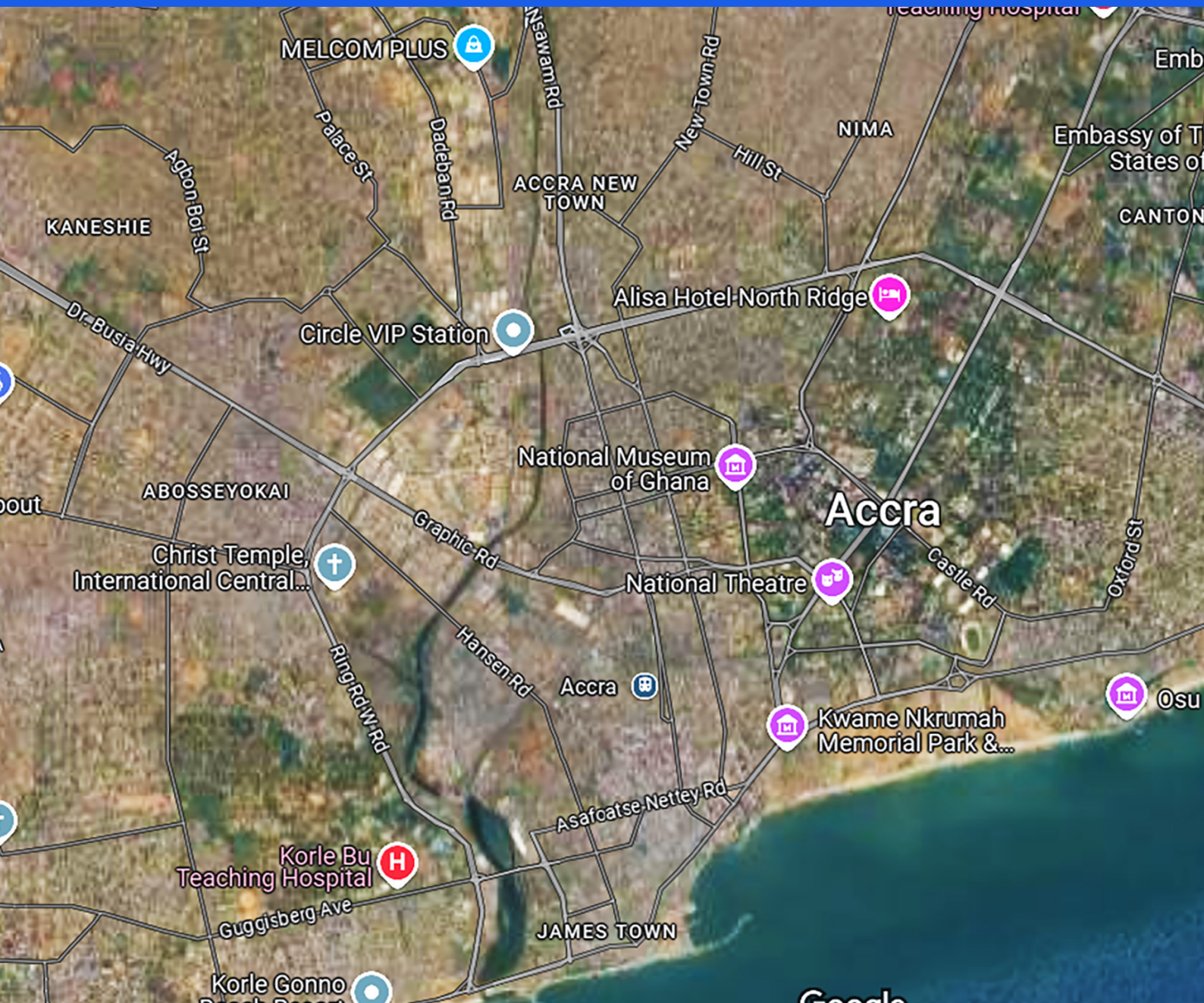
SECTION

4

MAPPING ESSENTIALS AND RELIEF REPRESENTATION



NAVIGATING OUR ENVIRONMENT

Maps, their Elements and Analyses

Introduction

In this section you will explore different types of maps, each revealing unique information. Have you ever wondered how some natural and artificial features are shown on maps? You will learn about various methods, like contour lines, which bring Earth's diverse landscapes to life on paper. By understanding different types of maps and how they represent relief, you will become good users of maps, with the ability to understand the marginal information of maps, plan adventures, and truly appreciate the amazing variety of our planet's surface. Though the entire section is devoted to maps, the beginning of the section covers the meaning of maps, their types, their importance, map scales and their conversion. This topic is related to what you learnt about maps and scales at JHS. Hope you now remember these.

