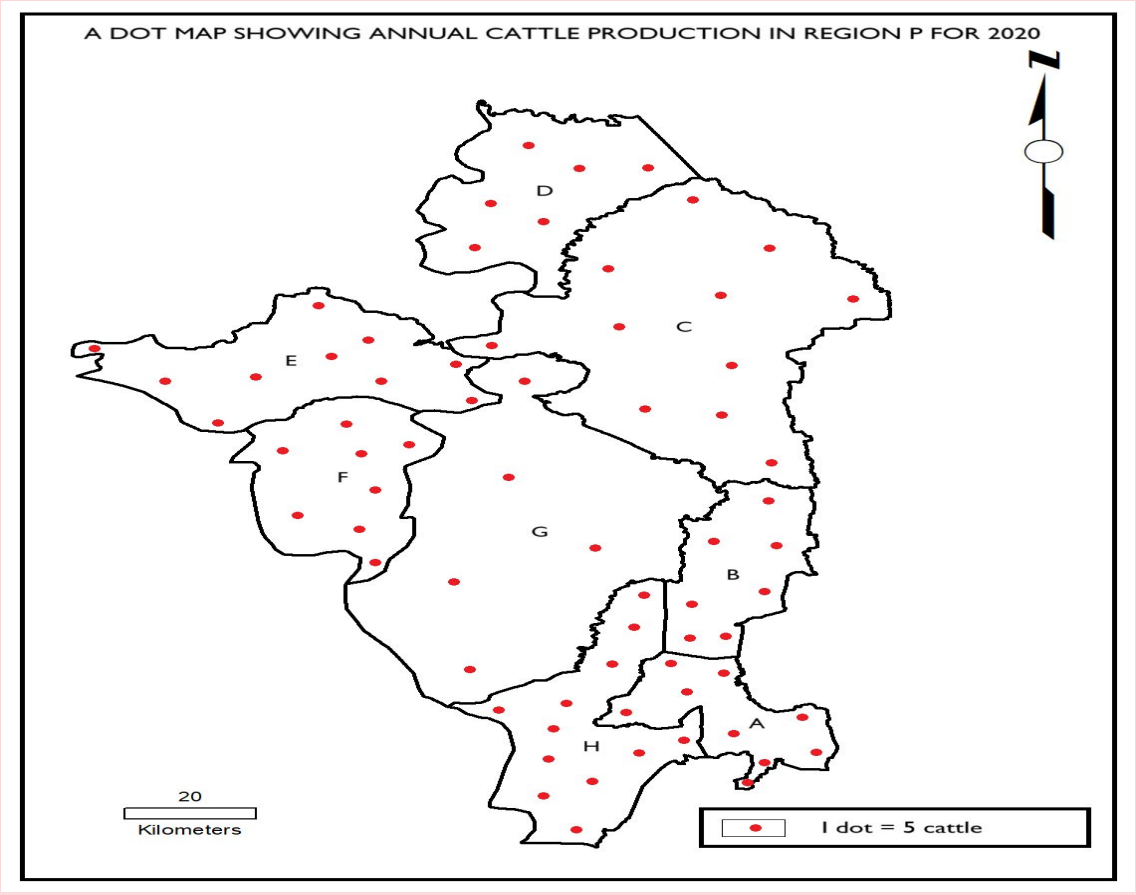


Figure 14.2: *Dot map for annual cattle production*

Sample Solution for b: Analysing the distribution and discussing the factors [12 marks]

Structure and Marks Allocation

1. **Analysis of Distribution [4 marks]**

   The dot map of Region P displays a concentration of cattle production in the northern and southern parts of the region, with fewer dots indicating lower production in one central area. This suggests that the northern and southern areas are more favourable for cattle production. Northern and southern areas may have better access to resources like grazing land and water, towns might be larger and demand for cattle higher. The central parts may have climatic, land or infrastructural limitations impacting production levels.

2. Factors Influencing Distribution [1 mark each for any four points well explained]

a. **Climate:** The northern and southern areas might have a climate that is more suitable for cattle rearing, such as less humidity and more open grazing lands, which are ideal for cattle health and productivity.

b. **Access to Water:** Proximity to water bodies or irrigation systems in the northern and southern parts can support cattle rearing by providing necessary water for both cattle and pasture maintenance.

c. **Transportation Infrastructure:** The presence of better roads and transportation facilities in the northern and southern areas can facilitate easier movement of cattle to markets and access to veterinary services, enhancing production levels.

d. **Additional Factors:** Regions with better access to veterinary services and market facilities can further support higher production levels.

3. **Plan to Support Towns with Lower Production [1 mark each for any four points well explained]**

a. **Identify Specific Towns:** The central town with fewer dots on the map indicates lower cattle production and requires targeted interventions.

b. **Improving Infrastructure:** Develop better road networks and transportation services to connect these towns to major markets and service centres, encouraging more efficient cattle trade.

c. **Water Access and Irrigation:** Implement small-scale irrigation systems, such as dams or ponds, to ensure a consistent water supply for cattle and pasture, which can be critical in drier areas.

d. **Training and Support:** Provide education and training programs for local farmers about modern cattle rearing practices and sustainable farming techniques. This can include workshops and extension services to help farmers adopt more efficient practices.

e. **Sustainability and Innovation:** Encourage sustainable practices by introducing technologies for better pasture management and environmental conservation efforts.

Digital Integration: Steps to Create a Dot Map in ArcMap, a GIS software (if Available to the school)

1. **Start ArcMap and Load Your Data**

a. Open ArcMap.

b. Load your polygon shapefile (e.g., districts, regions) that contains the attribute data you want to map (e.g., population, number of farms).

2. **Open the Layer Properties**

a. In the Table of Contents, right-click on the shapefile layer.

b. Select Properties.

3. **Go to the Symbology Tab**

a. In the Layer Properties window, click on the Symbology tab.

4. **Choose 'Dot Density'**

a. Under the "Show" options on the left panel, select Quantities > Dot Density.

5. **Select the Field(s) to Map**
    a. In the middle panel, under "Field Selection", choose the field(s) containing the data you want to visualise (e.g., Population, Cattle, Farms).
    b. Click the > arrow to add them to the "Mapped Fields" list.
6. **Set Dot Value and Dot Size**
    a. Choose an appropriate dot value (e.g., 1 dot = 500 people) depending on the total quantity.
    b. Adjust the dot size (in points) to ensure visibility without overcrowding.
7. **Choose Dot and Background Colours**
    a. Select a suitable dot colour that stands out against the background.
    b. Optionally, choose a background colour for your polygons (often a light or neutral colour works best).
8. **Preview and Adjust**
    a. Click Apply and then OK to preview the map.
    b. If the dots are too crowded or too sparse, go back to adjust the dot value or size.
9. **Add Map Elements**
    a. Add essential map components such as:
        i. Title
        ii. Legend (shows dot value)
        iii. North arrow
        iv. Scale bar
        v. Data source
        vi. Neat line
10. **Save or Export Your Map**
    a. Save your ArcMap project.
    b. To share the map, go to File > Export Map and choose a format (e.g., PDF, PNG, JPEG).

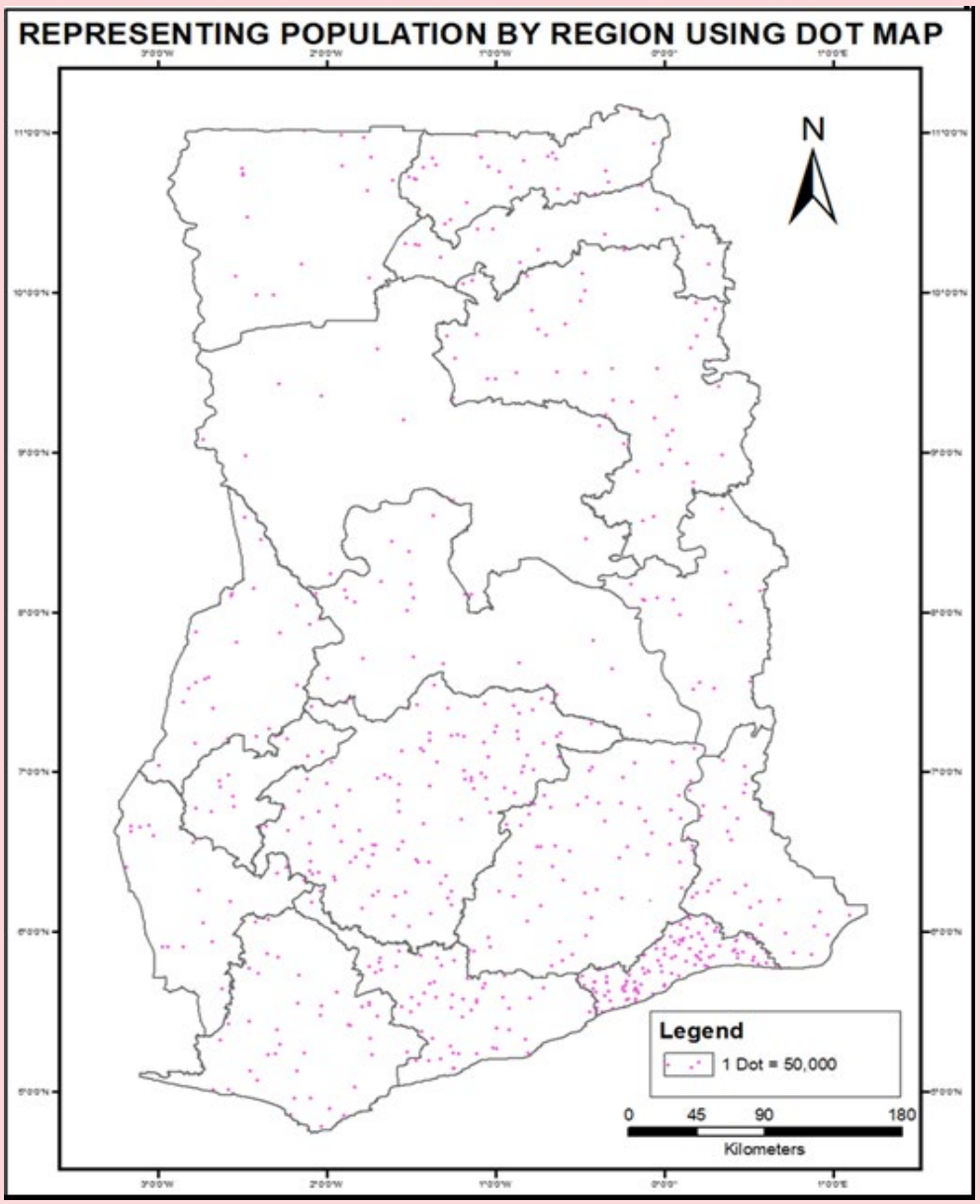


Figure 14.3: *Dot Map showing population by regions produced with ArcMap*

Note

Teachers can support learners to produce dot maps by using geospatial tools such as ArcMap/QGIS if an ICT laboratory is available in the school. By installing this software, learners can undertake a stunning project in school.

Analysing Geospatial Data Using Dot Maps

Once the dot map is created, you can analyse the spatial patterns. Key features to look for:

1. **Concentration**: Areas where dots are clustered—indicating high density.
2. **Dispersion**: Dots spread widely, indicating low density.
3. **Clusters**: Groups of dots forming distinct patterns.
4. **Gaps or absence**: Areas without dots—indicating the phenomenon is not present.
5. **Linear patterns**: Dots follow lines such as roads or rivers.

6. **Peripheral patterns**: Dots are concentrated around the edges of a region.
7. **Temporal change**: Comparing dot maps from different periods can reveal changes in distribution.

Guiding Questions for Analysis:

1. Where is the highest concentration?
2. Where is the lowest concentration or absence?
3. Are there recognisable patterns (linear, clustered)?
4. Do the patterns relate to physical or human features on the base map?
5. Are there anomalies or unexpected patterns?

Interpreting Geospatial Data Using Dot Maps

Interpretation goes beyond describing patterns; it involves explaining **why** the patterns exist. This step combines the observed data with geographical knowledge.

Guiding Questions for Interpretation:

1. Why are certain areas more concentrated? (e.g., urban centres, fertile land, resource-rich zones)
2. Why are some areas sparse or empty? (e.g., harsh environments, remote locations)
3. What physical, human, economic, or social factors may influence the pattern?
4. What are the implications? (e.g., infrastructure planning, environmental impact)
5. What could happen if the pattern continues or changes?

Example: Interpreting a Population Dot Map

If the map shows high population concentration along the coast and near major cities, but sparse dots in desert or mountainous areas:

- **Analysis**: High density in coastal and urban areas; low density in rugged or arid regions.
- **Interpretation**:
  - Coastal zones may be attractive due to trade, fishing, and a favourable climate.
  - Cities attract people due to jobs, education, and services.
  - Deserts/mountains may be less hospitable due to limited water, poor soils, and difficult terrain.
- **Implications**: High-density areas may face pressure on housing and services, while low-density areas might remain underdeveloped.

Analysing and Interpreting a Dot Map

A simplified dot map shows the **distribution of gold mines** in a hypothetical country. Clusters of dots appear in one region; other regions have few or none.

- **Analyse**: Describe the pattern. Where are the clusters? Where are the gaps?
- **Interpret**:
  - What physical factors (e.g., geology, mineral deposits) explain the clusters?
  - What economic benefits could result from such concentration?

- What environmental issues (e.g., land degradation, pollution) could arise in mining areas?

5. Limitations of Dot Maps

While dot maps are useful, they have certain limitations:

- **Estimating values**: Difficult to count the exact number of dots in dense areas, leading to imprecise data interpretation.
- **Dot size and visibility**: Oversized dots can obscure data, while very small dots may be hard to see.
- **Subjectivity in dot value selection**: Different dot values can lead to very different visual impressions and interpretations.
- **MAUP (Modifiable Areal Unit Problem)**: When data is aggregated by administrative units, patterns may appear misleading. Random placement within large units may not accurately reflect the actual distribution on the ground.

Learning Tasks

"Making Sense of the Dots: What Our Maps Tell Us"

1. Each group is given a set of dot maps representing real or simulated geospatial data for Ghana (or a region):
   a. Dot Map 1: Population distribution across districts
   b. Dot Map 2: Number of schools or health facilities
   c. Dot Map 3: Rainfall pattern or farming activity
2. Explore the Dot Maps (Map Reading)
   a. Identify what each dot represents (e.g., 1 dot = 1000 people or 1 school).
   b. Use a map interpretation guide with simplified vocabulary and map symbols.
   c. Learners describe what they observe (densities, clusters, gaps).

   Differentiation Tip: Use colour-coded dots, magnified versions for low-vision learners, and pair learners for support.
3. Analyse and Discuss Relationships
   a. Groups analyse relationships between maps:
      i. E.g. Are areas with high population also having many schools or health facilities?
      ii. Are farming areas concentrated in high rainfall zones?
      iii. What are the possible reasons for the observed patterns?
   b. Prompt questions (to scaffold for different abilities):
      i. "What do you notice?"
      ii. "What do the dots tell us about access?"
      iii. "Why do you think this pattern exists?"

iv. "What problems or solutions can you suggest?"

4. Create an Insight Poster or Infographic
   a. Each group creates a poster or infographic summarising their findings:
      i. A title (e.g. "The Uneven Spread of Schools in Ghana")
      ii. Key findings (3–5 bullet points or visual diagrams)
      iii. At least one suggested intervention or solution
      iv. A short reflection: "What surprised us?" or "What needs to change?"
5. Class Presentation & Peer Review
   a. Groups present their posters to the class in a mini-conference format. Peers ask questions and offer feedback using sentence frames such as:
      i. "I liked how your group explained…"
      ii. "One thing I'm curious about is…"
      iii. "This could help communities by…"

   Use visual cues or speaking aids for learners with speech anxiety or writing difficulties.

Pedagogical Exemplars

Activity-Based Learning

In an all-inclusive and gender-responsive classroom, analyse and interpret geospatial data using dot maps and discuss the relationships revealed in the datasets.

1. Organise learners into inclusive, gender-responsive groups that reflect diverse abilities and backgrounds to promote equity.
2. Provide clear instructions and simplified definitions of key geospatial terms to ensure all learners understand the task.
3. Use differentiated dot maps (varying complexity) to match learners' intellectual abilities.
4. Offer visual aids, legends, and step-by-step guides to support interpretation of the maps.
5. Assign specific roles (e.g., map reader, data interpreter, discussion leader, recorder) based on learners' strengths and preferences.
6. Use guiding questions to prompt analysis and support learners in identifying spatial patterns and relationships.
7. Encourage collaborative discussions that value all contributions and promote respectful turn-taking.
8. Allow the use of assistive tools or peer support for learners with special educational needs.
9. Offer alternative ways for learners to express their interpretations (e.g., drawing, oral explanations, simple write-ups).
10. Provide feedback that recognises effort, encourages teamwork, and builds learners' confidence and social-emotional skills.

Key Assessment Level 4: Short Answer Questions & Essay

1. A geographer creates a dot map of cattle production in Ghana using a very high dot value of "1 dot = 200,000 cattle". Critique this choice of dot value. Explain how this decision would likely create a misleading representation of cattle farming across Ghana's regions.
2. A dot map for a city shows that cases of a water-borne disease like cholera are heavily clustered in one specific low-income neighbourhood near a river, with very few dots in other areas. Analyse this spatial pattern to identify the likely cause of the outbreak. Based on your analysis, propose a two-part strategic response for the city's health authorities.

Essay Questions

1. Table 14.2 below shows the number of cocoa farms in the districts of a geographical area.

Table 14.2: *Number of cocoa farms by district*

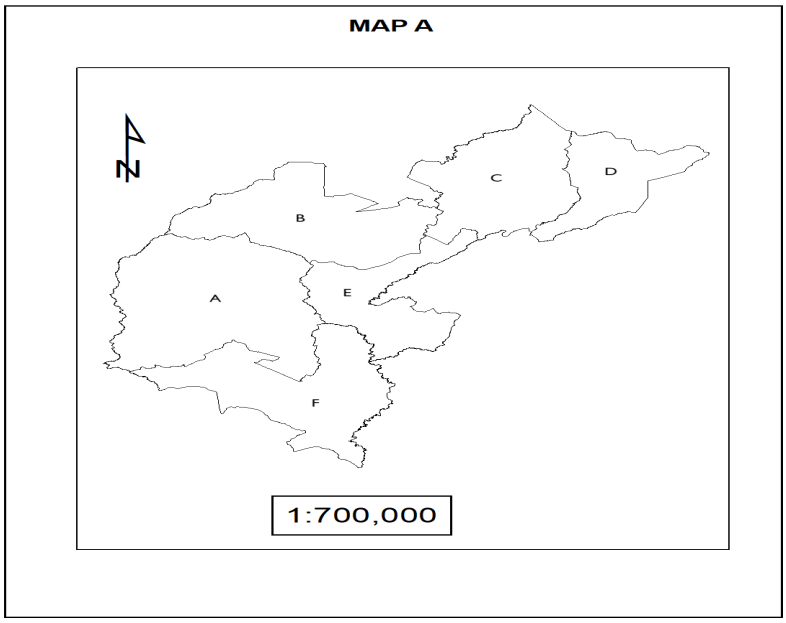
DISTRICT	Number of COCOA FARMS
A	100
B	80
C	220
D	150
E	190
F	170

a. (Teachers will need to provide multiple copies of MAP A) Using MAP A (below) as the base map, construct a dot map to represent the data in the table.