Maps are essential tools for understanding the physical features and terrain or nature of a geographic area. One of the key aspects of representing the relief, or the variation in elevation, on a map is the use of different techniques. This section also highlight the common methods used to show relief on maps, including how special lines called contour can represent relief on topographic maps.

At the end of this section, you should be able to:

- Discuss the types of maps and their importance.
- Explain the concept of map scale and convert it from one scale to another
- Examine the methods of representing relief on maps
- Read and interpret contours on maps

Key Ideas:

- A map is the graphical representation of the entire earth's surface or a part of it on a medium-wall, paper, ball, and leather, usually drawn to scale.
- There are two main types of maps, namely general-purpose maps and Thematic maps
- Maps serve several purposes such as showing boundaries, activities distribution and location of places among others.
- One of the major elements or characteristics of a map is its scale
- A map scale is the relationship between distances between any two points on the map and the corresponding distances on the ground.
- The three types of scales are representative fraction, Statement scale and Linear scale
- Relief refers to the variation in height of the Earth's surface.
- The methods of showing relief on maps include: - sport height, trigonometrical point or station, contour line.

MAPS AND THEIR IMPORTANCE

Meaning of a Map

Do you still remember the definition of a map from JHS? It has not changed. A map is a graphical representation of the entire earth's surface or a part of it on a medium such as a wall, paper, ball, or leather, usually drawn to scale. It means you can represent any part of the earth or the entire earth on the floor, wall, on paper or any space that may contain it. I am sure you have seen a map of Ghana in books or on school walls. Apart from drawing maps on the surfaces mentioned above, some are represented electronically. These are called digital or electronic maps. Digital maps are electronic representations of maps and other geographic information on electronic devices such as computers, smartphones and navigation systems. The art of producing digital maps is called Digital mapping or digital cartography. The primary function of this technology is to produce maps that give accurate representations of a particular area, features and other points of interest. Examples include Google Maps, Apple Maps, Bing Maps and Open Street Map.

Elements or Characteristics of a Map

Some common features are associated with maps. Every map must show some or all of these features. In other words, when you draw a map or you identify a map, look out for these features, characteristics or elements listed below:

a. **Title:** The title of the map describes what the map is about. On the other hand, it gives the type or purpose of the map.
b. **Legend or Key**: This is a list or explanation of symbols and colours used on maps. It helps or gives the identification of features in the map. It helps explain the symbols, colours and abbreviations used to represent features on the map
c. **Scale:** It gives the measurement of distance on the map and its equivalent on the ground
d. **Direction:** typically means indicating the orientation/ location of the map to the cardinal directions (north, south, east, west).
e. **Date:** It tells us the period the map was created, updated or prepared or how old the map is.
f. **Margins or frames** of a map may refer to the area surrounding the main map content, which typically includes various supplementary information and elements.
g. **Authorship**: Tells us the one who created or prepared the map (the Cartographer).

Visit this link to learn more about the basic elements of a map

If you cannot access the video, check your school or local library or look for an internet café near your home.

Activity 4.1

Study the map below (Figure 4.1) and identify the characteristics or elements of maps that are associated with it.

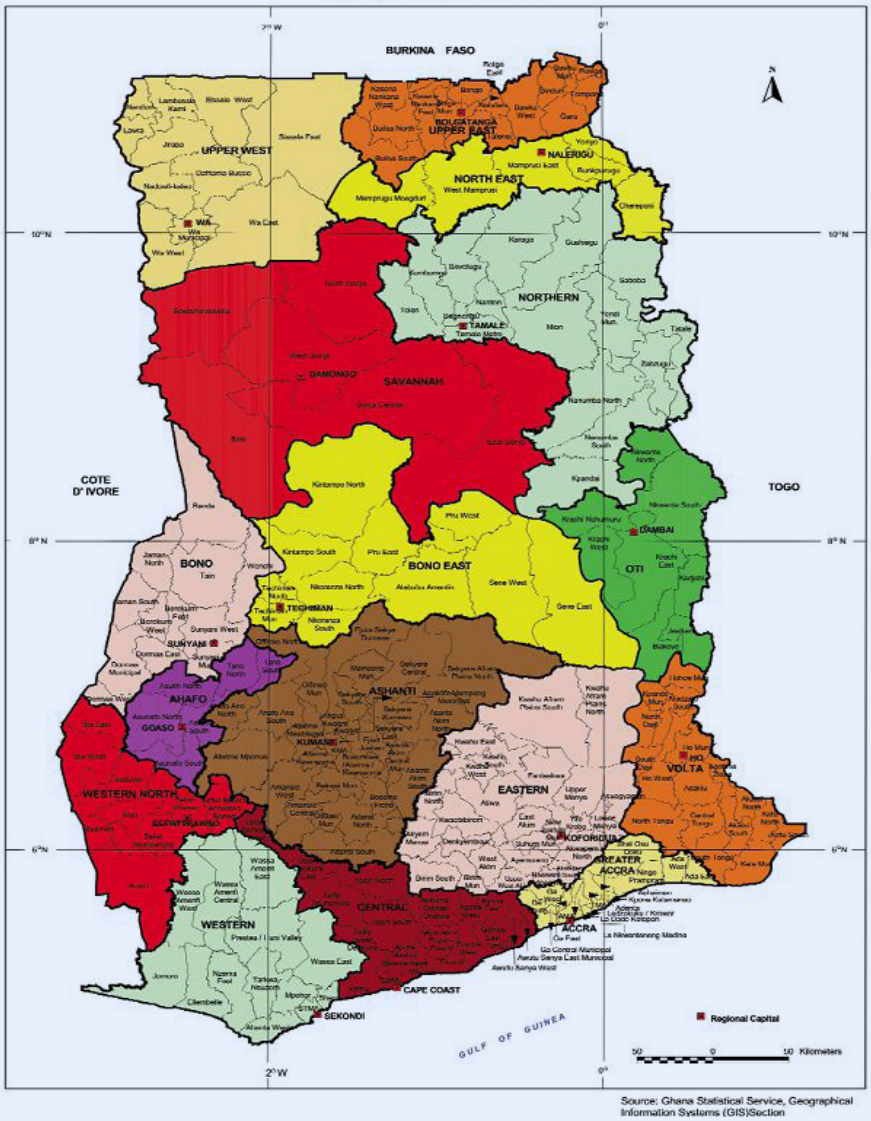


Fig. 4.1: Political map of Ghana

Types of Maps

There are **two main types of maps**, they are:

1. **General purpose maps:** These are maps that combine two or more themes, signs and symbols to represent both natural and human-made features. Examples include topographical maps, cadastral maps and aeronautical maps. In other words, these maps show multiple features at the same time.