Use **ONE dot to represent 10 cocoa farms** (12 marks)

b. Analyse the strengths and limitations of dot maps and provide examples to illustrate how they can be used effectively in real-world scenarios. (8 marks)

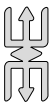
[Total 20 marks] **(DoK 4)**



PLC Session 14

45 minutes | **Planning & Reviewing the Learning Plan**

1. Begin the session by recapping lessons from the previous year/session/week, focusing on how learning was applied.
2. Use your subject specific app to explore the content before planning. Ask the app to
   a. explain the week's concepts in a practical way that will make it easier for learners to understand
   b. identify two or three common misconceptions learners may have on the week's content and how to address them using contexts familiar to Ghanaian learners. (NTS 3a, 3g and 3m).
3. Use your subject specific app to plan your lesson. Ask the app to
   a. suggest the most effective method for teaching the week's concepts to learners with diverse backgrounds.
   b. suggest learning activities, differentiation and essential questions based on the method of teaching (NTS 3a-3q)
   c. review your prepared learning plan and address any challenging issues you may have identified in your subject area (NTS 3a-3c).



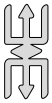
Note

- *Take note of the recap topics linked to Years 1 and 2 while preparing for your lesson.*
- *Refer to the Values Learning Community Handbook and link the values for the week in your lesson to ensure that learners are applying what they learn.*

4. Plan the week's key assessment with your app
   a. The key assessment for the week is ***short answer questions & essay***. Chat with your app to plan this assessment, indicating what you and your learners will do before, during and after the short answer questions & essay (NTS 3k-3q).

10 minutes | **Content Exploration**

5. As a subject group, select one problem or idea/term in the week's content that is challenging (not a routine procedural question, but one that requires conceptual understanding) and then
   a. use the app, ask it to solve the problem step by step and explain the reasoning behind each step (you may be assisted by a teacher who is strong in the content area)
   b. all teachers in the group work through a similar problem individually for 3–4 minutes
   c. the group then works through the problem together step by step
   d. highlight the most common errors made at each step and discuss (NTS 1c, 1e, 2c, 2e, 3e-3j).



Note

- *This part is not just about 'How do I teach this?' but how do I teach it for learners to understand?*
- *If the group still shares the same content gap, use the app: ask it to solve the problem step by step and explain the reasoning behind each step.*

- *Problems/ideas discussed should be sourced from the Teacher Manual content, not invented separately. This keeps the content exploration directly connected to what teachers will deliver.*

30 minutes **Enactment**

6. Enact a teaching activity based on your learning plan (NTS la-1b, 1e-lg, 2c, 2e, 2f, 3c-3j and 3o).
   a. Colleagues observe with specific attention to clarity of concept explanation, use of familiar Ghanaian examples and how misconceptions are handled if they arise.
   b. After the enactment, ask for structured feedback from the group
      i. was the concept explained in a way that a learner with no prior knowledge could follow?
      ii. were the examples grounded in contexts familiar to Ghanaian learners?
      iii. did any misconceptions surface and if so, how were they addressed?

5 minutes **Reflection**

7. Reflect and share your views on the session. One thing that worked well, what did not work well and what you will do differently. (NTS 1a, 1b).
8. Identify a critical friend to observe and provide feedback on your lesson in relation to the PLC Session conducted (NTS 1f, 1g).
9. Remember to
   a. transfer your chats into your learning planner template.
   b. read your Teacher Manual and related Learner Material in preparation for the next session. Take note of the recap weeks, which are linked to Years 1 and 2 (NTS 3a).
   c. integrate National Values, GESI, SEL, and 21st century skills into your learning activities, assessment tasks, and rubrics/mark schemes.

WEEK 15

Learning Indicator: *Analyse and interpret geospatial data using flow charts*

Focal Area 1: Analysing Geospatial Data Using Flow Chart (Flow Line Maps)

Introduction

To visualise movement data, we use flow line maps, a type of flow chart.

A **flow line map** shows the movement of people, goods, or other entities between locations using lines. The thickness of each line represents the volume or quantity of the flow. For example:

1. A thick line might show a high number of people moving between two cities.
2. A thin line might indicate a smaller amount of goods traded between two countries.

Flow line maps help us see patterns and connections in geospatial data.

Representing Geospatial Data with Flow Line Maps

To create a flow line map, you need data about movement, including:

1. The starting point (where the flow begins),
2. The ending point (where the flow goes),
3. The quantity of the flow (e.g., number of people, tons of goods).

Steps to Create a Flow Line Map

1. **Choose a Base Map:** Pick a map that shows all the locations in your data.
2. **Plot the Flows:** Draw lines between the starting and ending points. Add arrows to show the direction of movement.
3. **Scale the Lines:** Make the line thickness match the quantity of the flow. Choose a scale (e.g., 1 mm of thickness = 1,000 units) and use it for all lines.

Example

Imagine you have data about students traveling between two schools:

1. School A to School B: 3,000 students
2. School B to School A: 1,000 students

On your map

1. Draw a line from A to B, 3 mm thick (if 1 mm = 1,000 students).
2. Draw a line from B to A, 1 mm thick.

   The thicker line shows that more students move from A to B.

Analysing Flow Line Maps

After creating a flow line map, analyse it to understand the patterns. Look for:

1. **Major Flows:** Find the thickest lines—these show the largest movements.

2. **Directions:** Check the arrows. Is the flow mostly one-way or balanced?
3. **Connectivity:** See which places are linked by many or thick lines.

Example
In a flow line map of trade between cities, a thick line from City X to City Y (and a thinner one back) might show that X exports more to Y than Y sends back. Many lines to City X could mean it's a trade centre.

Interpreting Flow Line Maps

Interpreting means making sense of the patterns you've analysed. Ask:

- **Why do these flows exist?** Look for reasons like jobs, trade deals, or closeness between places.
- **What do they mean?** Large flows might affect population, economy, or culture.
- **Are there surprises?** Unexpected flows could show new trends.

Example
If a flow line map shows a thick line of tourists from Country A to Country B, you might interpret that B has popular attractions or better weather, drawing visitors from A.

Example: Migration Flow Line Map

Here's an example using migration between three countries: Country A, Country B, and Country C.

Migration Data

- A to B: 50,000 people
- B to A: 20,000 people
- A to C: 30,000 people
- C to A: 10,000 people
- B to C: 15,000 people
- C to B: 25,000 people

Representation

- Draw a flow line map with Countries A, B, and C.
- Add arrows between them showing migration direction.
- Scale the lines: Let 1 mm = 10,000 people.
    - A to B: 5 mm (50,000 people)
    - B to A: 2 mm (20,000 people)
    - A to C: 3 mm (30,000 people)
    - And so on.

Analysis

- The thickest line (A to B, 5 mm) shows the biggest flow: 50,000 people.
- More people move from C to B (25,000) than B to C (15,000).

Interpretation

- Country B might offer better opportunities (jobs, safety), attracting people from A and C.
- Fewer people leave B, suggesting it's a desirable place to stay.

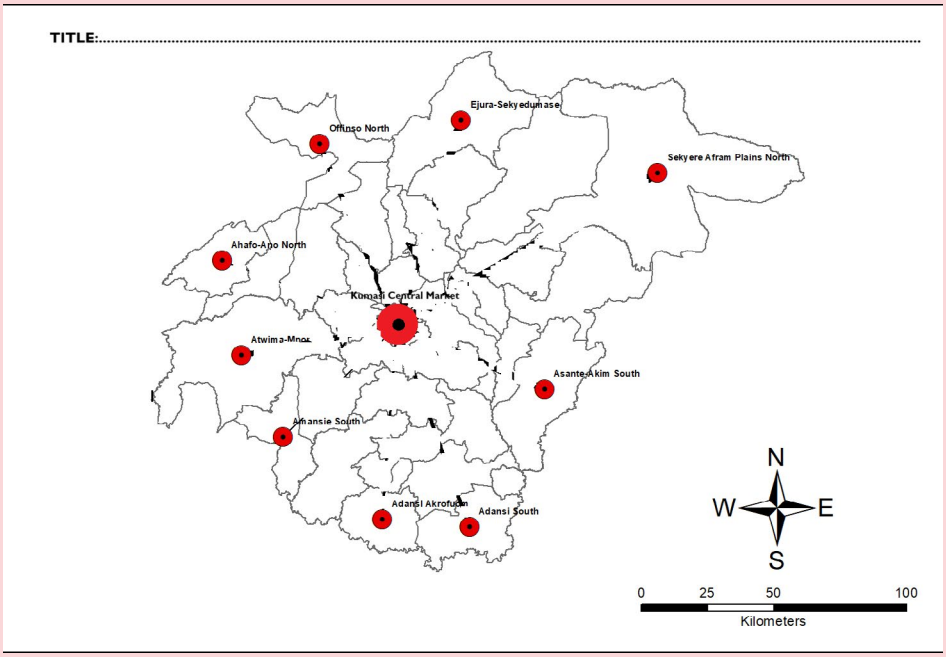
Worked Example

Table 15.1 below presents data on the quantity of farm produce transported from selected farming communities to the Kumasi Central Market in the Ashanti Region during October 2022.

a. Use it to calculate and construct a flow line chart for the transported farm produce to the Kumasi Central Market using the outline map provided. [Use 1mm to represent 1000 farm produce]

Table 15.1: *Quantity of transported farm produce*

Farming Community/ Town	Quantity of Farm Produce (in metric tonnes)
Adansi Akrofuom	1000
Adansi South	2000
Ahafo-Ano South	2000
Amansie South	1000
Atwima Mponua	3000
Asante-Akim South	4000
Ejura-Sekyedumasi	5000
Offinso North	2500
Sekyere Afram Plains North	5000



Solution

Since 1mm = 1000 farm produce (in metric tonnes)

i. Adansi Akrofuom =

ii. Adansi South =

iii. Ahafo-Ano South =

iv. Amansie South =

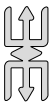
v. Atwima Mponua =

vi. Asante-Akim South =

vii. Ejura-Sekyedumasi =

viii. Offinso North =

ix. Sekyere Afram Plains North =



Note

Teacher should guide learners to use the data in the table and the base map attached to calculate and construct a flow line chart as part of their learning task.

Learning Tasks

"Following the Flow: What Movement Maps Reveal About Ghana"

1. **Select a Flow Theme and Research Data**

   a. Each group chooses a theme. Possible flow data topics

Theme	Example Flow
Migration	From Upper East to Accra
Trade	Tomatoes from Techiman to Accra
Transportation	Morning traffic into Kumasi CBD
Communication	Spread of internet services across Ghana

Data Sources: Internet, textbooks, newspapers, school surveys and teacher-provided summaries (for learners with limited access).

2. **Create Flow Line Maps**

   a. Use flow lines (arrows) of varying thickness to represent the volume or intensity of movement.

   b. Include the direction of flow, legend, title, and labels.

   c. Use large paper, markers, and optional digital tools (e.g. Google Drawings).

Support

- Use stencils/templates for learners with motor skill difficulties
- Peer drawing or dictation options for learners with writing challenges

3. **Interpret and Analyse Patterns**
   a. Discuss as a group:
      i. Where is the movement most intense?
      ii. What are the push and pull factors?
      iii. What impacts does this movement have (social, economic, environmental)?
      iv. What patterns or anomalies do you notice?

Support: Use a scaffolded prompt sheet with sentence starters like:

i. "We observed that…"
ii. "This is likely because…"
iii. "This affects the source area by…"
iv. "We think this flow causes…"

4. **Present and Defend Your Findings**
   a. Groups present their maps and interpretations to the class:
      i. Describe their map
      ii. Explain the relationships and patterns
      iii. Propose at least one recommendation (e.g. better roads, urban planning, rural support)

Support

- *Use cue cards or sentence frames*
- *Allow recorded video/audio presentations for shy learners*

Pedagogical Exemplar

Activity-Based Learning

In an all-inclusive and gender-responsive classroom, produce, analyse and interpret geospatial data using flow line maps and discuss the relationships revealed in the datasets.

1. Form GESI-responsive groups (ensure a mix of gender, learning abilities, and socio-cultural backgrounds).
2. Assign clear roles within groups (e.g., data analyst, map designer, interpreter, presenter) to promote participation from all learners.
3. Differentiate instruction by preparing materials at varying complexity levels for learners with different academic strengths.
4. Introduce flow line maps with real-world, relatable examples (e.g., migration, trade, water flow in Ghana).
5. Use visual aids/videos to support learners with low literacy or special needs.
6. Guide learners to collect or access geospatial data (e.g., migration patterns, commodity flows, river systems).

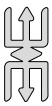
7. Facilitate hands-on creation of flow line maps using paper, markers, or digital tools like Google Earth or ArcGIS (depending on resources).
8. Provide scaffolds such as templates or partially completed maps to support learners with difficulties.
9. Encourage peer teaching within groups—stronger learners assist others.
10. Prompt groups to analyse and interpret maps by asking guiding questions (e.g., What trend is visible? What could be the cause or effect?).
11. Ensure everyone shares ideas using "round robin" or "think-pair-share" methods to foster inclusion.
12. Monitor for equity in participation—gently encourage quieter or marginalised learners to speak.
13. Model respectful communication and reinforce norms like listening, patience, and encouragement.
14. Validate all contributions—highlight strengths in different learners (e.g., artistic, spatial thinking, verbal explanations).
15. Use check-ins or mood metres to help learners express how they feel during group work and support emotional regulation.
16. Celebrate group diversity as a strength, linking it to diverse perspectives in spatial understanding.

Key Assessment Level 4: Project-Based

Short Answer Questions

1. Table 15.1 shows large quantities of farm produce from communities like Ejura-Sekyedumasi and Sekyere Afram Plains North flow into Kumasi Central Market. Analyse this one-way flow pattern and propose a strategic business that could be established in or near Kumasi to take advantage of this constant supply of raw agricultural goods. Justify your proposal.
2. A flow line map of Ghana reveals a major, thick line representing a continuous migration flow from the northern regions to the southern urban centres of Accra and Kumasi. Analyse how this pattern puts a strain on the country's primary north-south transportation infrastructure. Based on your analysis, recommend one major infrastructure project that would be a strategic long-term solution.

Essay Question Project (DoK 4) Total 40 marks



Note

Teacher must assess the progress of learners' project at every stage. Teachers can choose to cover stages over several lessons, or each stage may be given as one homework.

You are a group of geographers tasked with investigating internal population movements in Ghana. Within the two weeks allocated to section 6 learners work in small groups or independently to complete the following:

Stage 1: Data Collection & Preparation [10 marks]

1. Identify and gather at least two sources of geospatial data on internal migration or population movement. For example:
    a. Ghana Statistical Service reports or census summaries showing district-to-district migration flows
    b. Local surveys or community interviews about seasonal labour migration

c. Online datasets (e.g., UN migration statistics) that can be narrowed to Ghana's regions)

2. Record your raw data in a table, noting:
   a. Origin location (e.g., district or region)
   b. Destination location
   c. Number of people moving (absolute values or estimates)
   d. Time period covered

Stage 2: Flow Line Map Construction [10 marks]

1. On a blank map of Ghana (with district or regional boundaries), use arrows (flow lines) to represent the volume and direction of movement:
   a. Thicker arrows for larger volumes, thinner for smaller volumes.
   b. Ensure each arrow is correctly oriented from origin to destination.
2. Include a clear legend that explains:
   a. What each arrow thickness represents (e.g., "1 cm arrow = 1,000 people")
   b. Map title, compass rose, and scale (e.g., 1 cm = 50 km)

Stage 3: Analysis & Interpretation [10 marks]

1. Examine the completed flow line map and, in a written report (approximately **200–300 words**), answer the following:
   a. Pattern Identification:
      i. Which regions or districts show the highest outflows of people?
      ii. Which areas are the principal destinations?
      iii. Are there any unexpected or counterintuitive flows (e.g., a rural district that is a major destination)?
   b. Causal Relationships:
      i. Propose at least two social or economic reasons explaining why people move from those high-outflow areas. (Refer to Ghanaian contexts such as agricultural seasonality, urban employment opportunities in Accra or Kumasi, educational migration, or climate impacts in northern regions.)
      ii. Suggest at least one factor that attracts migrants to the major destination areas.
   c. Implications & Recommendations:
      i. Describe two potential socio-economic or environmental impacts of these migration patterns on origin communities (e.g., labour shortages, remittance flows, changing family structures).
      ii. Describe two potential impacts on destination areas (e.g., urban overcrowding, increased demand for housing or public services).
      iii. Based on your analysis, recommend one policy or community-based strategy to improve positive outcomes (e.g., supporting agro-jobs in origin districts, improving urban infrastructure, or developing vocational skills programs).

Stage 4: Reflection & Justification [10 marks]

1. In a short reflective paragraph (100–150 words), explain how using a flow line map helped you to:
   a. Discover patterns you might have missed by looking at raw numbers alone.
   b. Understand causal relationships between movement and local conditions in Ghana.

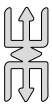
Submission Requirements

1. A neatly drawn or digitally produced flow line map (with legend, scale, and title).
2. A data-table appendix showing your sources and original figures.
3. A written report (approximately 300–450 words total) answering Stage 3 and 4, using evidence from your map and data.

PLC Session 15

45 minutes | **Planning & Reviewing the Learning Plan**

1. Begin the session by recapping lessons from the previous year/session/week, focusing on how learning was applied.
2. Use your subject specific app to explore the content before planning. Ask the app to
   a. explain the week's concepts in a practical way that will make it easier for learners to understand
   b. identify two or three common misconceptions learners may have on the week's content and how to address them using contexts familiar to Ghanaian learners. (NTS 3a, 3g and 3m).
3. Use your subject specific app to plan your lesson. Ask the app to
   a. suggest the most effective method for teaching the week's concepts to learners with diverse backgrounds.
   b. suggest learning activities, differentiation and essential questions based on the method of teaching (NTS 3a-3q)
   c. review your prepared learning plan and address any challenging issues you may have identified in your subject area (NTS 3a-3c).



Note

- *Take note of the recap topics linked to Years 1 and 2 while preparing for your lesson.*
- *Refer to the Values Learning Community Handbook and link the values for the week in your lesson to ensure that learners are applying what they learn.*

4. Plan the week's key assessment with your app
   a. The key assessment for the week is ***project-based***. Chat with your app to plan this assessment, indicating what you and your learners will do before, during and after the project (NTS 3k-3q).

10 minutes | **Content Exploration**

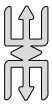
5. As a subject group, select one problem or idea/term in the week's content that is challenging (not a routine procedural question, but one that requires conceptual understanding) and then

a. use the app, ask it to solve the problem step by step and explain the reasoning behind each step (you may be assisted by a teacher who is strong in the content area)

b. all teachers in the group work through a similar problem individually for 3–4 minutes

c. the group then works through the problem together step by step

d. highlight the most common errors made at each step and discuss (NTS 1c, 1e, 2c, 2e, 3e-3j).