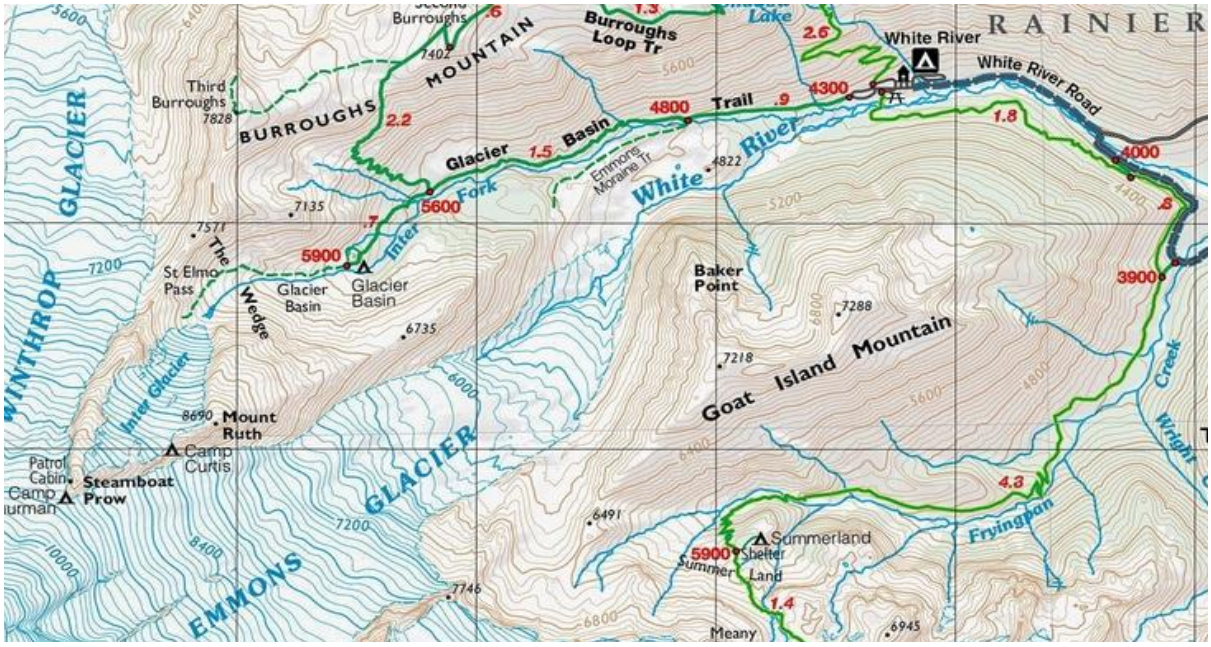


Fig. 4.2: A topographical map

This map shows a number of features at the same time on the same map. Try and mention at least three things that are shown on this map.

2. **Thematic maps:** They are maps that focus on specific themes, idea, subjects or topic, such as geological maps, relief maps, vegetation maps, drainage maps, climatic maps and political maps. As the name implies, this map shows one specific feature at a time. It means, there may be other features but the emphasis is on just a single theme or feature or phenomenon. For example, a political map of Ghana shows the national, regional and administrative boundaries. Here the emphasis is on administrative or political divisions of Ghana. A vegetation map of Ghana shows the vegetation zones of Ghana as the map below indicates (**Figure 4.3**).

Fig. 4.3: Vegetation map of Ghana

This is an example of a Thematic map, as it shows a single feature or theme, which is vegetation types or zones of Ghana.

Importance of Maps

Maps are of various uses and are important in your daily lives and activities. These are some of the importance of maps:

1. Maps show the regional and national boundaries of a place. For example, the political map of Ghana helps you to know your regional, district and national boundaries.
2. Maps help to show the location and distribution of natural features such as water bodies, mountains and valleys among others. These are identified on maps with the help of colours and symbols. For example, water bodies are shown with blue colour.

3. Maps help show human-made features such as settlements, roads and farms among others.
4. Maps can show the amount and distribution of rainfall, temperature and other climatic variables.
5. Maps help identify the location and geographical distribution of natural resources like minerals, timber and crops. With this, it also helps to know the specific type of economic activity in an area.
6. Maps are essential tools for navigation, i.e., determining location, planning routes and reaching destinations efficiently.
7. Maps serve as communication tools and help say a lot about places.

Activity 4.2

1. Sketch a map of your community, in the map, consider boundaries or landmarks such as streets, avenues, mountains, valleys, schools, churches and other important landmarks. Explain to a friend how your map can help others within your community locate their houses.
2. Sketch a map of your School, indicating the school library, classroom block, football field and the main administration block. Compare your sketch with different maps in books or atlas and write down the differences and similarities.
3. a. Categorize this list of types of maps under Thematic and General-Purpose maps:
    - Political map
    - Topographical map
    - Climate and Vegetation map of Ghana
    - Relief and Drainage map of Africa
    - Population distribution map
    - Map of your school
    - Geological map

   b. Select any two of the maps mentioned above and highlight their similarities and differences.

MAP SCALES AND THEIR CONVERSIONS

Meaning of Map Scales

Do you remember that the scale of a map is one of the major elements or characteristics of maps. Every map must have a scale. A map scale is defined as the relationship between distances on any two points on the map and the corresponding distances on the ground. On the other hand, a map scale is the ratio between distances on a map and the actual distances on the ground. It means that if you measure two distances A and B on a map, the scale will help you to know the actual distance on the ground.

Types of Scales

There are three types of map scales, namely:

1. Statement Scale
2. Representative Fraction Scale
3. Linear Scale.

These scales are commonly used on maps as shown in Figure 4.4.

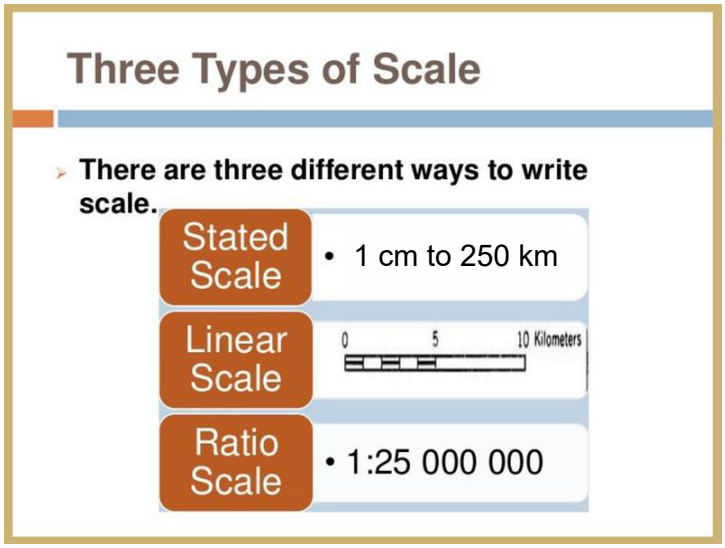


Fig. 4.4: The three types of map scales

The three types of scale commonly used on maps are discussed below:

1. Statement or Verbal or Word Scale

This is the expression of scale in words. This scale is expressed or written in a statement form or words. It is so simple.

a. One inch on the map represents one mile on the ground.
b. One centimetre on the map represents one kilometer on the ground.

Advantages of statement scale

a. Simplicity: It is easy to understand.
b. Universal application: Anyone can find the distance on a map regardless of the unit of measurement.
c. Versatility: The use of units makes it easily convertible.
d. Time efficiency: It requires little time to express.
e. Accuracy: It provides a correct idea about distance.

Disadvantages of statement scale

a. Units might not be familiar to the user – some countries do not use miles as measure.
b. Relies on the user being able to read the language the statement is written in.
c. Makes comparisons of the original map with reduced or enlarged maps difficult.

2. Representative Fraction or Fractional or Ratio Scale (R.F)

This is the expression of a scale in the form of a fraction or ratio. The R.F. always has a numerator of one. It shows the ratio of length on the map to distance on the ground. For instance, a map with R.F. of 1/125,000 or 1:125,000, means 1 unit on the map represents 125,000 units on the ground. Representative fractions are ratios so do not have units.

1cm = 1m
1:100
10m = 5cm

Fig. 4.5: Statement and Representative Fraction Scale

Advantages of R.F. Scale

a. It is the most commonly used scale because it allows for easy conversions between units
b. It compares distances on a map with those on the ground accurately.
c. It can be used in any country because it does not use any unit of measurement.

Disadvantages of R.F.

a. It is not easy to convert RF or ratio scale to other scales
b. The same RF cannot be used when the map is either enlarged or reduced

3. Linear/Graphic Scale

This scale is a segmented line that enables distances on the maps to be measured directly. It is a line drawn and accurately to show lengths. Linear scales may be stated in either metric or imperial units. It is divided into primary and secondary divisions.