Note

- *This part is not just about 'How do I teach this?' but how do I teach it for learners to understand?*
- *If the group still shares the same content gap, use the app: ask it to solve the problem step by step and explain the reasoning behind each step.*
- *Problems/ideas discussed should be sourced from the Teacher Manual content, not invented separately. This keeps the content exploration directly connected to what teachers will deliver.*

30 minutes **Enactment**

6. Enact a teaching activity based on your learning plan (NTS la-1b, 1e-lg, 2c, 2e, 2f, 3c-3j and 3o).
   a. Colleagues observe with specific attention to clarity of concept explanation, use of familiar Ghanaian examples and how misconceptions are handled if they arise.
   b. After the enactment, ask for structured feedback from the group
      i. was the concept explained in a way that a learner with no prior knowledge could follow?
      ii. were the examples grounded in contexts familiar to Ghanaian learners?
      iii. did any misconceptions surface and if so, how were they addressed?

5 minutes **Reflection**

7. Reflect and share your views on the session. One thing that worked well, what did not work well and what you will do differently. (NTS 1a, 1b).
8. Identify a critical friend to observe and provide feedback on your lesson in relation to the PLC Session conducted (NTS 1f, 1g).
9. Remember to
   a. transfer your chats into your learning planner template.
   b. read your Teacher Manual and related Learner Material in preparation for the next session. Take note of the recap weeks, which are linked to Years 1 and 2 (NTS 3a).
   c. integrate National Values, GESI, SEL, and 21st century skills into your learning activities, assessment tasks, and rubrics/mark schemes.

Section 6 Review

In this section, analysis and interpretation of geospatial data using dot maps to show population distribution and flow charts to represent the movement of goods, people, or services were dealt with. It reinforced the ability to read, compare, and draw conclusions from spatial patterns and visual data representations. Furthermore, 21st-century skills such as data literacy, analytical thinking, and digital mapping skills were taught. They also collaborated in groups, enhancing communication and teamwork. In addition, this section helped to build SEL skills, including self-awareness and social awareness, through group discussions and recognises diverse interpretations while working towards shared conclusions.

MARKING SCHEMES FOR THE KEY ASSESSMENTS

WEEK 14

Short Answers

Q1

Marking Scheme

- Critiques the dot value (1 mark): States that the chosen dot value is too high and therefore inappropriate for the data being mapped.
- Explains the problem of underrepresentation (2 marks): Explains that because cattle farming is dispersed and no single district likely produces 200,000 cattle, many regions would end up with zero dots on the map.
- Analyses the misleading impression (3 marks): Concludes that this would create a false impression of "gaps or absence" of cattle farming in most of the country. This fails the primary purpose of a dot map, which is to clearly show the actual distribution of a phenomenon.

Total: 6 marks

Sample Answer

Choosing a dot value of "1 dot = 200,000 cattle" is a poor decision for mapping this data in Ghana. This high value would create a misleading representation of cattle farming.

The main problem is that it would severely underrepresent the actual distribution. Cattle farming in Ghana, while important, is not concentrated in such massive numbers in single districts. Therefore, most districts would not meet the 200,000-cattle threshold to receive even a single dot. This would result in a map with "gaps or absence" of dots in many regions, falsely suggesting that no cattle farming occurs there. This defeats the purpose of a dot map, which is to effectively show the spatial variation and presence of a phenomenon across an area.

Q2

Marking Scheme

- Analysis of the Pattern and Cause (2 marks): Correctly analyses the "cluster" of dots as a disease hotspot and interprets this pattern to identify the likely cause as a contaminated water source, probably the nearby river.
- Strategic Response Part 1 (2 marks): Proposes a logical, immediate response, such as dispatching medical teams to the affected neighbourhood and providing emergency supplies of clean drinking water.
- Strategic Response Part 2 (2 marks): Proposes a logical, long-term prevention strategy, such as investing in sanitation infrastructure for the neighbourhood or launching a public health education campaign about water safety.

Total: 6 marks

Sample Answer

An analysis of this spatial pattern, which shows a dense cluster of cholera cases in one specific area, indicates that the outbreak is not random but is linked to a localised source. Given that

cholera is a water-borne disease and the cluster is near a river, the likely cause is a contaminated water source that residents of that specific neighbourhood are using.

Based on this analysis, a strategic two-part response would be:

a. Immediate Containment: Health authorities must immediately provide emergency aid to the affected neighbourhood. This includes setting up temporary health posts to treat the sick and distributing clean drinking water and water purification tablets to prevent new infections.

b. Long-Term Prevention: To prevent future outbreaks, authorities must address the root cause. This involves investing in permanent infrastructure, such as building proper sewage systems to stop waste from contaminating the river and launching a public education campaign on hygiene and safe water practices for the community.

Essay Questions

PART A: Construction Dot Map

Structure and Marks Allocation

Criteria	Marks	Details
1. Calculation of Dots per District	6 marks	- Correct division of cocoa units by 10 for each district: A: 10, B: 8, C: 22, D: 15, E: 19, F: 17 - Full marks if all are correct
2. Accurate Dot Placement within Districts	2 marks	- Dots should be well-distributed within the appropriate district boundaries - Random/ scattered spacing is preferred to clustering
3. Appropriate Dot Size and Consistency	1 mark	- All dots should be of similar size and clearly visible
4. Neatness and Legibility of Map	1 mark	- Map should be neat, clean, and dots should not overlap heavily or go outside district boundaries
5. Inclusion of Key/Legend (1 dot = 10 units)	1 mark	- A clearly labelled key or legend indicating scale (1 dot = 10 cocoa farm units)
6. Title for the Map	1 mark	- A relevant title such as "Distribution of Cocoa Farm Units by Dot Map"

PART B: Analyse the Strengths and Limitations of Dot Maps

Structure and Marks Allocation

Each strength and weakness should have a relevant example to support it.

c. **Strengths of Dot Maps (4 marks)**

i. Visual Clarity and Simplicity (2 marks)

- Explain how dot maps provide a clear, easy-to-understand visual representation of data distribution.
- Example: Use of dot maps in illustrating population density or disease spread in Ghana.

ii. Revealing Patterns and Trends (2 marks)

- Discuss how dot maps can effectively reveal spatial patterns such as clustering and gaps.
- Example: Mapping agricultural outputs to identify areas of high productivity.

c. **Limitations of Dot Maps (4 marks)**

i. Overcrowding and Underrepresentation (2 marks)

- Discuss issues related to overcrowding in densely populated areas and underrepresentation in sparsely populated ones.
- Example: Challenges in visualising urban population density without overcrowding the map.

ii. Subjectivity and Interpretation (2 marks)

- Explain the challenges of selecting appropriate dot values and how this affects interpretation.
- Example: Variability in dot values leading to different interpretations in economic data mapping.

WEEK 15

Short Answer Questions

Q1

Marking Scheme

- Analysis of the Pattern (2 marks): Correctly identifies the pattern as a large, one-way flow of raw materials converging on a central hub (Kumasi), indicating Kumasi is a major receiving centre, not a production hub for these goods.
- Proposal of a Strategic Business (2 marks): Suggests a specific, relevant value-addition business, such as a food processing factory (e.g., for maize flour, yam chips, or fruit juice) or a large-scale modern storage and packaging facility.
- Justification of the Proposal (2 marks): Explains that such a business is strategic because it leverages the reliable and high-volume supply of raw materials. This reduces transportation costs for the business and allows it to create higher-value products, reduce post-harvest losses, and create manufacturing jobs.

Total: 6 marks

Sample Answer

The flow line map pattern shows a large, one-way movement of raw agricultural produce into Kumasi, making it a central collection point. A strategic business to establish would be a food processing and packaging plant.

This proposal is justified because the business could take advantage of the steady, high-volume supply of raw materials like maize and yams from areas like Ejura without needing to transportation them over long distances. By processing these raw goods into higher-value products (like fortified maize flour or packaged yam chips), the business would create finished goods with a longer shelf-life, reduce post-harvest losses, and generate more profit than simply trading the raw produce. This adds value to the local economy and creates stable manufacturing jobs in Kumasi.

Q1

Marking Scheme

- Analysis of the Strain on Infrastructure (3 marks): Explains that a large, continuous flow of people leads to high demand for transportation services, causing severe traffic congestion, increased wear and tear on the main north-south roads, and longer, less safe travel times.
- Recommendation of an Infrastructure Project (3 marks): Proposes a strategic, large-scale project, such as developing a national railway network connecting the north and south. Justifies this by explaining that rail is more efficient for mass transit of people, would reduce the burden on the roads, and could facilitate the movement of goods in the opposite direction.

Total: 6 marks

Sample Answer

This pattern of high-volume migration puts immense strain on the existing north-south road network. A continuous flow of people means a high number of buses and vehicles use this corridor daily. This leads to heavy traffic congestion, accelerates the degradation of the road surface requiring frequent, costly repairs, and increases the risk of accidents. This over-reliance on roads makes travel inefficient and slow.

A strategic long-term infrastructure project to manage this would be the development of a modern, efficient national railway line connecting the northern regions to Kumasi and Accra. A railway is far more efficient for moving large numbers of people than road transportation. It would offer a safer, faster, and potentially cheaper alternative, significantly reducing the pressure on the roads. This would not only ease the movement of people but also create a new corridor for transporting goods, helping to better integrate the national economy.

Essay Question (Project)

Structure and Marks Allocation

Stage 1: Data Collection & Preparation (10 marks)

Up to ten marks are awarded based on the following criteria:

- Full credit (5 marks) is given if the learner identifies and cites at least two credible geospatial data sources (for example, Ghana Statistical Service reports, local surveys/interviews, and internationally recognised datasets) and demonstrates that each source is relevant to internal population movement in Ghana.
- Three additional marks are allocated for correctly recording the raw data in a neatly organised table: this includes accurately listing origin locations, destination locations, and the number of people moving.
- The remaining two marks are awarded for noting and clearly labelling the time period covered by each dataset, as well as presenting the table with legible headings and consistent units or estimates.

A learner who cites only one source or whose table omits key columns (origin, destination, number of people) can receive up to 5 marks, depending on completeness and clarity; if the table is entirely disorganised or missing the time period, fewer than 5 marks should be awarded in this stage.

Stage 2: Flow Line Map Construction (10 marks)

Up to ten marks are awarded for the accuracy, clarity, and completeness of the flow line map:

- Four marks are given if the learner uses arrows of appropriate thickness to represent volume correctly (for example, consistently thicker arrows for larger migration flows and thinner arrows for smaller flows).
- Three marks are reserved for ensuring that each arrow is correctly oriented from origin to destination locations (i.e. no misdirected arrows) and that the spatial distribution of flow lines matches the data table.
- Two marks are awarded for including a clear legend that explains exactly what each arrow thickness represents (e.g. "1 cm arrow = 1,000 people") and for placing that legend prominently on the map.
- One mark is given for including essential map elements: a descriptive title, a compass rose indicating north, and a scale (for example, "1 cm = 50 km").

If arrow thickness is inconsistent or the legend is missing or unclear, deduct accordingly (e.g. a map with accurate flows but no legend cannot receive more than 7 marks). If the title, compass rose, or scale is missing, reduce the total for this stage by that missing element's single mark.

Stage 3: Analysis & Interpretation (10 marks)

Up to **10 marks** are awarded for the written analysis (200–300 words) in which learners examine the completed flow line map and address three components: pattern identification, causal relationships, and implications/recommendations. The mark breakdown is as follows:

- Three marks are allocated for correctly identifying the main patterns visible on the map: specifically, naming which regions or districts show the highest outflows, identifying principal destination areas, and pointing out any unexpected flows. Full marks require precise naming of at least two high-outflow areas and two destination areas, plus mention of any counterintuitive flows.
- Three marks are given for articulating causal relationships: the learner must propose at least two valid social or economic reasons for outflows (for example, agricultural seasonality in the north, urban employment opportunities in Accra or Kumasi, educational migration) and at least one credible pull factor for the primary destination (e.g. greater job availability, educational institutions, or better climate conditions). Full marks in this section require that reasons be tied explicitly to the Ghanaian context.
- Two marks are reserved for describing a total of four implications: two on origin communities (e.g. labour shortages, changes in family structure or remittance patterns) and two on destination areas (e.g. urban overcrowding or increased demand for housing and services). Each implication must be clearly stated, with reference to how the migration pattern causes that specific effect.
- Two marks are awarded for recommending one well-justified policy or community-based strategy to improve positive outcomes, such as supporting agribusiness in origin regions or investing in urban infrastructure. To earn full marks here, the recommendation must logically follow from the analysis and be feasible in Ghana's socio-economic context.

Note

If any of these components is missing or superficial—for example, if a student identifies patterns but gives only one causal reason—deduct proportionally (e.g. identifying patterns but providing weak or general causes would earn only 3 of the 6 available marks for pattern and causal sections combined). If no recommendation is given, deduct the 2 marks allocated for that part.

Stage 4: Reflection & Justification (10 marks)

Up to **10 marks** are awarded for a concise reflective paragraph (100–150 words) in which learners explain how using a flow line map enhanced their understanding. The marks are distributed as follows:

- Six marks for clearly explaining how the visualisation helped uncover patterns that raw numerical data alone would not reveal. The learner should mention specific examples—e.g., "By seeing thick arrows from District A to Accra, I noticed that A has the highest outflow; if I had only looked at numbers, I might have missed the relative scale of movement."
- Four marks for articulating how the map clarified causal relationships between movement and local conditions in Ghana—e.g., "Because I saw arrows converging on Kumasi, I realised migration is driven by job opportunities there." Full marks require explicit reference to how the map guided their reasoning.

If the reflection merely restates the stages without linking how the map specifically changed their perspective or deepened their analysis, limit the score to 4 or fewer. If no reflection is present, award 0 marks for this stage.

General Notes on Awarding Marks

- At each stage, partial credit is appropriate when a learner demonstrates some, but not all, required elements.
- The teacher should monitor and provide feedback after each stage; if substantial revision occurs before the final submission, it should be reflected in the marks (for instance, if a learner's map legend was unclear at Midpoint but corrected at Submission, award the full mark for legend in Stage 2).
- Legibility, coherence, and evidence of independent thinking should be rewarded: if handwriting is messy but the content is accurate and complete, do not penalise the learner for presentation alone.
- Where group work is evident (e.g., one member's writing style appears in the map legend, but the analysis clearly integrates multiple voices), the teacher may consider awarding marks to the entire group, provided each criterion is met.
- Any plagiarism or copying without attribution must result in zero for the affected section.

Total Possible Marks: 40

Stage 1: Data Collection & Preparation – 10 marks

Stage 2: Flow Line Map Construction – 10 marks

Stage 3: Analysis & Interpretation – 10 marks

Stage 4: Reflection & Justification – 10 marks

SECTION 7: WASTE MANAGEMENT IN GHANA

STRAND: HUMAN AND ENVIRONMENT

Sub-Strand: Environmental Degradation

Learning Outcome: *Analyse the sources of waste and effects of improper waste disposal in Ghana*

Content Standard: *Demonstrate skills in waste management in Ghana*

INTRODUCTION AND SECTION SUMMARY

This section introduces learners to the critical issue of waste and its management in their communities and across Ghana. Learners will identify and discuss the various sources of waste, ranging from household and industrial to agricultural and electronic sources, and understand how these contribute to the growing waste problem. They will explore the negative effects of improper waste disposal, including health risks, environmental degradation, and socio-economic challenges such as flooding and reduced quality of life. The section also emphasises sustainable waste management practices by examining the 3Rs: Reduce, Reuse, and Recycle. Learners will gain knowledge of how these strategies can minimise waste generation, conserve resources, and promote a cleaner, healthier environment. By the end of this section, learners will develop critical thinking, problem-solving, and advocacy skills that empower them to contribute meaningfully to effective waste management in their communities and beyond.

The weeks and the indicators covered by the section are:

Week 16: Discuss the sources of waste in your community and Ghana

Week 17: Discuss the effects of improper waste management or disposal in your community and Ghana

Week 18: Examine appropriate methods of waste management in Ghana: Reduce, Reuse and Recycle (3Rs)

The section on "Waste Management in Ghana" in this Year 3 TM builds upon the foundational knowledge established in Year 1 and Year 2 within the "Human and Environment" strand, particularly under the sub-strand "Environmental Degradation." In Year 1, students begin by evaluating the causes and effects of water and air pollution, as well as measures to prevent or mitigate these environmental issues (1.3.3.LO.1). This foundational understanding is expanded in Year 2 where learners analyse the causes, effects, and strategies for preventing land degradation and soil pollution (2.3.3.LO.1). The Year 3 curriculum continues this progression by focusing on the sources and effects of improper waste disposal, as well as examining appropriate waste management methods in Ghana through the 3Rs: Reduce, Reuse, and Recycle (3.3.3.LO.1).

SUMMARY OF Pedagogical Exemplars

This section integrates Inquiry-Based, Exploratory, Collaborative, and Project-Based Learning strategies to enhance learners' understanding of waste management in a GESI-responsive manner. Inquiry-Based Learning involves learners visiting nearby communities to identify major and minor sources of waste generation, fostering observational and analytical skills. Exploratory Learning uses field trips, images, or videos to provoke discussions on the environmental and health effects of poor waste disposal, deepening real-world connections. **Collaborative Learning** encourages learners to listen to expert presentations and classify waste management strategies under the 3Rs—Reduce, Reuse, and Recycle—promoting critical thinking and teamwork. Project-Based Learning enables learners to creatively convert waste into useful artefacts, reinforcing the principles of sustainability and innovation. These pedagogical approaches promote active engagement, critical reflection, problem-solving, and social responsibility. They also cater to diverse learner needs and experiences, encouraging inclusive participation. Overall, these exemplars foster deeper understanding and long-term retention of waste management concepts, while equipping learners with practical skills and environmental consciousness.

ASSESSMENT SUMMARY

Indicators	DOK Level	*Assessment Strategy and/or Mode*
Week 16 1. Discuss the sources of waste in your community and Ghana	2	• 5 short answer questions with marking scheme • Essay questions with marking guide
Week 17 1. Discuss the effects of improper waste management or disposal in your community and Ghana	4	• 5 short answer questions with marking scheme • Essay questions with marking guide
Week 18 1. Examine appropriate methods of waste management in Ghana: Reduce, Reuse and Recycle (3Rs)	4	• Practice Paper 2 • 5 short answer questions with mark scheme • Essay question with marking guide

Y3 RECAP: Topics related to 'analyse the sources of waste and effects of improper waste disposal in Ghana'.	
YEAR/TOPIC	Activities/Tasks – can be in groups or pairs or individual
Year 1W Air Pollution	Air Pollution in Ghana 1. What are the main sources of air pollution in Ghana? 2. How does air pollution impact public health in Ghana? 3. Why is Accra particularly affected by air pollution? 4. What measures can be taken to reduce air pollution in Ghana? 5. How does air pollution contribute to climate change in Ghana?