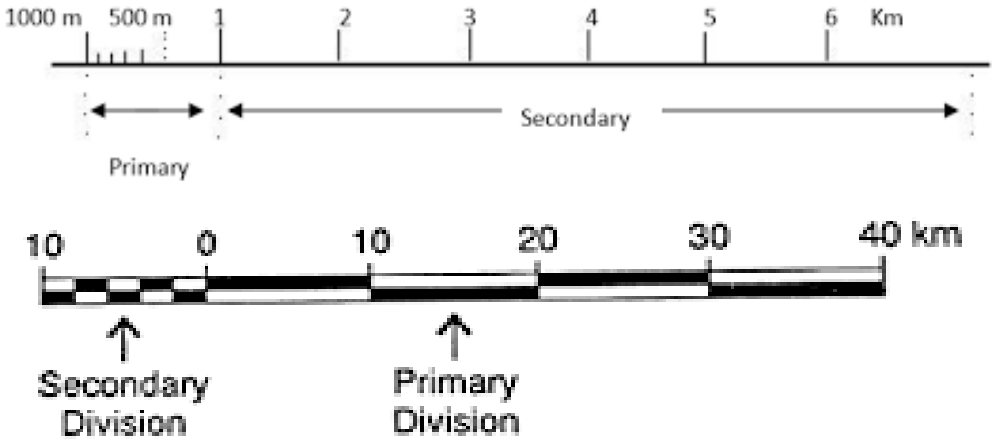


Fig. 4.6: Linear scale showing primary and secondary divisions *(The primary division represents the main, largest units of measurement on the scale and the secondary division represents the smaller, more granular subdivisions within each primary unit).*

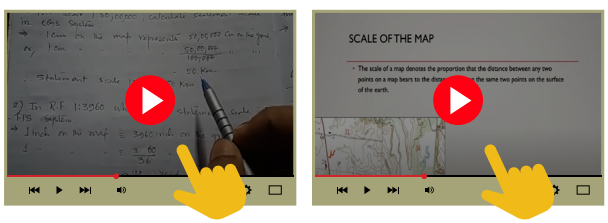
Advantages of linear scale

a. It is used worldwide.
b. It is easy to express linear scale in miles and kilometres, making it acceptable worldwide
c. It gives good and quick visual impression

Disadvantages of linear scale

a. Its conversion to other scales may be challenging since it involves some mathematical calculations.
b. It requires some specialized skills before it can be constructed.

Visit these links below to learn practical lessons about scale, types of Scale and its conversion



If you cannot access the video, check your school or local library or look for an internet café near your home.

Activity 4.3

1. Using a pencil, ruler and paper, sketch a rectangle of any length. Beneath the diagram, write one example of each of the three types of scale. Discuss with your friends in class, why you prefer one scale to the other.
2. Explain to your friend what a 1 cm to 20 km scale on a map means.

MAP SCALES AND THEIR CONVERSIONS

Scales can be converted from one type to the other. Examples are given below

Conversion of a linear scale map to Statement and R.F scales.

Regarding Figure 4. 7 below, let us follow the steps involved in converting a linear scale to R.F. scale

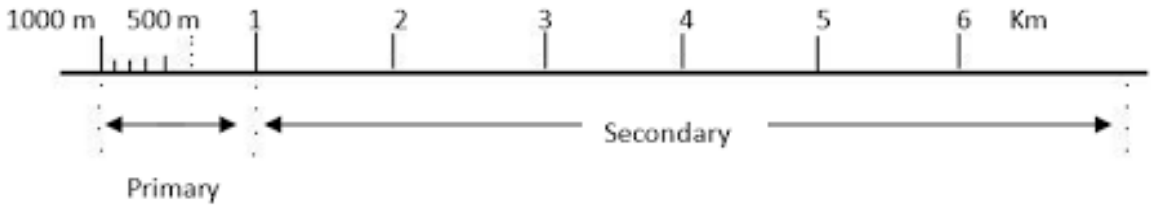


Fig. 4.7 A linear scale map

1. Look at the map scale. You will see two sets of numbers - the bigger numbers are the primary divisions, and the smaller numbers in between are the secondary divisions. The primary divisions are usually in metric units, like kilometres (km).
2. Take a ruler and line it up with the map scale, making sure the 0 cm on your ruler matches up with the 0 km on the map scale.
3. Look at the first big number on the map scale. For example, it might say 1 km. Now look at the ruler - what number lines up with that 1 km mark? Let us say it is 2 cm.
4. This means that on the map, 2 cm represents 1 km in the real world. So, if you measure 2 cm on the map, that distance is equal to 1 km on the ground.

Conversion from Statement Scale to R.F. Scale

It is easy to convert a scale from one way to another or from one unit to another. Learners, to be able to do this, you must understand these measurements

10 millimetres (mm)	=	1 centimetre (cm)
1000 millimetres (mm)	=	1 metre (m)
100 centimetres	=	1 metres (m)

1000 metres (m)	=	1 kilometres (km)
100,000 centimetres (cm)	=	1kilometres (km)
63360 inches	=	1mile

Procedure for conversion from Statement Scale to R.F Scale

a. Write out the statement scale clearly
b. Express the two parts of the scale (map distance and ground distance) together in the same units; (both centimetres or both inches).
c. Write the scale as a fraction with the mapping measurement or distance as the numerator and the ground measurement or distance as the denominator
d. Simplify the fraction by dividing numerator and denominator by the same number before expressing the final answer as a ratio or the RF scale

Worked Examples

Convert the following statement scales to R.F

a. 1cm to 1km
b. 2cm to 1km
c. 1cm to 5km

Solutions:

a. 1cm to 1km

Convert 1km to cm by multiplying with 100,000 (100,000cm to 1km)
Express the statement scale in the same unit, i.e; 1cm to (1km × 100,000) = 1cm to 100,000 cm
Expressed as a fraction, that is, 1cm to 100,000cm = 1cm/100,000cm
Expressed as a ratio / R. F
1cm to 1km is therefore 1:100,000 or 1/100,000 in R. F

b. 2cm to 1km

2cm to (1km × 100,000) = 2cm to 100,000cm
Expressing as a fraction and dividing through
2cm / 100,000cm = 1/50,000
Therefore, 2cm to 1km is 1:50,000 in R. F
Note: 2cm to 1km may also be written as 1cm to ½km

Now, try the last one, which is 1cm to 5km

Conversion from R.F. Scale to Statement Scale

Example 1

State or write the RF scale clearly (e.g. 1:50,000)

If you are converting from cm to km, divide the denominator of the RF scale by 100,000 (100,000cm = 1km)

Given a Representative Fraction of 1:50,000, to find the number of kilometres to a centimetre, divide the denominator of the fraction by 100,000 i.e., 50,000 ÷ 100,000 = ½ km to 1 cm or 0.5km to 1 cm

Answer: (one centimetre on the map represents half a kilometre on the ground)

Example 2

Convert RF 1:25,000 to Statement Scale

Dividing ground measurement by 100,000

That is, 25,000/100,000 = ¼ so 1/4km to 1cm or 0.25cm to 1cm (4cm to 1km)

Answer: one centimetre on the map represents a quarter of a kilometre on the ground.

Changing from Representative Fraction to Linear Scale

1. First, find the number of kilometres to a centimetre. That is, 50,000/100,000 = 1cm to 1/2 km or 2cm to 1km
2. Rule a horizontal line of any length and divide it accurately into 2 cm segments to represent map distances. Number the divisions with an interval of 1km to represent ground distances as shown in Figure 4.8.

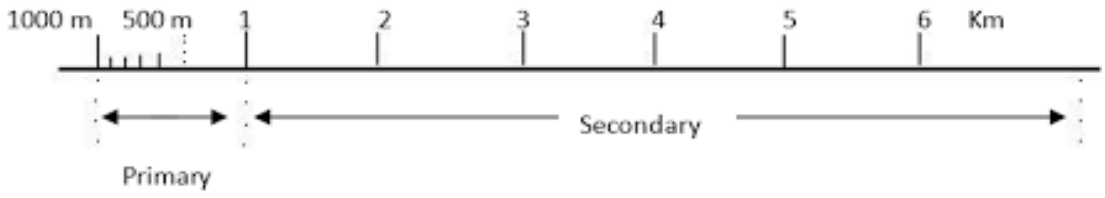
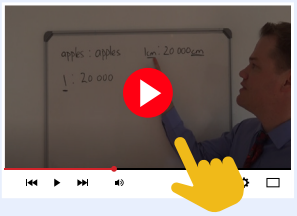


Fig. 4.8: Representation of linear scale

Activity 4.4

1. Visit the links below to watch a video on the conversion of map scales



If you cannot access the video, check your school or local library or look for an internet café near your home.