Year 1 Water Pollution	Water Pollution in Ghana 1. What are the primary causes of water pollution in Ghana? 2. How does illegal mining (galamsey) affect Ghana's water bodies? 3. What are the consequences of water pollution for human health? 4. What strategies can Ghana implement to improve water quality? 5. How does water pollution impact agriculture and food security?
Year 2 Land Degradation in Ghana	1. Brainstorm the meaning of land degradation. 2. Document and present the machinery used in mining activities. 3. Discuss the effects of land degradation on the environment. 4. Suggest remedies to mitigate the effects of land degradation.
Year 2 Soil Pollution in Ghana	1. Brainstorm the definition of soil pollution. 2. Identify causes of soil pollution in local communities. 3. Discuss the impacts of soil pollution on humans and the environment in Ghana. 4. Propose remedies to reduce the impacts of soil pollution. 5. Create a mind-map on the causes, effects, and control of soil pollution in Ghana.

WEEK 16

Learning Indicator: *Discuss the sources of waste in your community and Ghana*

Focal Area: Sources of Waste in our Community and Ghana

Introduction

Waste is any material or substance that is discarded or no longer needed. It is produced every day by people, businesses, and industries. Waste can harm the environment and human health if not managed properly, so it is important to understand where it comes from. This focal area explores the sources of waste in our local community and in Ghana as a nation.

Types of Waste

Before discussing the sources, it is helpful to know the different types of waste. Waste can be grouped into several categories:

1. **Organic Waste:** Leftover food, yard waste (like leaves and grass), and other natural materials.
2. **Recyclable Waste:** Materials like paper, plastic, glass, and metal that can be reused.
3. **Hazardous Waste:** Dangerous substances like chemicals, batteries, and medical waste.
4. **Electronic Waste (E-Waste):** Old or broken electronic devices like computers, phones, and televisions.
5. **Construction and Demolition Waste:** Debris from building projects, such as concrete, wood, and metal.

Sources of Waste in Your Community

In a typical community, waste is produced by everyday activities. Here are the main sources

1. **Households**
    a. Food scraps and packaging from groceries.
    b. Old furniture, clothes, and appliances.
    c. Garden waste like grass clippings and branches.
2. **Schools and Institutions**
    a. Paper from classrooms and offices.
    b. Food waste from cafeterias.
    c. Maintenance waste like broken desks or chairs.
3. **Businesses**
    a. Packaging from products sold in stores.
    b. Office waste like paper and ink cartridges.
    c. By-products from manufacturing or production processes.
4. **Construction and Demolition**
    a. Leftover materials from building or renovating, such as bricks, wood, and metal.

b. Debris from demolishing old structures.

c. Excavated soil and rocks.

5. **Agriculture**

   a. Crop residues like stalks and husks.

   b. Animal waste from farms.

   c. Empty pesticide containers and old equipment.

Sources of Waste in Ghana

Ghana, like many countries, has both common and unique sources of waste due to its industries and way of life. Here are some key sources:

1. **Mining Activities:** Ghana is known for its gold and bauxite mining. These activities produce waste like **tailings** (leftover rock after extracting minerals) and **slag** (waste from metal processing).
2. **Fishing Industry:** Fishing is important in coastal areas. Waste includes fish processing scraps and discarded fishing gear, like nets and ropes.
3. **Marketplaces:** Busy markets, especially food markets, generate large amounts of organic waste like rotten fruits and vegetables. Packaging waste from goods sold, such as plastic bags and cardboard boxes.
4. **Informal Settlements:** In densely populated areas with limited waste management, waste can include household trash, human waste, and discarded items.
5. **Electronic Waste (E-Waste):** Ghana has one of the largest e-waste dumps in the world at **Agbogbloshie** in Accra. Old electronics from around the world are sent here, creating hazardous waste.



Figure 16.1: *Agbogbloshie e-waste dump site*

Learning Tasks

"Where Does Our Waste Come From? Exploring Local Waste Sources"

1. **Pre-Visit Planning (Classroom Activity)**
    a. In groups, brainstorm possible sources of waste in your school or community (e.g. households, markets, schools, hospitals, sachet water sellers).
    b. The teacher introduces the two categories:
        i. Main sources – produce large/regular amounts of waste
        ii. Minor sources – occasional or small-scale contributors
    c. Discuss observation strategies (what to look for, whom to talk to) and agree on safety and respectful behaviour during the visit.
2. **Community Visit (Local Fieldwork)**
    a. Each group visits a nearby area (e.g. market, street, residential zone) with support from a teacher or facilitator to:
        i. Observe areas where waste is commonly found.
        ii. Record the types of locations (homes, stores, etc.) and the type/amount of waste seen.
        iii. Talk (if possible) to a local resident, shopkeeper, or waste collector.
        iv. Sketch, list, or photograph at least 3–5 waste sources.

Accessibility Tip: *Learners with mobility limitations may be assigned to observe and record near the school or use photos/maps if they cannot travel.*

3. **Organise and Categorise Findings**
    a. Back in class, each group will:
        i. List the waste sources they found.
        ii. Classify each source as a main or minor source.
        iii. Describe the type of waste found (e.g. plastic, food, paper, medical).
        iv. Note any differences between waste sources in their community vs. general knowledge about waste in Ghana (e.g. Accra vs. rural area).

Use sentence starters or template charts to assist learners with limited writing ability.

4. **Create a Group Poster or Chart**
    a. Each group creates a simple poster or chart showing:
        i. A title (e.g. "Waste in Our Community")
        ii. Two sections: Main Sources and Minor Sources
        iii. Pictures, drawings, or printed icons
        iv. Simple captions (e.g. "The market generates plastic and food waste daily.")

v. A short statement about one way to reduce one of the major waste sources

Allow learners with low literacy to dictate captions, draw, or use printed picture labels.

5. **Class Presentation and Discussion**
   a. Each group presents their findings (1–2 minutes per group).
   b. Peers respond with "One thing we learned from your visit was…"
   c. Teacher leads a reflection discussion:
      i. *"Why is it important to understand where our waste comes from?"*
      ii. *"What differences did you see across groups or areas?"*

Pedagogical Exemplar

Inquiry-Based Learning

- In GESI responsive groups, visit the nearby community to identify various sources of waste generation.
- Based on the visitation, write down the main and minor sources of waste generation within the local community and Ghana as a whole**.**

1. Organise GESI-responsive groups that ensure gender balance, mixed abilities, and representation from diverse backgrounds.
2. Clearly explain the purpose and expectations of the community visit using simple language and visual aids.
3. Assign group roles (e.g., observer, note-taker, question asker, summariser) based on learners' strengths and learning preferences.
4. Provide guiding questions and data collection templates to support focused observation and note-taking.
5. Allow the use of assistive devices or peer support for learners with special needs.
6. Encourage use of multiple formats (written notes, photos, sketches) to record observations, catering to different learning styles.
7. Create a respectful and safe space for learners to share findings and reflections post-visit.
8. Facilitate group discussions to help learners distinguish between major and minor sources of waste, promoting analytical thinking.
9. Offer support and feedback throughout the writing process, using sentence starters or graphic organisers if needed.
10. Promote empathy and civic responsibility by encouraging learners to reflect on the environmental and social impacts of waste.

Key Assessment Level 2: Short Answer Questions and Essay

Short Answer Questions

1. Classify the following items into two categories: 'Organic Waste' and 'Recyclable Waste':
   a. Leftover food scraps

b. Plastic water bottles

c. Grass clippings

d. Old newspapers

2. Compare one major source of waste typically found in a rural agricultural community in Ghana with one major source of waste that is unique to a large urban centre like Accra.
3. Explain what 'Electronic Waste (E-Waste)' is and provide a specific example mentioned in the document of where this type of waste is a major issue in Ghana.
4. Describe two distinct types of waste that originate specifically from Ghana's mining activities, as mentioned in the document.
5. Summarise the main types of waste generated by large marketplaces in Ghana and explain why they are considered significant sources of waste.

Essay Question

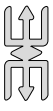
1. Compare and contrast the benefits of implementing Recycle, Reduce, and Reuse strategies in your school to prevent waste generation, and explain how each strategy contributes to solving the school's waste problem.

[Total 20 marks] **(DoK 2)**

PLC Session 16

45 minutes | **Planning & Reviewing the Learning Plan**

1. Begin the session by recapping lessons from the previous year/session/week, focusing on how learning was applied.
2. Use your subject specific app to explore the content before planning. Ask the app to
   a. explain the week's concepts in a practical way that will make it easier for learners to understand
   b. identify two or three common misconceptions learners may have on the week's content and how to address them using contexts familiar to Ghanaian learners. (NTS 3a, 3g and 3m).
3. Use your subject specific app to plan your lesson. Ask the app to
   a. suggest the most effective method for teaching the week's concepts to learners with diverse backgrounds.
   c. suggest learning activities, differentiation and essential questions based on the method of teaching (NTS 3a-3q)
   d. review your prepared learning plan and address any challenging issues you may have identified in your subject area (NTS 3a-3c).



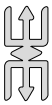
Note

- *Take note of the recap topics linked to Years 1 and 2 while preparing for your lesson.*
- *Refer to the Values Learning Community Handbook and link the values for the week in your lesson to ensure that learners are applying what they learn.*

4. Plan the week's key assessment with your app
   a. The key assessment for the week is ***short answer questions and essay***. Chat with your app to plan this assessment, indicating what you and your learners will do before, during and after the short answer questions and essay (NTS 3k-3q).

10 minutes | Content Exploration

5. As a subject group, select one problem or idea/term in the week's content that is challenging (not a routine procedural question, but one that requires conceptual understanding) and then
   a. use the app, ask it to solve the problem step by step and explain the reasoning behind each step (you may be assisted by a teacher who is strong in the content area)
   b. all teachers in the group work through a similar problem individually for 3–4 minutes
   c. the group then works through the problem together step by step
   d. highlight the most common errors made at each step and discuss (NTS 1c, 1e, 2c, 2e, 3e-3j).



Note

- *This part is not just about 'How do I teach this?' but how do I teach it for learners to understand?*
- *If the group still shares the same content gap, use the app: ask it to solve the problem step by step and explain the reasoning behind each step.*
- *Problems/ideas discussed should be sourced from the Teacher Manual content, not invented separately. This keeps the content exploration directly connected to what teachers will deliver.*

30 minutes | Enactment

6. Enact a teaching activity based on your learning plan (NTS la-1b, 1e-lg, 2c, 2e, 2f, 3c-3j and 3o).
   a. Colleagues observe with specific attention to clarity of concept explanation, use of familiar Ghanaian examples and how misconceptions are handled if they arise.
   b. After the enactment, ask for structured feedback from the group
      i. was the concept explained in a way that a learner with no prior knowledge could follow?
      ii. were the examples grounded in contexts familiar to Ghanaian learners?
      iii. did any misconceptions surface and if so, how were they addressed?

5 minutes | Reflection

7. Reflect and share your views on the session. One thing that worked well, what did not work well and what you will do differently. (NTS 1a, 1b).
8. Identify a critical friend to observe and provide feedback on your lesson in relation to the PLC Session conducted (NTS 1f, 1g).
9. Remember to
   a. transfer your chats into your learning planner template.
   b. read your Teacher Manual and related Learner Material in preparation for the next session. Take note of the recap weeks, which are linked to Years 1 and 2 (NTS 3a).
   c. integrate National Values, GESI, SEL, and 21st century skills into your learning activities, assessment tasks, and rubrics/mark schemes.

WEEK 17

Learning Indicator: *Discuss the effects of improper waste management or disposal in your community and in Ghana*

Focal Area: Effects of Improper Waste Management

Introduction

Waste management involves the collection, transportation, processing, recycling, and disposal of waste materials. Simply put, waste management is all about how we collect, treat, and get rid of waste so that it does not harm the environment or the health of people. Improper waste management occurs when waste is not handled appropriately, for example, when it is disposed of illegally, allowed to accumulate, or burned in an unsafe manner. This results in significant problems for both local communities and the nation as a whole. In this lesson, we will examine how improper waste management affects our local community as well as Ghana, a country currently facing considerable challenges in managing waste effectively.

What is Improper Waste Management?

Improper waste management refers to the careless handling of waste without following safe, environmentally friendly, or hygienic practices. Examples include:

1. **Littering:** Disposing of rubbish on the ground rather than using a designated bin.
2. **Illegal Dumping:** Abandoning large quantities of waste in locations where disposal is prohibited.
3. **Inadequate Waste Collection:** Situations where waste is not collected regularly or is not collected at all.
4. **Poor Disposal Methods:** The improper handling of waste, such as burning it or discarding it into rivers, lakes, or open land.

Effects of Improper Waste Management in our Community

1. **Environmental Effects**
    a. **Land Pollution:** Open dumping of waste makes the land dirty and unattractive. It reduces the quality of the soil and can affect plant growth.
    b. **Water Pollution:** Dumping waste in rivers, streams, and drains pollutes water sources. This affects drinking water and aquatic life.
    c. **Air Pollution:** Burning waste releases smoke and toxic gases into the air, causing air pollution and reducing air quality.
    d. **Blocked Drains and Flooding:** Waste that clogs gutters and drains can cause flash floods during heavy rains, especially in urban communities.
2. **Health Effects**
    a. **Spread of Diseases:** Uncollected waste attracts flies, mosquitoes, and rodents, which spread diseases such as malaria, cholera, typhoid, and diarrhoea.

b. **Respiratory Problems:** Burning of plastics and other materials can cause coughing, asthma, and other breathing difficulties.

c. **Injuries:** Sharp objects like broken glass and rusted metals can injure people, especially children who play around dump sites.

3. **Social and Economic Effects**

a. **Reduced Quality of Life:** A dirty environment affects community pride and makes living conditions uncomfortable.

b. **Loss of Tourism and Investment:** Dirty surroundings discourage tourists and investors from visiting or investing in the community.

c. **Increased Government Spending:** The government spends more money on cleaning, treating diseases, and repairing flood damage caused by improper waste disposal.

Effects of Improper Waste Management in Ghana

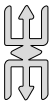
Ghana, a West African nation, faces significant waste management challenges due to rapid urbanisation and industrial growth. The following are some of the major effects:

1. **Urban Waste Crisis:** In major urban centres such as Accra, the capital city, the volume of waste generated often exceeds the capacity of existing waste collection systems. As a result, public bins overflow and refuse accumulates along streets and in open spaces.
2. **Flooding:** During the rainy season, improperly disposed waste frequently blocks drainage systems. This leads to widespread flooding, which damages property, displaces residents, and contributes to the spread of waterborne diseases.
3. **E-Waste Challenges:** Ghana is home to one of the largest electronic waste sites in the world, Agbogbloshie, located in Accra. Here, discarded electronic items such as mobile phones, computers, and televisions are burned to extract valuable metals. This process releases hazardous chemicals into the air, soil, and nearby water bodies. Individuals who work or live near such sites are often exposed to toxic fumes, resulting in respiratory illnesses, skin conditions, and other serious health concerns.
4. **Marine and Coastal Pollution:** Waste that is improperly disposed of, particularly plastic and other non-biodegradable materials, frequently ends up in the ocean. This harms marine life and degrades coastal environments. Ghana's beaches, which are vital for fishing and tourism, are increasingly affected by pollution.
5. **The Plastic Waste Problem:** Plastic waste, especially bags and bottles, is a major concern. These materials decompose very slowly, often remaining in the environment for hundreds of years. Their presence clogs drains, litters landscapes, and threatens both terrestrial and aquatic ecosystems.
6. **Economic Costs:** The treatment of pollution-related illnesses places a financial burden on both families and the national healthcare system. Moreover, unsanitary urban environments and polluted beaches deter tourists, negatively impacting businesses and communities that depend on the tourism sector.

Learning Tasks

"Waste in Our World: Seeing, Understanding, Solving"

1. **Exploration (Observation & Data Collection)**



Note

In this task, teachers should choose the most convenient one depending on the resources available to the school.

Option A – Field Visit

a. Visit a location in the community affected by poor waste disposal (e.g., open dump site, choked drain, polluted stream, roadside litter). Observe:

   i. Types of waste present (plastic, organic, industrial, etc.)

   ii. Who is affected and how (humans, animals, plants, infrastructure)

   iii. Reactions of the local community (e.g., complaints, clean-up attempts)

Option B – Multimedia Observation

   i. If fieldwork isn't possible, watch short teacher-selected videos and picture slides showing the effects of waste mismanagement in Ghana (e.g., flooding in Accra due to inadequate/blocked drains, litter in streets/markets, open burning of refuse).

Learner Support

- *Learners with limited mobility or visual impairments can rely on audio/video descriptions.*
- *Use graphic organisers with pictures or symbols to guide observations.*

2. **Group Analysis & Discussion**

a. Each group uses a Cause–Effect–Consequence–Solution (CECS) framework to analyse their findings:

   i. **Cause**: What leads to improper waste disposal here?

   ii. **Effect**: What visible problems result (e.g., blocked drains)?

   iii. **Consequence**: What deeper or long-term impacts occur? (e.g., cholera, air pollution, flooding)

   iv. **Solution**: What realistic actions could the school or community take?

b. Provide sentence starters or visual cues to support discussion:

   i. *"We noticed that…"*

   ii. *"This can cause…"*

   iii. *"This will likely lead to…"*

   iv. *"A possible solution is…"*

3. **Creative Presentation – "Tell the Story"**
    i. Each group creates one of the following to communicate their understanding and solutions:

Format	Description
🖼️ Poster or Infographic	Uses drawings/photos with captions explaining CECS
🎭 Skit or Role-Play	Act out the problem and proposed solution
📽️ Short Video	Records a 1–2 min video with a key message
🗺️ Waste Impact Map	Shows areas of concern and possible solutions
🎙️ Radio Message	A recorded announcement raising awareness

Inclusive Adaptation Tips

- Learners who struggle with writing can contribute through drawing, speaking, or arranging images.
- Learners with speech difficulties can present via pre-recorded audio or support from a peer.

4. **Class-wide Sharing & Reflection**
    i. Each group presents their project. Peers respond using sentence frames like:
    - *"We learned that…"*
    - *"Your solution was interesting because…"*
    - *"This could help our community by…"*

Key Assessment

Short Answer Questions

1. Explain the direct cause-and-effect relationship between improper waste disposal and the increased risk of flooding in urban communities in Ghana.
2. Describe one specific environmental effect and one specific health effect of the open burning of waste in a community.
3. Explain the specific health problems associated with the E-waste challenges at the Agbogbloshie site in Accra.
4. Show the relationship between dumping waste into gutters and the spread of diseases like malaria and cholera in a community.
5. Describe two distinct ways that improper waste management negatively affects a community's economy.

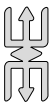
Essay Question (DOK 4): Critically evaluate the effects of improper waste management or disposal in your community and Ghana.

[Total 20 marks] (DoK 4)

PLC Session 17

45 minutes | **Planning & Reviewing the Learning Plan**

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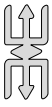
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9. Remember to
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   b. read your Teacher Manual and related Learner Material in preparation for the next session. Take note of the recap weeks, which are linked to Years 1 and 2 (NTS 3a).
   c. integrate National Values, GESI, SEL, and 21st century skills into your learning activities, assessment tasks, and rubrics/mark schemes.

WEEK 18

Learning Indicator: *Examine the appropriate methods of waste management in Ghana: Reduce, Reuse and Recycle (3Rs)*

Focal Area: Methods of Waste Management in Ghana: Reduce, Reuse and Recycle (3Rs)

Introduction

The 3Rs (Reduce, Reuse, and Recycle) are fundamental principles of waste management that help minimise waste and manage it sustainably. In Ghana, where rapid urbanisation and limited waste infrastructure pose challenges, these methods are crucial for creating cleaner communities and healthier environments. This lesson explores each method with examples, benefits, and practical applications relevant to Ghanaian contexts.

Reduce

Meaning: To **reduce** means to **minimise the amount of waste we create** in our daily activities by being more careful about what we use and how much of it we use. In many countries, the use of plastic shopping bags has fallen dramatically because they have been banned or need to be paid for at the service counter. Single-use plastics have also been reduced significantly in the UK and European countries by making their use unlawful. To consume fast food, wooden spoons and forks are now used, made with wood from sustainable sources, which are biodegradable. Increasing use of plant-based materials, also biodegradable, is seen as a viable alternative to oil-based products like plastics. The 'Biodegradable Bag Company' has been leading biodegradable bag production in the UK for nearly 50 years.

Examples of Reducing Waste in Ghana

- Buying products with less packaging (e.g. loose tomatoes instead of packaged ones)
- Using digital documents instead of printed ones in schools and offices
- Carrying reusable shopping bags instead of collecting plastic bags
- Avoiding single-use plastics such as straws, cutlery, and water sachets

Learners can reduce waste by using both sides of paper for writing or printing, carrying reusable water bottles and lunch boxes to school, and encouraging families to buy in bulk to reduce packaging waste. These actions can be tracked over a week to measure impact, fostering a habit of waste reduction.

Benefits

1. Saves natural resources and energy
2. Reduces the pressure on landfill sites
3. Helps lower household and municipal waste collection costs

Reuse

Meaning: To **reuse** means to **use items more than once** instead of throwing them away after a single use.

Examples of Reusing in Ghana

1. Using empty bottles to store water or homemade drinks
2. Reusing plastic containers for food storage
3. Donating old clothes, shoes, and school supplies to others in need
4. Repairing broken items (like shoes or bags) instead of discarding them

Benefit

1. Reduces the volume of waste sent to landfill
2. Saves money and reduces the need for new products
3. Encourages creativity and innovation (e.g. using old tyres as flowerpots)

Challenges and Opportunities

While reuse is practiced, awareness and formal integration into waste management systems are low, with reusable materials often found littering streets and drains. Incentives, such as free bins or increased collection frequency, could encourage more reuse.

Recycle

Meaning: To **recycle** means to **process used materials into new products** instead of disposing of them as waste.

Examples of Recycling in Ghana

1. Collecting plastic waste for recycling into chairs, buckets, and pavement blocks
2. Melting down scrap metals to produce tools or machine parts
3. Turning food waste into compost for farming
4. Using old paper to produce recycled paper products

Recycling Initiatives in Ghana

1. Companies such as *Trashy Bags Africa* collect and recycle water sachets into bags and wallets
2. Some communities now have separate bins for plastics, metals, and organic waste to encourage sorting and recycling
3. Educational campaigns and NGOs promote recycling in schools and markets

Benefits

1. Reduces the amount of waste in the environment
2. Creates jobs and business opportunities in the recycling industry
3. Conserves raw materials and reduces the need for new resources

Learning Tasks

"What Can We Do with Our Waste? Understanding and Applying the 3Rs"

1. **Expert Input – Presentation by a Resource Person**
   a. Learners attentively listen to a short presentation by a guest speaker or watch a recorded video discussing various ways of managing waste.
   b. During the presentation, learners take guided notes (using a worksheet with headings like: "Strategy Mentioned," "How It Works," "Which R?").
   c. The teacher may pause the video or presentation at key points for clarification or reinforcement for learners who need extra support.
      - *Learners with hearing difficulties can receive printed transcripts. Learners with writing challenges can use pictorial prompts or paired scribing.*
2. **Group Discussion & Classification Task**
   a. In their groups, learners:
      i. Review the strategies mentioned by the resource person.
      ii. Discuss and classify each strategy under Reduce, Reuse, or Recycle, justifying their reasoning.
      iii. Identify any strategy that could belong to more than one category, explaining why.
      iv. Use examples from the Ghanaian context (e.g., "reusing plastic containers for selling water," "reducing food waste at chop bars").


Use classification cards, coloured icons, or drag-and-drop sorting sheets for accessibility

3. **Create a 3Rs Poster or Chart**
   a. Each group designs a 3-column poster or Venn diagram that includes:
      i. One section for each R – Reduce, Reuse, Recycle
      ii. Key examples from the presentation
      iii. Illustrations or icons to support understanding
      iv. 1–2 practical school/community actions per category (e.g., "Organise a bottle collection for recycling")


Learners can use drawings, printed pictures, colour coding, or digital tools. Those who struggle with text can contribute by selecting images or colouring the chart.

4. **Presentation and Class Gallery Walk**
   a. Each group presents their poster:
      i. Explain at least two strategies per category and why they chose them.
      ii. Share one school-based waste management initiative that their group proposes.
   b. During the gallery walk:

i. Other learners ask questions or place feedback stickers like "💡 Great idea!" or "🛠 Could improve by…"

Learners with speech anxiety can record a short video/audio explanation or use a peer presenter.

5. **Reflection & Evaluation**

a. Individually, learners complete a reflection sheet, answering:

i. *"Which of the 3Rs do I use most in my daily life?"*

ii. *"Which one is most needed in my community, and why?"*

iii. *"One small change I can make is…"*

Provide sentence starters or voice-to-text tools for learners with literacy challenges.

"Trash to Treasure: Building with a Purpose"

1. **Research & Brainstorm**

a. Each group discusses:

i. What kinds of waste materials are common in their school or community (e.g. plastic bottles, old cloth, cans, polythene bags)?

ii. What useful items could be made from them? Ideas may include pencil holders, wall organisers, flower pots, foot mats or handbags, toys or games, eco-bricks for a garden edge and others.

Learner Support: *Use picture cards or videos of upcycled projects to spark ideas. Let learners sketch or verbally describe their thoughts.*

2. **Design the Artefact**

a. Groups sketch a design plan for the artefact:

i. Label the materials needed (must be recycled or waste).

ii. Describe the function or purpose of the item.

iii. Justify why their artefact helps solve a waste problem.

Learners with low writing ability can dictate plans to a scribe or use a drawing-only plan.

3. **Construct the Artefact**

a. Using collected waste materials (clean and safe), learners create their artefact:

i. Use simple tools (scissors, glue, thread) under teacher supervision.

ii. Ensure safety and hygiene protocols are followed (e.g., handwashing after handling materials).

Support Ideas:

Provide adapted tools (e.g., scissors with grip support).

Allow learners with limited dexterity to assist with painting, designing, or sorting.

4. **Create a Display & Explanation**
    a. Groups prepare a presentation board or short oral script that explains:
        i. The type of waste used and why it was chosen.
        ii. The steps taken to design and construct the artefact.
        iii. The usefulness of the item and how it helps manage waste.
        iv. A suggestion on how the idea could be used in the wider community.



Use photos, diagrams, or even a short video, if possible, to support learners who struggle with text.

5. **Showcase & Reflect**
    a. Organise a "Waste to Wealth Exhibition":
        i. Each group presents their artefact to classmates, teachers, or parents.
        ii. Peers give feedback using phrases like:
            - *"I liked that you reused…"*
            - *"Your idea could help our school because…"*
            - *"I wonder if you could also try…"*
    b. After the presentation, learners complete a short personal reflection:
        i. *"What did I learn about waste?"*
        ii. *"What part of the project was most fun or challenging?"*
        iii. *"How can I reuse waste in my daily life?"*

Key Assessment: Practice Paper 2

Short Answer Questions

1. What do the three Rs—Reduce, Reuse, and Recycle—mean in the context of waste management? 2 marks **(Dok 2)**
2. Give two examples of how individuals in Ghana can practice waste reduction in their daily lives. 2 marks **(Dok 2)**
3. What are some challenges Ghana faces in implementing effective recycling programs, and how can these be addressed? 3 marks **(DoK 3)**
4. How does reusing materials contribute to both economic benefits and environmental sustainability in Ghana? 3 marks **(DoK 3)**
5. Why is reducing waste considered the most effective approach in the 3Rs framework, and how does this align with long-term waste management strategies in Ghana? 4 marks **(DoK 4)**

Essay Question (DoK 4)

1. "Rethinking Waste in Ghana: A Critical Approach to Sustainable Management and the Three Rs"

[Total 20 Marks] **(DoK 4)**

Write a paper to present to your local community/class members which addresses this statement. Teachers can choose to provide the following guidelines for learners:

Introduction ***(Approx. 200 words)***

- Define waste management and its importance.
- Provide a brief overview of Ghana's waste management challenges.
- Introduce the concept of the **Three Rs** as a **sustainable solution**.
- Present the main area to be discussed—**a critical evaluation of Ghana's waste management and innovative solutions that promote sustainability**.

Main Section Paragraphs *(Approx. 800–1,200 words)*

1. The Waste Management Crisis in Ghana ***(Cause & Effect Analysis)***

- **Current state of waste disposal in Ghana** (urban vs. rural challenges).
- **Causes** – Rapid urbanisation, lack of proper infrastructure, illegal dumping.
- **Effects** – Environmental pollution, public health risks, economic impact.
- **Critical perspective** – Discuss why current strategies are insufficient.

2. The Role of the Three Rs in Sustainable Waste Management ***(Solution-Oriented Approach)***

- **Reduce** – Limiting waste production through responsible consumption and corporate accountability.
- **Reuse** – Encouraging reuse of materials in households and industries.
- **Recycle** – Improving recycling programs and developing circular economy policies.
- **Critical perspective** – Examine Ghana's existing Three Rs policies and how they can be strengthened.

3. Innovative Strategies and Global Best Practices ***(Comparative & Critical Thinking)***

- **Lessons from other countries with effective waste management systems** (e.g., Rwanda's ban on plastic bags, Germany's return deposits on plastic and glass bottles).
- **Integration of technology** – Waste-to-energy solutions, digital tracking of waste.
- **Policy recommendations** – Stronger regulations, investment in recycling infrastructure, incentives for businesses to adopt sustainable practices.
- **Critical perspective** – Evaluate feasibility and challenges in Ghana's socio-economic context.

Conclusion ***(Approx. 200–300 words)***

- Summarise key findings from the discussion.
- Reinforce the importance of the Three Rs and **innovative solutions**.
- Present a **call to action** for policymakers, businesses, and individuals in Ghana.
- End with a thought-provoking statement on **how sustainable waste management can transform Ghana's future**.

HINT

*Conduct **Practice Paper 2**. It should cover the contents taught from Years 1 to 3. Refer to the **Table of Specification and Structure of the Paper** at the end of this section to guide you. Learners' papers should be marked immediately, and scores entered into the SAP.*

PAPER 1–MULTIPLE CHOICE QUESTIONS TABLE OF SPECIFICATION

STRAND	SUB-STRAND	LEARNING INDICATOR	DoK LEVELS			TOTAL
			1	2	3	
THE EARTH AND ITS NEIGHBOURHOODS	**The Earth and its features**	Explain Geography and its branches	–	–	1	1
		Describe the solar system and its constituents	1	–	–	1
		Examine the effects of the Earth's rotation and revolution	–	1	–	1
		Use latitudes and longitudes to locate places on the earth's surface	–	1	–	1
		Calculate distances using latitudes and time using longitudes	–	1	–	1
		Sketch, label and describe the internal structure of the Earth	1	–	–	1
		Explain the concepts of continental drift and discuss the supporting evidence	–	–	1	1
		Identify the different types of mountains (e.g. volcanic, fold and block), their characteristics, the processes that create them and their importance	1	1	–	2

		Describe the types of plains (e.g. structural, erosional and depositional), their characteristics, the processes that create them and their importance	–	1	–	1
		Describe the development of river channels and associated landforms	1	1	–	2
		Examine the importance of river landforms to the socio-economic development in Ghana	–	–	1	1
	Rocks, weathering and mass wasting	Discuss the three types of rocks, their characteristics, formational processes and their importance	1	–	–	1
		Explain weathering and the factors affecting its processes	–	1	–	1
		Evaluate the three weathering processes (physical, chemical and biological weathering processes)	–	–	1	1
		Differentiate between the soil types and discuss the importance of soil	–	1	–	1
		Examine the type of mass wasting	–	1	–	1
	The Earth's atmosphere	Discuss the physical structure and composition of the Earth's atmosphere and their importance	1	–	–	1

		Explain the differences between the weather and climate and the factors that affect them	-	1	-	1
		Calculate the annual and mean rainfall and temperature data of a station with appropriate instruments for measuring the various elements of weather	1	-	-	1
		Discuss the factors influencing the various elements of climate	1	-	-	1
		Discuss the socio-economic and environmental impacts of climate change in Ghana and beyond	-	-	1	1
NAVIGATING OUR ENVIRONMENT	**Maps, their elements and analyses**	Explain the concepts of map scale and convert from one scale type to another	1	1	-	2
		Read and interpret contours on maps	-	2	-	2
		Analyse the interrelationship between natural and cultural features on map	1	-	1	3
	Geospatial Data Collection, Representation and Interpretation	Discuss the method of collecting geospatial data (surveying, remote sensing, Global Positioning System, etc.)	1	-	1	2
		Collect and map geospatial data using Computer and Mobile Apps, GIS and GPS	1	1	-	2

		Analyse and interpret geospatial data using dot maps	-	1	-	1
HUMAN AND ENVIRONMENT	**Physical setting and People**	Discuss the major relief and drainage features of Ghana and their importance and challenges to development	1		1	2
		Describe the relief, drainage, climate and vegetation of West Africa and Africa	-	1	-	1
		Examine population growth and distribution in Ghana	-	-	1	1
		Discuss migration trends, settlement types and patterns in Ghana	-	-	1	1
	Economic Activities	Discuss the characteristics of subsistence and commercial agriculture and their importance and challenges in Ghana	-	1	-	1
		Examine the methods, importance and problems of lumbering and mining in Ghana	-	-	1	1
		Discuss the distribution, types and characteristics of manufacturing industries in Ghana	1	-	1	2
		Examine the role of tourism in the socio-economic development of Ghana and the challenges facing the tourism sector	-	1	-	1

		Examine causes and measures for preventing/ mitigating water pollution in Ghana	1	–	–	1
	Environmental Degradation	Discuss the causes of land degradation, its effects and management strategies in Ghana	–	1	–	1
		Discuss the effects of improper waste management or disposal in your community and Ghana	–	–	1	1
	Environmental Hazards and their management	Differentiate between hazards and disasters	–	1	–	1
		Examine the measures for managing floods in Ghana	–	–	1	1
		Examine measures for the prevention /mitigation of landslides	–	–	1	1
TOTAL			15	20	15	50

PAPER 2-HUMAN AND ENVIRONMENT TABLE OF SPECIFICATION

STRAND	SUB-STRAND	LEARNING INDICATOR	DoK LEVELS			TOTAL
			1	2	3	
HUMAN AND ENVIRONMENT	**Physical setting and People**	Discuss the climate, vegetation and soil types in Ghana and their importance and challenges to socio-economic development (SECTION A)	–	1		1
		Discuss the major relief and drainage features of Ghana and their importance and challenges to development (SECTION A)	–	1		1

		Describe the relief, drainage, climate and vegetation of West Africa and Africa (SECTION B)	-	2	2
		Explore the socio-economic implications of migration from Africa to the rest of the world (SECTION B)	-	1	1
	Economic Activities	Discuss the characteristics of subsistence and commercial agriculture and their importance and challenges in Ghana (SECTION A)	-	1	1
		Examine the role of tourism in the socio-economic development of Ghana and the challenges facing the tourism sector (SECTION A)	-	1	1
	Environmental Degradation	Examine the measures for managing drought and bushfires in Ghana (SECTION A)	-	1	1
TOTAL			-	8	8

PAPER 3- THE EARTH AND ITS NEIGHBOURHOODS AND NAVIGATING OUR ENVIRONMENT
TABLE OF SPECIFICATION

STRAND	SUB-STRAND	LEARNING INDICATOR	DoK LEVELS			TOTAL
			1	2	3	
THE EARTH AND ITS NEIGHBOURHOODS	**The Earth and its features**	Discuss evidence of the shape of the earth	1			1
		Use latitudes and longitudes to locate places on the earth's surface	1			1
		Describe the development of river channels and associated landforms	1			1
	Rocks, weathering and mass wasting	Explain weathering and the factors affecting its processes	1			1
		Evaluate the three weathering processes (physical, chemical and biological weathering processes)				

	The Earth's atmosphere	Explain the differences between the weather and climate and the factors that affect them	1		1
		Calculate the annual and mean rainfall and temperature data of a station with appropriate instruments for measuring the various elements of weather			
NAVIGATING OUR ENVIRONMENT	**Maps, their elements and analyses**	Explain the concepts of map scale and convert from one scale type to another	–	1	1
		Measure distance and areas on maps			
		Analyse the interrelationship between natural and cultural features on map			
	Geospatial Data Collection, Representation and Interpretation	Discuss the method of collecting geospatial data (surveying, remote sensing, Global Positioning System, etc.)	–	1	1
		Analyse and interpret geospatial data using flow charts	–	1	1
TOTAL			8		8

PLC Session 18

45 minutes | **Planning & Reviewing the Learning Plan**

1. Begin the session by recapping lessons from the previous session, focusing on how learning was applied.
2. Use your subject specific app to explore the content before planning. Ask the app to
   a. explain the week's concepts in a practical way that will make it easier for learners to understand.
   b. identify three common misconceptions learners may have on the week's content and how to address them using contexts familiar to Ghanaian learners (NTS 3a, 3g and 3m).
3. Use your subject specific app to plan your lesson. Ask the app to
   a. suggest the most effective method for teaching the week's concepts to learners with diverse backgrounds.
   b. suggest learning activities, differentiation and essential questions based on the method of teaching (NTS 3a-3q).
   c. review your prepared learning plan and address any challenging issues you may have identified in your subject area (NTS 3a-3c).

Note

- *Take note of the recap topics linked to Years 1 and 2 while preparing for your lesson.*
- *Refer to the Values Learning Community Handbook and link the values for the week in your lesson to ensure that learners are applying what they learn.*

4. Use your app to plan and administer the mode of assessment for the Student Assessment Portal (SAP)

   a. The key assessment for the week is ***practice paper 2***. Chat with your app to plan this assessment by reviewing or developing the assessment items/tasks and marking schemes/rubrics for the practice paper (NTS 3k-3q).

10 minutes **Content Exploration**

5. As a subject group, select one problem or topic/idea/term in the week's content that is challenging (not a routine procedural question, but one that requires conceptual understanding) and then

   a. use the app, ask it to solve the problem step by step and explain the reasoning behind each step (you may be assisted by a teacher who is strong in the content area)

   b. all teachers in the group work through the problem individually for 3–4 minutes

   c. the group then works through it together the problem, step by step

   d. highlight the most common errors made at each step (NTS 1c, 1e, 2c, 2e, 3e-3j).

Note

- *This part is not 'How do I teach this?' but how do I teach it for learners to understand?*
- *If the group still shares the same content gap, use the app: ask it to solve the problem step by step and explain the reasoning behind each step.*
- *Problems/ideas discussed should be sourced from the Teacher Manual content, not invented separately. This keeps the content exploration directly connected to what teachers will deliver.*

30 minutes **Enactment**

6. Enact a teaching activity based on your learning plan (NTS la-1b, 1e-lg, 2c, 2e, 2f, 3c-3j and 3o).

   a. Colleagues observe with specific attention to clarity of concept explanation, use of familiar Ghanaian examples and how misconceptions are handled if they arise.

   b. After the enactment, ask for structured feedback from the group

      i. was the concept explained in a way that a learner with no prior knowledge could follow?

      ii. were the examples grounded in contexts familiar to Ghanaian learners?

      iii. did any misconceptions surface and if so, how were they addressed?

5 minutes **Reflection**

7. Reflect and share your views on the session. One thing that worked well, what did not work well and what you will do differently. (NTS 1a, 1b).

8. Identify a critical friend to observe and provide feedback on your lesson in relation to the PLC Session conducted (NTS 1f, 1g).
9. Remember to
    a. transfer your chats into your learning planner template.
    b. read your Teacher Manual and related Learner Material in preparation for the next session. Take note of the recap weeks, which are linked to Years 1 and 2 (NTS 3a).
    c. integrate National Values, GESI, SEL, and 21st century skills into your learning activities, assessment tasks, and rubrics/mark schemes.

Section 7 Review

This section identified and discussed the major sources of waste in their communities and across Ghana, including household, industrial, agricultural, and electronic waste. They examined how improper waste disposal, such as open dumping, burning, and littering, leads to environmental degradation, water pollution, health hazards, and flooding. Learners further explored appropriate waste management methods, focusing on the 3Rs: Reduce, Reuse, and Recycle. They understood how reducing waste at the source, reusing materials, and recycling can minimise environmental harm and promote sustainable living. Through these activities, learners developed 21st-century skills such as critical thinking, civic literacy, and problem-solving, as they evaluated local waste challenges and proposed solutions. They also enhanced their digital literacy by researching and presenting data on waste management. Additionally, learners nurtured Social and Emotional Learning (SEL) skills, particularly social awareness, responsible decision-making, and collaboration, as they worked in groups and reflected on their roles in protecting the environment and promoting a cleaner community.

Other Resources

1. Access to a local community for a field visit to observe waste disposal sites
2. Multimedia resources (videos and pictures) showing the effects of waste mismanagement
3. A resource person (guest speaker) or a recorded video on waste management strategies

MARKING SCHEMES FOR THE KEY ASSESSMENTS

WEEK 16

Short Answer Questions

Q1

Marking Scheme

1 mark for each correctly classified item.

Total: 4 marks

Sample Answer

- Organic Waste: Leftover food scraps, grass clippings
- Recyclable Waste: Plastic water bottles, old newspapers

Q2

Marking Scheme

- Correctly identifies a typical rural source of waste with an example (e.g., agriculture). (2 marks)
- Correctly identifies a unique urban source of waste with an example (e.g., E-waste). (2 marks)

Total: 4 marks

Sample Answer

A major source of waste in a rural agricultural community is from agriculture itself, such as "crop residues like stalks and husks" and "animal waste from farms". In contrast, a major source of waste unique to a large urban centre like Accra is Electronic Waste (E-Waste). Ghana has one of the world's largest e-waste dumps at "Agbogbloshie in Accra", which receives discarded electronics from around the world.

Q3

Marking Scheme

- Provides a clear explanation of what E-Waste is. (2 marks)
- Correctly identifies Agbogbloshie as the specific location mentioned in the text. (2 marks)

Total: 4 marks

Sample Answer

Electronic Waste (E-Waste) is defined as "old or broken electronic devices like computers, phones, and televisions". This is a major issue in Ghana at the e-waste dump in "Agbogbloshie in Accra", which is noted as one of the largest in the world.

Q4

Marking Scheme

- Correctly identifies and describes the first type of mining waste (tailings). (2 marks)

- Correctly identifies and describes the second type of mining waste (slag). (2 marks)

Total: 4 marks

Sample Answer

Two distinct types of waste from Ghana's mining activities are:

a. Tailings: This is the "leftover rock after extracting minerals" from the ore.

b. Slag: This is the waste product that results "from metal processing" after the valuable minerals have been separated.

Q5

Marking Scheme

- Correctly identifies organic waste as a main type. (1 mark)
- Correctly identifies packaging waste as another main type. (1 mark)
- Explains that the high volume of daily commercial activity is what makes markets a significant source of waste. (2 marks)

Total: 4 marks

Sample Answer

Large marketplaces in Ghana generate two main types of waste: large amounts of "organic waste like rotten fruits and vegetables" and significant "packaging waste from goods sold, such as plastic bags and cardboard boxes". They are considered significant sources of waste because of the high volume of goods that are bought and sold every day, which naturally produces a large and continuous stream of both leftover products and discarded packaging.

Essay Question

Structure and Marks Allocation

a. **Introduction (2 marks)**

   i. Introduce the importance of waste management in schools and outline the 3Rs strategies.

b. **Body (15 marks total)**

   i. Recycle (5 marks)

   - Content: Definition, explanation, and benefits in a school context.
   - Examples: Specific recycling initiatives.

   ii. Reduce (5 marks)

   - Content: Definition, explanation, and benefits of reduction.
   - Examples: Practices like digitalisation or bulk purchasing.

   iii. Reuse (5 marks)

   - Content: Definition, explanation, and benefits of reusing materials.
   - Examples: Reuse initiatives like repurposing materials.

   iv. Comparison and Contrast (3 marks)

- Content: Analyse the effectiveness, advantages, and limitations of each strategy.

c. **Conclusion (2 marks)**

i. Content: Summarise the main points and reinforce the importance of the combined strategies.

WEEK 17

Short Answer Questions

Q1

Marking Scheme

- Identifies that improper disposal means waste, especially plastics, is thrown into drains and gutters. (2 marks)
- Explains that this waste "clogs gutters and drains", which blocks the flow of water. (2 marks)
- Concludes that during heavy rains, the blocked drainage systems cannot handle the water, leading to flash floods. (1 mark)

Total: 5 marks

Sample Answer

Improper waste disposal directly leads to flooding in urban areas because people discard rubbish, particularly plastic waste, into open drains and gutters. This waste accumulates and "clogs gutters and drains". When there are heavy rains, the blocked drainage systems prevent rainwater from flowing away freely. As a result, the water overflows its channels, causing "widespread flooding, which damages property" and displaces residents.

Q2

Marking Scheme

- Environmental Effect (2 marks): Correctly describes the effect as air pollution caused by the release of smoke and harmful gases.
- Health Effect (2 marks): Correctly describes a relevant health effect, such as respiratory problems (coughing, asthma) from inhaling the polluted air.

Total: 4 marks

Sample Answer

a. Environmental Effect: The open burning of waste causes air pollution. As stated in the text, it "releases smoke and toxic gases into the air, causing air pollution and reducing air quality".

b. Health Effect: A major health effect is the development of respiratory problems. Inhaling the smoke from burning materials, especially plastics, "can cause coughing, asthma, and other respiratory difficulties".

Q3

Marking Scheme

- Explains that burning e-waste releases hazardous chemicals into the environment. (2 marks)

- Identifies the specific health problems mentioned in the text, such as respiratory illnesses and skin conditions. (2 marks)

Total: 4 marks

Sample Answer

The health problems at the Agbogbloshie e-waste site are caused by the process of burning discarded electronic items to extract valuable metals. This process "releases hazardous chemicals into the air, soil, and nearby water bodies". People who work and live near the site are exposed to these toxic fumes, which result in serious health issues such as "respiratory illnesses, skin conditions, and other serious health concerns".

Q4

Marking Scheme

- Explains that waste dumped in gutters blocks water flow, creating stagnant pools. (2 marks)
- Explains that this stagnant, dirty water becomes a breeding ground for pests like mosquitoes and flies. (2 marks)
- Links the specific pests to the diseases they carry (e.g., mosquitoes spread malaria; flies can contaminate food and spread cholera). (1 mark)

Total: 5 marks

Sample Answer

When waste is dumped into gutters, it blocks them and causes water to become stagnant. This dirty, stagnant water is an ideal breeding ground for pests. Mosquitoes breed in stagnant water, and their population increases, leading to a higher risk of malaria. At the same time, the decomposing waste "attracts flies... and rodents which spread diseases such as... cholera, typhoid, and diarrhoea". The flies can land on the waste and then contaminate food, spreading cholera.

Q5

Marking Scheme

- Economic Effect 1 (2 marks): Describes the loss of tourism and investment revenue due to an unattractive and unsanitary environment.
- Economic Effect 2 (2 marks): Describes the increased financial burden on the government or local authorities, who must spend more money on cleanup, healthcare, and infrastructure repair.

Total: 4 marks

Sample Answer

Improper waste management negatively affects a community's economy in two distinct ways:

a. Loss of Tourism and Investment: A dirty and polluted environment is unattractive to visitors. This leads to a "loss of tourism and investment" as tourists and potential investors are discouraged from visiting or putting money into a community that appears unhygienic and poorly managed.

b. Increased Government Spending: It forces the government to spend more money on reactive measures. These costs include cleaning up illegally dumped waste, repairing infrastructure damaged by floods (caused by clogged drains), and covering the increased healthcare costs for treating "pollution-related illnesses".

Essay Question

Mark Scheme

Note that reference should be made to both local and national examples

1. Introduction to the Problem (4 Marks)

- **Definition of improper waste management** – Explanation of waste disposal issues locally and in Ghana. (1 mark)
- **Contextual background** – Overview of local and Ghana's waste management challenges, including urbanisation and population growth. (1 mark)
- **Significance of the issue** – Why waste management is crucial for environmental and public health. (1 mark)
- **Clarity of objective** – Clear statement to support the critical evaluation approach. (1 mark)

2. Evaluating the Effects (10 Marks)

- **Environmental Impact (3 Marks)**
  - Pollution of water bodies due to illegal dumping. (1 mark)
  - Air pollution from burning waste contributes to climate change. (1 mark)
  - Land degradation affecting agriculture and biodiversity. (1 mark)
- **Health Consequences (3 Marks)**
  - Spread of diseases such as cholera and respiratory infections. (1 mark)
  - Contamination of drinking water sources. (1 mark)
  - Increased healthcare costs due to waste-related illnesses. (1 mark)
- **Economic and Social Effects (4 Marks)**
  - Loss of tourism appeal due to poor sanitation. (1 mark)
  - Strain on government resources for waste management. (1 mark)
  - Impact on livelihoods, especially for informal waste collectors. (1 mark)
  - Public dissatisfaction and protests over waste mismanagement. (1 mark)

3. Conclusion: What Can Be Done? (6 Marks)

- **Policy Recommendations (2 Marks)**
  - Strengthening waste management regulations and enforcement. (1 mark)
  - Investing in waste collection and recycling infrastructure. (1 mark)
- **Community Engagement (2 Marks)**
  - Public awareness campaigns on responsible waste disposal. (1 mark)
  - Encouraging local participation in waste management initiatives. (1 mark)
- **Sustainable Solutions (2 Marks)**
  - Promoting circular economy practices such as composting and recycling. (1 mark)
  - Developing innovative waste-to-energy projects. (1 mark)

WEEK 18

Short Answers

Mark Scheme for Answer Questions

2-Marks Questions (Conceptual Understanding **DoK 2**)

- 1 mark: Basic definition or example relevant to waste management.
- 2 marks: Clear, well-explained definitions or multiple relevant examples.

3-Mark Questions (Strategic Reasoning **DoK 3**)

- 1 mark: Basic identification of challenges or benefits.
- 2 marks: Explanation of factors with some reasoning.
- 3 marks: Comprehensive reasoning with supporting examples or implications.

4-Mark Question (Extended Critical Thinking and Reasoning **DoK 4**)

- 1 mark: Basic response addressing reduction in waste.
- 2 marks: Explanation of the advantages of waste reduction in the 3Rs framework.
- 3 marks: Consideration of broader implications or strategic alignment with Ghana's waste policies.
- 4 marks: Well-structured argument incorporating long-term strategies, environmental impact, and socio-economic factors.

Essay Question

Mark Scheme

Introduction (4 Marks)

- Clear definition of waste management. (1 mark)
- Overview of waste challenges in Ghana. (1 mark)
- Explanation of the Three Rs as a solution. (1 mark)
- Clear statement outlining the essay focus. (1 mark)

Body (12 Marks)

- **Waste Management Issues (4 Marks)**
  - Identifies key problems (pollution, health risks, urban waste). (2 marks)
  - Uses examples to support the discussion. (2 marks)
- **Solutions & Critical Thinking (8 Marks)**
  - Explains the role of the Three Rs in addressing waste. (3 marks)
  - Evaluates sustainable strategies (policy, infrastructure, education). (3 marks)
  - Draws on global examples for comparison. (2 marks)

Conclusion (4 Marks)

- Summarises key arguments. (2 marks)
- Reinforces the importance of sustainable waste management. (1 mark)
- Provides a strong closing statement or call to action. (1 mark)

SECTION 8: DESERT ENCROACHMENT AND LANDSLIDES

STRAND: HUMAN AND ENVIRONMENT

Sub-Strand: Environmental Hazards and their Management

Learning Outcome: *Evaluate the management strategies for desert encroachment and landslides.*

Content Standard: *Demonstrate knowledge and skills for preventing or mitigating desert encroachment and landslides*

INTRODUCTION AND SECTION SUMMARY

In this section, learners will explore key environmental challenges: desert encroachment and landslides and examine effective ways to manage and mitigate their impacts. They will understand the causes and consequences of desert encroachment, particularly in the northern parts of Ghana, and identify practical methods such as afforestation, sustainable land use practices, and community awareness initiatives to combat it. Learners will also examine the triggers of landslides, including human activities and natural factors, and evaluate measures for their prevention and mitigation, such as proper land use planning, slope stabilisation, and vegetation cover. Through this section, learners will develop an understanding of the relationship between human actions and environmental hazards. They will also acquire problem-solving and decision-making skills, enabling them to propose and advocate for sustainable environmental management practices within their communities.

The weeks and the indicators covered by the section are:

Week 19: Examine ways of managing desert encroachment

Week 20: Examine measures for the prevention/mitigation of landslides

The section on "Desert Encroachment and Landslides" in Year 3 builds upon the foundational knowledge from Year 1 and Year 2 within the "Human and Environment" strand, specifically under the sub-strand "Environmental Hazards and Their Management." In Year 1, students are introduced to the concept of environmental hazards and disasters in Ghana, including examining various threats like floods, droughts, and other natural hazards, emphasising the causes, impacts, and mitigation strategies (1.3.4.LO.1). This foundational understanding is expanded in Year 2 where learners evaluate measures for controlling or mitigating floods, droughts, earthquakes, and fires (2.3.4.LO.1). The Year 3 curriculum continues this progression by evaluating management strategies for desert encroachment and landslides (3.3.4.LO.1), focusing on prevention and mitigation.

SUMMARY OF Pedagogical Exemplars

This section applies **Talk for Learning** and **Collaborative Learning** strategies in GESI-responsive, culturally inclusive settings to address environmental hazards such as desert encroachment and landslides. Learners engage in interactive discussions to explore the meaning, causes, and effects of desert encroachment, drawing from diverse cultural experiences and knowledge. Follow-up collaborative group work encourages learners to analyse and suggest practical ways to minimise desert encroachment, enhancing critical thinking and cooperative problem-solving. Similarly, through small group discussions supported by videos and pictures, learners investigate the causes and effects of landslides, making abstract concepts more relatable and visually engaging. These methods promote deeper understanding, peer learning, and inclusive participation, especially among learners from different backgrounds and abilities. By encouraging active communication and teamwork, the exemplars help learners build confidence, improve analytical skills, and apply knowledge to real-life environmental issues, thereby enhancing learning outcomes and environmental awareness.

ASSESSMENT SUMMARY

Indicators	DOK Level	Assessment Strategy and/or Mode
Week 19 1. Examine ways of managing desert encroachment	4	• 3 short answer questions with marking scheme • 2 essay questions in the form of analysis and evaluation questions with a marking scheme
Week 20 1. Examine measures for the prevention/mitigation of landslides	4	• 3 short answer questions with marking scheme • I essay question in the form of a case study with a marking scheme

Y3 RECAP: Desert Encroachment and Landslides	
YEAR/TOPIC	**Activities/Tasks – can be in groups or pairs or individual**
Year 1: Hazards and Disasters	1. Visit a nearby area in your locality that is prone to hazards and produce a disaster map. 2. Map areas prone to environmental disasters (e.g., earthquakes or tremors, landslides, floods and drought) in your community or Ghana.
Year 2: Floods in Ghana	1. Brainstorm on the definition of flood. 2. Discuss the causes of floods in communities/districts/Ghana. 3. Identify low-lying areas or water channels within the community. 4. Map areas that are prone to floods in your community, district or region using printed or digital maps.
Year 2: Drought and Fires in Ghana	1. Brainstorm on the definition of drought and fires. 2. Discuss the causes of drought and fires in Ghana. 3. Explore methods to mitigate droughts and fire outbreaks in our communities and Ghana.

WEEK 19

Learning Indicator: *Examine ways of managing desert encroachment*

Focal Area: Desert Encroachment in Ghana

Introduction

Desert encroachment refers to the gradual spread of desert-like conditions into areas that were previously fertile and productive. It is sometimes used interchangeably with desertification and often occurs in drylands due to both natural factors and human activities.

Areas in Ghana Susceptible to Desert Encroachment

In Ghana, desert encroachment is a growing concern, particularly in the northern regions, which lie within the savanna ecological zone. These regions are characterised by semi-arid conditions, making them more susceptible to desertification if land management practices are not improved. Areas most susceptible include:

1. **Upper East Region:** Districts like Bawku, Bolgatanga, and Garu experience low rainfall, high temperatures, and overgrazing, making them prone to desertification.
2. **Upper West Region:** Areas such as Wa and Lawra face similar challenges due to sparse vegetation and unsustainable land use.
3. **Northern Region:** Regions like Tamale and Yendi are at risk due to deforestation and intensive farming practices.
4. **Parts of the Savannah Region:** Areas with sandy soils and low vegetation cover are increasingly vulnerable.

Causes of Desert Encroachment
Natural Causes

1. **Prolonged drought:** Lack of rainfall over several years leads to dry soil and dying vegetation.
2. **Climate change:** Rising temperatures and reduced rainfall patterns affect soil and water availability.

Human Activities

1. **Deforestation**: Cutting down trees for firewood, charcoal, and farming exposes the soil to erosion.
2. **Overgrazing**: Too many animals feed on the same land, leading to the destruction of vegetation cover.
3. **Bush burning:** Frequent burning of grasslands and farms destroys the soil structure and organic matter.
4. **Poor farming practices:** Continuous farming without soil conservation depletes nutrients and causes land degradation.

Effects of Desert Encroachment
Environmental Effects

1. Loss of biodiversity due to the destruction of habitats for plants and animals.
2. Increased soil erosion and reduced soil fertility.
3. Disruption of water cycles, leading to reduced water availability.

Social Effects

1. Displacement of communities as fertile land becomes unproductive, forcing people to migrate.
2. Food insecurity due to reduced agricultural yields.

Economic Effects

1. Decline in agricultural productivity, affecting livelihoods and food supply.
2. Increased costs for rehabilitation of degraded land and provision of relief to affected communities.

Prevention and Management of Desert Encroachment

Preventing desert encroachment involves both environmental conservation and community action. Below are key strategies used in Ghana and around the world:

1. **Afforestation and Reforestation:** One of the most effective ways to combat desert encroachment is through afforestation (planting trees in areas where there were none before) and reforestation (replanting trees in areas where vegetation has been lost). Trees play a critical role in maintaining the health of the soil by shielding it from wind and water erosion, improving its ability to absorb and retain rainfall, and enhancing the microclimate. In Ghana, initiatives such as the Green Ghana Project have been introduced to encourage individuals, schools, and communities to plant trees and restore degraded lands. This not only supports ecological recovery but also helps stabilise the environment and prevent further land degradation.
2. **Sustainable Farming Practices:** Unsustainable agricultural methods contribute significantly to desertification. By adopting sustainable farming techniques, such as crop rotation (changing the types of crops grown on the same land in different seasons) and mixed cropping (growing two or more crops simultaneously), farmers can preserve soil fertility and reduce the likelihood of land exhaustion. Additionally, conservation methods like contour ploughing (ploughing along the natural contours of the land), terracing (creating stepped levels on sloped land), and mulching (covering the soil with organic matter) help minimise soil erosion, conserve moisture, and increase agricultural productivity. These practices are essential for maintaining the land's resilience in dry regions.
3. **Controlled Grazing:** Overgrazing by livestock leads to the destruction of vegetation cover, leaving the soil exposed to erosion. Implementing controlled or rotational grazing systems allows grasslands to regenerate by giving areas of pasture rest periods before they are grazed again. This improves plant growth and soil stability. Additionally, measures such as fencing and designated grazing zones help regulate the number of animals on a piece of land, preventing overuse. Effective pasture management ensures that land remains productive and less vulnerable to desertification.
4. **Alternative Energy Sources:** Many communities in arid and semi-arid regions depend on firewood and charcoal for cooking and heating. This overdependence leads to deforestation, which accelerates land degradation. To prevent this, the promotion of alternative and cleaner energy sources, such as

improved cookstoves, solar energy systems, and Liquefied Petroleum Gas (LPG), is encouraged. These energy alternatives are more sustainable and environmentally friendly, helping to reduce the demand for fuelwood and preserve existing forests.

5. **Public Education and Community Involvement:** Creating awareness about desertification and its negative impacts is vital in changing attitudes and behaviours that contribute to land degradation. Educating the public, especially farmers, herders, and youth, on the importance of environmental stewardship can lead to more responsible land use practices. Furthermore, involving communities in desertification control activities, such as tree planting, land restoration, and monitoring, empowers them to take ownership of their local environments. Community-led efforts ensure that solutions are culturally appropriate, sustainable, and more likely to be successful over time.

Learning Tasks

"When the Land Changes: Talking About Desert Encroachment"

1. **Whole-Class Activation – What Do We Know?**
   a. The teacher begins with a class discussion using guided questions and visual aids (photos of desertification in Ghana, before-and-after land images, satellite imagery that spans 5-10 years or more):
      i. *What do you think "desert encroachment" means?*
      ii. *Have you or someone you know seen dry land, cracked soil, dying crops, or tree loss?*
      iii. *Where in Ghana is this most common?*

      Learners from drier zones are encouraged to share personal or family experiences. Those from forest zones are asked to compare.



***Support**: Learners with low confidence can contribute via drawings or short written cards.*

2. **Pyramid Talk Structure (Think-Pair-Group-Share)**
   a. Individual Thinking: Each learner reflects and writes, draws, or records:
      i. The meaning of desert encroachment
      ii. At least two causes
      iii. One effect they've seen or heard about
   b. Pair Discussion: In pairs, learners compare their thoughts and:
      i. Add new ideas to each other's list
      ii. Discuss: "Which causes are more human-induced or natural?"
   c. Small Group Discussion: In groups of 4–5:
      i. Share all the causes and effects
      ii. Identify which effects are most dangerous and which groups suffer most (e.g., farmers, women, herders)
      iii. Decide three causes and three effects that they all agree on

3. **Mind Map or Visual Summary**
    a. Each group creates a simple visual map or infographic on:
        i. Centre: "Desert Encroachment in Ghana"
        ii. Branches:
            - Meaning
            - Causes (use icons or drawings)
            - 3 Effects (with real examples)



Support: *Use symbol cards or templates for learners with writing challenges. Artistic learners may illustrate, while others explain.*

4. **Gallery Walk and Cultural Exchange**
    a. Groups display their mind maps on walls or tables.
    b. Learners rotate and view each group's ideas.
    c. Each visitor adds a sticky note with:
        i. "🌟 New idea I learned"
        ii. "❓ I have a question about…"
        iii. "👍 I agree with…"

    After the walk, groups reflect:
        i. *"What did other groups add that we didn't think of?"*
        ii. *"How do our local experiences shape our understanding of this problem?"*

5. **Whole-Class Reflection**
    a. In an open circle, the teacher leads a reflection:
        i. *"Why is it important to hear from students in different parts of Ghana?"*
        ii. *"What can we do as young people to stop land degradation?"*
        iii. *"Whose responsibility is it – the government, the community, or us?"*



Learners with speech challenges can contribute through drawings, written notes, or peer readers.

"Fighting Back the Sands: Our Plan to Stop Desert Encroachment"

1. **Activate Thinking**
    a. Begin with a brief review:
        i. What is desert encroachment?
        ii. What are its causes and effects in Ghana?
    b. Teacher introduces key question:

    "How can we, as a community or nation, prevent or reduce desert encroachment?"

    c. Provide prompt cards or slides with solution ideas such as:

i. Tree planting
ii. Controlled grazing
iii. Water harvesting techniques
iv. Public education campaigns
v. Anti-bush burning bylaws
vi. Use of drought-resistant crops

2. **Group Brainstorm & Solution Mapping**
   a. Each group discusses:
      i. *Which of these solutions are practical for our community or region?*
      ii. *What are the advantages and limitations of each?*
      iii. *Who needs to be involved (e.g. government, farmers, schools)?*
   b. Groups then:
      i. Choose 3–4 key strategies
      ii. Map them under "What – Why – How – Who":
         - What is the solution? (e.g., tree planting)
         - Why is it helpful? (e.g., protects soil)
         - How can it be done? (e.g., school/community campaign)
         - Who is responsible? (e.g., students, chiefs, assembly)


Provide scaffold templates or sentence frames for support.

3. **Create a Group Product – "Our Anti-Desert Plan"**
   a. Each group chooses a format that suits its members' strengths to present their solutions:

Format	What It Involves
Poster or Mind Map	Visual diagram with solution branches
Radio Script	Write and perform a short radio PSA about desert control
Skit or Role-Play	Act out the solution (e.g., the chief encouraging tree planting)
Action Map	Draw a regional map showing at-risk areas and proposed actions
Action Plan Report	Simple 1-page group proposal with bullet points and visuals

Provide printed icons, drawing tools, or assistive tech to include learners with low literacy or mobility.

4. **Presentation and Peer Feedback**
   a. Each group presents its "Anti-Desert Plan" to the class.
   b. Audience peers give structured feedback:

i. "👍 We liked your idea about…"

ii. "❓ One question we have is…"

iii. "🌱 This could help our town by…"

Learners with speech anxiety can present in pairs, use cue cards, or pre-record their message.

5. **Individual Reflection (Differentiated)**

   a. Each learner completes one of the following:

      i. Write a short paragraph: "Which strategy do I think is most important, and why?"

      ii. Draw a before-and-after sketch of a community affected by desert encroachment.

      iii. Record a voice note explaining one solution and who should lead it.

      iv. Create a slogan or campaign hashtag (e.g., GreenNorthGhana)

Pedagogical Exemplars

Talk for Learning

In an interactive, GESI and different cultural background class discussion, explain the meaning, causes and effects of desert encroachment.

1. Create a safe, respectful, and inclusive classroom environment that encourages all learners to share ideas confidently.
2. Use simple language, visuals, and real-life examples to explain desert encroachment, catering to different intellectual abilities.
3. Organise learners into small, mixed-ability, GESI-responsive groups to ensure inclusive participation and diverse perspectives.
4. Use open-ended and guiding questions to stimulate thinking and encourage contributions from all learners.
5. Allow learners to express themselves in local languages or code-switch when needed for clarity and inclusion.
6. Provide sentence starters and key vocabulary to support learners with lower literacy or language challenges.
7. Encourage active listening, turn-taking, and respectful dialogue to build empathy and social skills.
8. Use storytelling or cultural references familiar to learners to explain the causes and effects of desert encroachment.
9. Offer positive reinforcement and emotional support to build learners' confidence and engagement.
10. Facilitate peer feedback and collaborative thinking to deepen understanding and promote SEL.

Collaborative learning

In the same task group, explain ways in which desert encroachment can be minimised.

1. Provide guiding questions and prompts to help structure group discussions on ways to minimise desert encroachment.
2. Use visual aids (e.g., charts, diagrams, videos) to support learners with varied intellectual and literacy levels.
3. Encourage the use of culturally relevant examples and local knowledge to make the discussion relatable.
4. Offer sentence starters, vocabulary lists, and concept maps to support learners with language or cognitive difficulties.
5. Promote respectful turn-taking and active listening to develop empathy and inclusive group interaction.
6. Allow multiple ways for groups to share their solutions (oral presentation, poster, role-play, or digital format).
7. Monitor group dynamics and provide encouragement, scaffolding, and conflict resolution support as needed.
8. Celebrate all group efforts and highlight cooperation, creativity, and respectful communication to strengthen SEL.

Key Assessment Level 4: Short Answer Questions & Essay

Short Answer Questions

1. Explain how the human activities of **deforestation** and **overgrazing** each contribute to the process of desert encroachment in Ghana's northern regions.
2. Analyse two potential knock-on effects that a "decline in agricultural productivity" due to desert encroachment would have on a community in the Upper West Region, one being social and the other economic.
3. Compare the management strategies of "Afforestation" and "Sustainable Farming Practices" (like contour ploughing). Explain one way they are similar in their ultimate goal and one key difference in their approach.

Essay Question (DoK 4)

1. Evaluate the effectiveness of different strategies used to manage desert encroachment in Ghana. In your evaluation, consider both environmental and socio-economic impacts of these strategies, and provide recommendations for improvement.

   [Total 20 marks] **(DoK 4)**

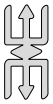
2. Analyse the interplay between natural and human-induced factors contributing to desert encroachment in Ghana. Discuss how these factors exacerbate the problem and propose integrated solutions.

   [Total 20 marks] **(DoK 4)**

PLC Session 19

45 minutes **Planning & Reviewing the Learning Plan**

1. Begin the session by recapping lessons from the previous year/session/week, focusing on how learning was applied.
2. Use your subject specific app to explore the content before planning. Ask the app to
   a. explain the week's concepts in a practical way that will make it easier for learners to understand
   b. identify two or three common misconceptions learners may have on the week's content and how to address them using contexts familiar to Ghanaian learners. (NTS 3a, 3g and 3m).
3. Use your subject specific app to plan your lesson. Ask the app to
   a. suggest the most effective method for teaching the week's concepts to learners with diverse backgrounds.
   b. suggest learning activities, differentiation and essential questions based on the method of teaching (NTS 3a-3q)
   c. review your prepared learning plan and address any challenging issues you may have identified in your subject area (NTS 3a-3c).



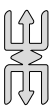
Note

- *Take note of the recap topics linked to Years 1 and 2 while preparing for your lesson.*
- *Refer to the Values Learning Community Handbook and link the values for the week in your lesson to ensure that learners are applying what they learn.*

4. Plan the week's key assessment with your app
   a. The key assessment for the week is ***short answer questions and essay***. Chat with your app to plan this assessment, indicating what you and your learners will do before, during and after the short answer questions and essay (NTS 3k-3q).

10 minutes **Content Exploration**

5. As a subject group, select one problem or idea/term in the week's content that is challenging (not a routine procedural question, but one that requires conceptual understanding) and then
   a. use the app, ask it to solve the problem step by step and explain the reasoning behind each step (you may be assisted by a teacher who is strong in the content area)
   b. all teachers in the group work through a similar problem individually for 3–4 minutes
   c. the group then works through the problem together step by step
   d. highlight the most common errors made at each step and discuss (NTS 1c, 1e, 2c, 2e, 3e-3j).



Note

- *This part is not just about 'How do I teach this?' but how do I teach it for learners to understand?*
- *If the group still shares the same content gap, use the app: ask it to solve the problem step by step and explain the reasoning behind each step.*

- *Problems/ideas discussed should be sourced from the Teacher Manual content, not invented separately. This keeps the content exploration directly connected to what teachers will deliver.*

30 minutes	Enactment

6. Enact a teaching activity based on your learning plan (NTS la-1b, 1e-lg, 2c, 2e, 2f, 3c-3j and 3o).
   a. Colleagues observe with specific attention to clarity of concept explanation, use of familiar Ghanaian examples and how misconceptions are handled if they arise.
   b. After the enactment, ask for structured feedback from the group
      i. was the concept explained in a way that a learner with no prior knowledge could follow?
      ii. were the examples grounded in contexts familiar to Ghanaian learners?
      iii. did any misconceptions surface and if so, how were they addressed?

5 minutes	Reflection

7. Reflect and share your views on the session. One thing that worked well, what did not work well and what you will do differently. (NTS 1a, 1b).
8. Identify a critical friend to observe and provide feedback on your lesson in relation to the PLC Session conducted (NTS 1f, 1g).
9. Remember to
   a. transfer your chats into your learning planner template.
   b. read your Teacher Manual and related Learner Material in preparation for the next session. Take note of the recap weeks, which are linked to Years 1 and 2 (NTS 3a).
   c. integrate National Values, GESI, SEL, and 21st century skills into your learning activities, assessment tasks, and rubrics/mark schemes.

WEEK 20

Learning Indicator: *Examine measures for the prevention/mitigation of landslides*

Focal Area: Landslides in Ghana and Their Prevention

Introduction

A landslide is the rapid downward movement of a mass of soil, rocks, and debris along a slope under the influence of gravity. Landslides occur when a slope's stability is compromised—either by natural processes (such as heavy rainfall or earthquakes) or by human activities (such as deforestation or unplanned construction). Depending on local conditions, a landslide may involve surface soil alone, or it may cut deeply into bedrock.

Areas in Ghana Likely Susceptible

Although Ghana does not experience landslides as frequently as some other countries, there are particular zones where the combination of steep terrain, heavy precipitation, and human interference increases susceptibility:

1. **Akwapim-Togo Ranges**
    a. Steep, undulating hills rising to over 1,000 metres above sea level.
    b. High rainfall during the wet seasons (April–July; September–October) can saturate soils.
2. **Kwahu Plateau and Escarpments**
    a. Elevated terrain with several escarpment faces (up to 500 metres above adjoining lowlands).
    b. Significant agricultural clearing on slopes exposes soil to erosion.
3. **Hilly Zones Around Kumasi**
    a. Pockets of steep slopes surrounding urban and peri-urban areas.
    b. Intense construction and road-cutting disturb natural slope profiles.
4. **Western North Region (Forest-Savannah Transition Zones)**
    a. Areas where selective logging and mining release topsoil, weakening slopes.
    b. Seasonal rainfall patterns (April–July; September–October) can trigger slides.

Causes of Landslides

Landslides are triggered by several natural and human-induced factors:

Natural Causes

1. **Heavy Rainfall:** Saturates the soil, reducing its stability and increasing the likelihood of landslides. For instance, the recent Accra event was linked to heavy rains
2. **Earthquakes:** Can shake loose soil and rock, particularly in areas with unstable geological formations, though less common in Ghana.

3. **Erosion:** Removes supportive material from slopes, making them more prone to failure, especially in hilly areas like Aburi.

Human Causes

1. **Deforestation**: Removes vegetation that holds soil in place, exposing slopes to erosion. This is a significant issue in Ghana, contributing to increased landslide vulnerability.
2. **Construction on Steep Slopes**: Alters natural drainage patterns and destabilises the land, as seen in areas like Weija-Kasoa with rapid urbanisation.
3. **Poor Land Management**: Includes unsustainable farming practices, mining activities, and inadequate drainage systems, all of which exacerbate slope instability.

Effects of Landslides

The impacts of landslides in Ghana are profound, affecting the environment, society, and economy:

Environmental Effects

1. Destruction of vegetation and habitats, leading to loss of biodiversity, as seen in areas affected by deforestation and landslides.
2. Alteration of water courses, with increased sedimentation in rivers and streams, impacting water quality and ecosystems.

Social Effects

1. Loss of life and injury due to the sudden movement of earth and debris, as evidenced by the four deaths in Accra in May 2025
2. Displacement of communities, with over 3,000 displaced in Accra, disrupting lives and livelihoods.
3. Damage to homes and infrastructure, such as roads and bridges, isolating communities and hindering access to services.

Economic Effects

1. Damage to agricultural land and crops, affecting food security and the livelihoods of farmers, particularly in rural areas like Twifo-Mampong.
2. High costs for rehabilitation, relief efforts, and rebuilding, straining government resources and local economies.
3. Disruption of transportation and commerce due to damaged infrastructure, impacting economic activities.

Prevention and Mitigation Strategies

Preventing and mitigating landslides in Ghana requires a multifaceted approach, addressing both natural and human-induced causes. The following strategies are recommended:

1. **Afforestation and Reforestation:** Planting trees and restoring forests help stabilise soil and prevent erosion by acting as natural barriers and holding soil with their roots. This helps reduce the speed of water flow, decreasing the likelihood of soil saturation and slope failure.

2. **Proper Drainage Systems**: Installing effective drainage systems to manage surface water and prevent soil saturation, particularly in urban areas like Accra and Weija-Kasoa. This reduces the risk of landslides by ensuring excess water is channelled away from vulnerable slopes.
3. **Terracing on Steep Slopes:** Creating terraces on steep slopes to reduce the gradient and stabilise the land, making it suitable for agriculture and less prone to landslides. This strategy enhances land use while reducing the risk of slope failure, especially in hilly regions like Aburi.
4. **Restricting Construction in Vulnerable Areas:** Avoiding building structures on steep or unstable slopes, enforcing land-use policies to protect high-risk areas. This prevents human settlements from being directly in the path of potential landslides, reducing loss of life and property.
5. **Early Warning Systems:** Implementing systems to monitor conditions like rainfall intensity and ground movement, providing advance notice for evacuation. This will enhance preparedness, allowing communities to take protective measures before landslides occur.
6. **Community Education and Awareness**: Educating local communities about landslide risks and response strategies, empowering them to take preventive actions. This reduces the impact of landslides by fostering community resilience and awareness, particularly in rural areas.
7. **Government Policies and Regulations**: Enforcing laws to protect vulnerable areas, promoting sustainable land use, and supporting research on geo-hazards, as mandated by the Ghana Geological Survey Authority. This ensures long-term protection of the environment and public safety through policy and regulatory frameworks.

Learning Tasks

"When the Ground Moves: Talking About Landslides"

1. **Multimedia Exploration (Class-Wide Viewing)**
   a. The teacher shows 2–3 short video clips or pictures illustrating:
      i. Landslides in Ghana (e.g. Akwatia, Ahafo Region, hilly mining zones)
      ii. Landslides globally (e.g. Brazil, Sierra Leone, Nepal)
      iii. Before-and-after images, community impacts, and emergency responses



***Accessibility tip**: Use audio descriptions for visuals and pause videos for learners with cognitive or hearing needs.*

2. **Small Group Discussion – "What Did We See and Learn?"**
   a. Using guided prompt cards or a graphic organiser, groups discuss and document:

   A. Meaning

   i. *What is a landslide?*
   ii. *How does it happen? What did the pictures show?*

   B. Causes

   i. *What natural factors cause landslides? (e.g., heavy rainfall, earthquakes, slope angle)*
   ii. *What human activities make them worse? (e.g., mining, deforestation, poor construction)*

C. Effects

iii. *How are people and the environment affected? (e.g., loss of life, destruction of homes, blocked roads, school closure)*



Provide sentence frames and visual aids to support learners with low literacy:

- *"A landslide is when…"*
- *"It is caused by…"*
- *"One effect we noticed was…"*

3. **Create a Group Summary Product**

a. Each group chooses a format that fits their members' strengths to summarise their understanding:

Format	Description
Mind Map or Infographic	Central concept with branches for meaning, causes, effects (with drawings/icons)
Role-Play or Skit	Act out a landslide and its effects in a community
Mini-News Report	Present a breaking news report from a landslide-affected area
Cause-Effect Domino Chain	Visual model using flashcards to connect causes → landslide → effects



Support learners with disabilities using large print, tactile materials, or assistive technology.

4. **Presentation and Peer Exchange**

a. Each group presents their summary to the class.

b. Peer groups respond using a feedback frame:

i. *"One thing we learned…"*

ii. *"One thing we'd like to know more about…"*



Learners with speech difficulties may use cue cards, pre-recorded responses or pair with a confident peer for support

5. **Individual Reflection**

a. Each learner responds to the prompt:

"If a landslide happened in my area, how would it affect us, and what could we do to stay safe?"



Support options:

- *Write a short paragraph*
- *Draw a scene*
- *Record an oral message*
- *Create a safety poster*

Pedagogical Exemplar

Talk for Learning

Using videos/pictures and other sources, discuss the meaning, causes and effects of landslides in small groups.

1. Select age-appropriate and culturally relevant videos/pictures that explain landslides clearly to support varied learning needs.
2. Use visuals with subtitles or voice-overs to aid understanding for learners with hearing or reading difficulties.
3. Pre-teach key vocabulary and concepts before the discussion to scaffold learners with lower literacy levels.
4. Organise learners into small, GESI-responsive and mixed-ability groups to ensure inclusive and balanced participation.
5. Provide guiding questions and discussion prompts to help structure conversations and support critical thinking.
6. Allow learners to express ideas in multiple ways (speaking, drawing, or using gestures) to cater to different communication styles.
7. Encourage respectful dialogue, turn-taking, and empathy during discussions to support SEL.
8. Support learners with cognitive challenges by assigning peer buddies or offering extra clarification as needed.
9. Check in with each group to offer encouragement, clarify misunderstandings, and boost confidence.
10. Celebrate all contributions, reinforcing that each learner's voice matters in understanding the causes and effects of landslides.

Key Assessment Level 4: Short Answer Questions and Essay

Short Answer Questions

1. Explain how the human activities of **construction on steep slopes** and **deforestation** each increase the risk of landslides in Ghana.
2. The Akwapim-Togo Ranges are identified as being susceptible to landslides due to steep terrain and high rainfall. Propose two different prevention strategies from the text that would be particularly effective in this region and explain *why* each is suitable for these specific conditions.
3. Describe one major social effect and one major economic effect of a landslide on a community in Ghana, using information from the text.

Essay Question (DoK 4)

1. Ghana, though not frequently experiencing landslides, does face a significant risk in certain regions due to a combination of natural factors and human activities. Drawing on your understanding of landslides and their prevention strategies, conduct an in-depth analysis of a hypothetical scenario in the Akwapim-Togo Ranges, an area susceptible to landslides due to its steep terrain and high rainfall. [Total 20 marks]

   Teachers should provide the following guidelines:

   a. Identify and analyse the primary natural factors and human-induced causes that could lead to a landslide in this region. (5 marks)

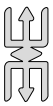
b. Evaluate the potential environmental, social, and economic impacts of a landslide occurring in this area. (5 marks)

c. Develop a comprehensive mitigation and prevention plan tailored to the specific conditions of the Akwapim-Togo Ranges. Your plan should include strategies for afforestation, proper drainage systems, and community education, among others. Explain how each strategy would effectively reduce the risk of landslides. (10 marks)

PLC Session 20

45 minutes | **Planning & Reviewing the Learning Plan**

1. Begin the session by recapping lessons from the previous year/session/week, focusing on how learning was applied.
2. Use your subject specific app to explore the content before planning. Ask the app to
   a. explain the week's concepts in a practical way that will make it easier for learners to understand
   b. identify two or three common misconceptions learners may have on the week's content and how to address them using contexts familiar to Ghanaian learners. (NTS 3a, 3g and 3m).
3. Use your subject specific app to plan your lesson. Ask the app to
   a. suggest the most effective method for teaching the week's concepts to learners with diverse backgrounds.
   b. suggest learning activities, differentiation and essential questions based on the method of teaching (NTS 3a-3q)
   c. review your prepared learning plan and address any challenging issues you may have identified in your subject area (NTS 3a-3c).



Note

- *Take note of the recap topics linked to Years 1 and 2 while preparing for your lesson.*
- *Refer to the Values Learning Community Handbook and link the values for the week in your lesson to ensure that learners are applying what they learn.*

4. Plan the week's key assessment with your app
   a. The key assessment for the week is ***short answer questions and essay***. Chat with your app to plan this assessment, indicating what you and your learners will do before, during and after the short answer questions and essay (NTS 3k-3q).

10 minutes | **Content Exploration**

5. As a subject group, select one problem or idea/term in the week's content that is challenging (not a routine procedural question, but one that requires conceptual understanding) and then
   a. use the app, ask it to solve the problem step by step and explain the reasoning behind each step (you may be assisted by a teacher who is strong in the content area)
   b. all teachers in the group work through a similar problem individually for 3–4 minutes
   c. the group then works through the problem together step by step
   d. highlight the most common errors made at each step and discuss (NTS 1c, 1e, 2c, 2e, 3e-3j).

Note

- *This part is not just about 'How do I teach this?' but how do I teach it for learners to understand?*
- *If the group still shares the same content gap, use the app: ask it to solve the problem step by step and explain the reasoning behind each step.*
- *Problems/ideas discussed should be sourced from the Teacher Manual content, not invented separately. This keeps the content exploration directly connected to what teachers will deliver.*

30 minutes **Enactment**

6. Enact a teaching activity based on your learning plan (NTS la-1b, 1e-lg, 2c, 2e, 2f, 3c-3j and 3o).
   a. Colleagues observe with specific attention to clarity of concept explanation, use of familiar Ghanaian examples and how misconceptions are handled if they arise.
   b. After the enactment, ask for structured feedback from the group
      i. was the concept explained in a way that a learner with no prior knowledge could follow?
      ii. were the examples grounded in contexts familiar to Ghanaian learners?
      iii. did any misconceptions surface and if so, how were they addressed?

5 minutes **Reflection**

7. Reflect and share your views on the session. One thing that worked well, what did not work well and what you will do differently. (NTS 1a, 1b).
8. Identify a critical friend to observe and provide feedback on your lesson in relation to the PLC Session conducted (NTS 1f, 1g).
9. Remember to
   a. transfer your chats into your learning planner template.
   b. read your Teacher Manual and related Learner Material in preparation for the next session. Take note of the recap weeks, which are linked to Years 1 and 2 (NTS 3a).
   c. integrate National Values, GESI, SEL, and 21st century skills into your learning activities, assessment tasks, and rubrics/mark schemes.

Section 8 Review

This section examined effective ways of managing desert encroachment, such as afforestation, sustainable land use, and water conservation techniques. They also explored measures for preventing and mitigating landslides, including proper land use planning, terracing, and early warning systems. These lessons deepened their understanding of environmental management and resilience strategies. Learners developed 21st-century skills such as critical thinking, problem-solving, and environmental literacy. Through group discussions and collaborative tasks, they also strengthened SEL skills, including responsible decision-making, empathy for affected communities, and teamwork, as they proposed practical solutions to real-world environmental challenges.

Additional Resources

Here are five resources on desert encroachment that can be accessed on a smartphone/tablet/laptop computer with access to the internet:

1. **Desertification in Ghana: A Problem with Many Faces**
   This article explores the causes and consequences of desertification in Ghana, particularly in the north. It highlights the role of deforestation, overgrazing, and climate change, and suggests policy-level and community-based interventions.
2. **Strategies to Combat Desertification in Northern Ghana**
   A research paper detailing the Environmental Protection Agency's efforts to monitor and mitigate desertification using GIS, public education, and community engagement.
3. **BBC Bitesize – Strategies to Reduce Desertification**
   Though not Ghana-specific, this educational guide outlines practical, low-cost strategies like tree planting, drip irrigation, and soil conservation that are highly relevant to Ghana's drylands.
4. **Desert Encroachment: Meaning, Causes, Effects and Preventive Measures**
   A comprehensive explainer on desert encroachment, including its relevance to West Africa. It covers both natural and human-induced causes and offers actionable prevention tips.
5. **YouTube or Video-Based Resources**
   For visual learners, search for *"Desertification in Ghana"* or *"Combating Desert Encroachment in West Africa"* on YouTube. Look for clips featuring local initiatives, expert interviews, and satellite imagery analysis.

Here are five resources on landslide prevention and mitigation that can be accessed on a smartphone/tablet/laptop computer with access to the internet:

1. **How to Avoid and Reduce Landslides: Strategies and Innovations**
   This article covers proven landslide prevention techniques, risk mitigation strategies, and modern technology used to manage landslide hazards.
2. **How to Stop a Landslide: Essential Strategies for Prevention and Response**
   This guide explores the causes of landslides, effective strategies for prevention, and the importance of community engagement in landslide-prone areas.
3. **Landslide Preparedness Guidelines for Safety of Buildings on Slopes**
   A detailed document from the National Institute of Disaster Management, providing guidelines for landslide preparedness and mitigation measures.
4. **Think Hazard - Global Landslide Risk**
   This resource provides an overview of landslide susceptibility worldwide, including recommendations for planning and risk reduction.
5. **YouTube or Video-Based Resources**
   Further resources can be discovered by using a search engine and typing in "Landslide Prevention Strategies". This should bring up useful clips for visual learners with expert discussions and demonstrations.

MARKING SCHEMES FOR THE KEY ASSESSMENTS

WEEK 19

Short Answer Questions

Q1

Marking Scheme

- **Explanation for Deforestation (2 marks):** Correctly explains that cutting down trees for farming or firewood removes the vegetation that protects the soil, exposing it to erosion by wind and water.
- **Explanation for Overgrazing (2 marks):** Correctly explains that allowing too many animals to feed on the same land destroys the grass cover, leaving the soil bare and vulnerable to degradation.

Total: 4 marks

Sample Answer

a. **Deforestation:** When trees are cut down for firewood or to clear land for farming, the soil loses its protective cover. Without tree roots to hold it together and a canopy to shield it, the topsoil is easily washed or blown away, which is a key part of desert encroachment.

b. **Overgrazing:** This occurs when too many animals are kept on a piece of land. They eat the vegetation faster than it can regrow, leading to the "destruction of vegetation cover". This leaves the soil bare and compact, making it susceptible to erosion and degradation.

Q2

Marking Scheme

- Identifies and explains a social effect (3 marks): Identifies a logical social effect like displacement or food insecurity. Explains that as land becomes unproductive and crop yields fail, families may be forced to migrate to other areas in search of work and food, disrupting community and family structures.
- Identifies and explains an economic effect (3 marks): Identifies a logical economic effect like loss of income or poverty. Explains that since farming is the primary livelihood for many, a decline in productivity directly translates to lower or no income, deepening poverty within the community.

Total: 6 marks

Sample Answer

a. Social Effect: A major social effect would be the displacement of communities. When agricultural land can no longer support families due to poor yields, people are often forced to migrate to other regions or urban centres in search of new livelihoods. This breaks up long-standing communities and family ties.

b. Economic Effect: An immediate economic effect is the loss of income and increased poverty. For a community in the Upper West Region that depends on farming, a decline in

productivity means smaller harvests to sell. This directly reduces the main source of income for households, making it harder for them to afford basic needs and pushing them deeper into poverty.

Q3

Marking Scheme

- **Similar Goal (2 marks):** Explains that both strategies aim to protect the soil from erosion and improve the health and productivity of the land to combat desertification.
- **Different Approach (2 marks):** Explains that afforestation is about adding new vegetation (trees) to an area, while sustainable farming is about changing the methods used on existing farmland to conserve the soil that is already there.

Total: 4 marks

Sample Answer

a. **Similar Goal:** Both afforestation and sustainable farming practices share the ultimate goal of preventing land degradation. They both work to protect the soil from being eroded by wind and water and help the land retain moisture, which are key to stopping desert encroachment.

b. **Different Approach:** The main difference is in their approach. Afforestation involves introducing new vegetation by planting trees in areas where they have been lost or never existed. In contrast, sustainable farming practices like contour ploughing work by managing existing farmland differently, by ploughing along the land's contours to minimise soil erosion from water runoff on land that is already being cultivated.

Essay Questions

Q1

Structure and Marks Allocation

a. **Introduction (3 marks)**
   i. Clear definition of desert encroachment and its relevance to Ghana (1 mark)
   ii. Brief overview of the strategies being evaluated (2 marks)

b. **Evaluation of Strategies (8 marks)**
   i. Afforestation and Reforestation: Analysis of its effectiveness and impact (2 marks)
   ii. Sustainable Farming Practices: Discussion on its role and outcomes (2 marks)
   iii. Controlled Grazing: Evaluation of benefits and challenges (2 marks)
   iv. Alternative Energy Sources: Assessment of its impact on deforestation (2 marks)

c. **Socio-Economic Impacts (4 marks)**
   i. Analysis of the socio-economic benefits and challenges of implementing these strate
   ii. gies (4 marks)

d. **Recommendations for Improvement (3 marks)**
   i. Practical and innovative recommendations to enhance the effectiveness of the strategies (3 marks)

e. **Conclusion (2 marks)**

   i. Summary of key points and overall assessment of the strategies' effectiveness (2 marks)

Q2

Structure and Marks Allocation

a. **Introduction (2 marks)**

   i. Definition and significance of desert encroachment in the Ghanaian context (1 mark)

   ii. Overview of natural and human-induced factors (1mark)

b. **Analysis of Natural Factors (5 marks)**

   i. Prolonged drought: Explanation and impact (2 marks)

   ii. Climate change: Discussion of how it affects desertification (3 marks)

c. **Analysis of Human-Induced Factors (5 marks)**

   i. Deforestation and its role in exacerbating desertification (2 marks)

   ii. Overgrazing and poor farming practices: Impact on land degradation (3 marks)

d. **Interplay Between Factors (4 marks)**

   i. Discussion on how natural and human-induced factors interact to increase vulnerability to desert encroachment (4 marks)

e. **Proposed Integrated Solutions (2 marks)**

   i. At least two suggestions for combining natural and human efforts to combat desert encroachment (2 marks)

f. **Conclusion (2 marks)**

   i. Recap of main points and the importance of integrated solutions for sustainable management (2 marks)

WEEK 20

Short Answer Questions

Q1

Marking Scheme

- **Explanation for Construction (2 marks):** Correctly explains that construction destabilises the land and can alter the natural flow of water, leading to soil saturation.
- **Explanation for Deforestation (2 marks):** Correctly explains that removing trees and their root systems weakens the soil, making it more susceptible to being washed away by rain.

Total: 4 marks

Sample Answer

a. **Construction on Steep Slopes:** Building on steep slopes increases landslide risk because it "alters natural drainage patterns and destabilises the land". The weight of buildings and the cutting into hillsides for foundations can weaken the slope's stability, making a collapse more likely, especially during heavy rains.

b. **Deforestation:** This activity increases risk because it "removes vegetation that holds soil in place". Tree roots act like a natural net, binding soil and rock together. When trees are cut down, the soil becomes loose and is easily eroded and washed away by rainfall, leading to landslides.

Q2

Marking Scheme

- **Strategy 1 with Justification (3 marks):** Proposes a relevant strategy like Terracing (1 mark). Justifies it by explaining that terracing reshapes steep slopes into a series of flat steps, which is ideal for managing the "steep terrain" and making it stable for farming (2 marks).
- **Strategy 2 with Justification (3 marks):** Proposes another relevant strategy, like constructing Proper Drainage Systems (1 mark). Justifies it by explaining that effective drainage is crucial for managing the "high rainfall", as it channels excess water away from slopes and prevents the soil from becoming saturated and unstable (2 marks).

Total: 6 marks

Sample Answer

Two effective strategies for the Akwapim-Togo Ranges would be:

a. **Terracing on Steep Slopes:** This strategy is ideal for the region's "steep, undulating hills". By creating terraces, the steep gradient is broken into a series of flat, manageable steps. This directly reduces the speed of water runoff, prevents soil erosion, and makes the land stable enough for agriculture, which is a common activity in the region.

b. **Proper Drainage Systems:** Given the "high rainfall" in the area, this strategy is essential. Installing effective drains and channels would manage the large volume of surface water, preventing it from oversaturating the soil on the slopes. This directly addresses one of the main triggers of landslides by keeping the ground more stable.

Q3

Marking Scheme

- **Describes a social effect (2 marks):** Identifies a specific social effect like displacement of communities or loss of life/injury and briefly explains it.
- **Describes an economic effect (2 marks):** Identifies a specific economic effect like damage to agricultural land or high rehabilitation costs and briefly explains it.

Total: 4 marks

Sample Answer

a. **Social Effect:** A major social effect is the **displacement of communities**. When a landslide destroys homes and makes an area unsafe, entire communities are forced to leave, disrupting lives, separating families, and losing their sense of place.

b. **Economic Effect:** A significant economic effect is the **damage to agricultural land and crops**. A landslide can bury or wash away fertile farmland, destroying the main source of food and income for farming communities and affecting the local economy.

Essay Question

Structure and Marks Allocation

a. **Identification and Analysis of Causes (5 marks)**

   i. Identification of Natural Causes (2 marks)

   ii. Identification of Human-Induced Causes (2 marks)

   iii. Analysis and Explanation (1 mark)

   - Clear explanation of how these factors interact to increase landslide risk.

b. **Evaluation of Potential Impacts (5 marks)**

   i. Environmental Impacts (2 marks)

   ii. Social Impacts (2 marks)

   iii. Economic Impacts (1 mark)

c. **Development of Mitigation and Prevention Plan (10 marks)**

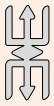
   i. Afforestation and Reforestation (2 marks):

   ii. Proper Drainage Systems (2 marks):

   iii. Community Education and Awareness (2 marks)

   iv. Terracing on steep slopes (2 marks)

   v. Restricting construction in vulnerable areas (2 marks)



Note

Learners are expected to justify how these strategies reduce landslide risk, with examples to obtain the maximum marks.

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