2. Write the Statement of scale 10 centimetres to 1 kilometre as a Representative Fraction.
3. The taxi driver taking you to school says the distance between your home and the school is about 1 km. On his map, the distance measures 5cm. What is the RF scale of his map? Show each step of your work.
4. Follow the instructions and work this out. You will need a map, ruler, calculator, pencil and paper:
   a. Select your map from a book or Atlas or ask your teacher to provide you a map of your local area. Make sure it has a scale.
   b. Choose two locations on the map (e.g. a town, village, local buildings or parks).
   c. Measure the distances between these two points on the map, using the ruler.
   d. Convert the measurement to real ground distance, using the statement, Rf or linear scale.
   e. Write down the procedure you did for the measurement and calculation of real ground distance.
   f. Repeat steps with different locations and maps.

7. a. Convert 1:5,000 to statement scale in kilometres.
   b. Convert 2 cm to 1km to RF scale.

METHODS OF REPRESENTING RELIEF ON MAPS

Relief refers to the variation in height of the Earth's surface, such as mountains, spurs, valleys, plains, ridges and plateaux. Relief features can be represented on maps using methods such as spot heights, trigonometrical stations, hachures, layer tinting and contour lines.

1. Spot heights

Spot heights refer to the height or elevation of a specific point with figures attached to a map or terrain. They are used to show the exact height of the land at a particular point. Spot heights are depicted using a black dot with the actual height written against it. For example,

- 450

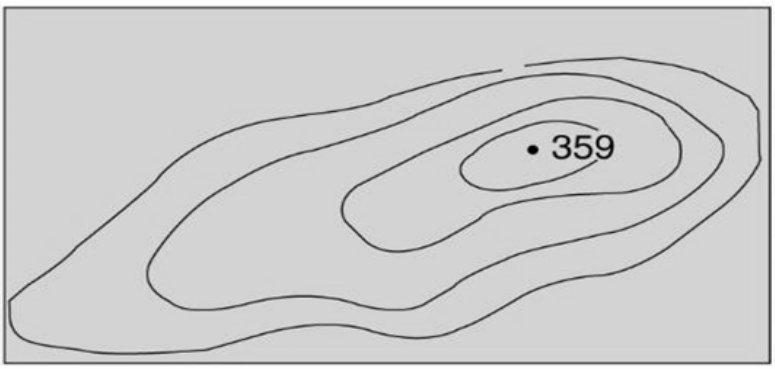


Fig. 4.9: Spot height with contours (Mishra, 2015)

2. Trigonometrical Points/stations

Trigonometrical points, also known as trigonometrical stations or triangulation points, refer to specific locations on the Earth's surface that are used as reference points for surveying and mapping purposes. These are indicated on the map by a triangle or a circle having a dot inside it. It occupied a survey point and indicated the height above sea level. On the ground, it is indicated by a concrete pillar. An example is Figure 4.10.

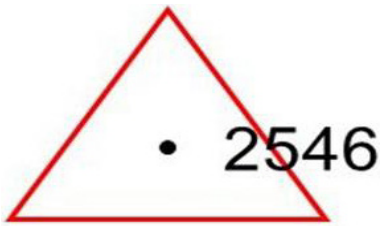


Fig. 4.10: Trigonometrical station

3. Layer tinting (colouring)

Layer tinting also known as layer colouring or layer shading, refers to the technique of applying different colours or shades to represent different layers or zones on a map or diagram. It is a method of showing relief by colour. This method is based on contours. Each shade of colour, or band, represents a definite height range. For example, light brown and brown are used to show different levels of highlands. The colour gives a vivid picture of lowland and highland areas. An example is Figure 4.11

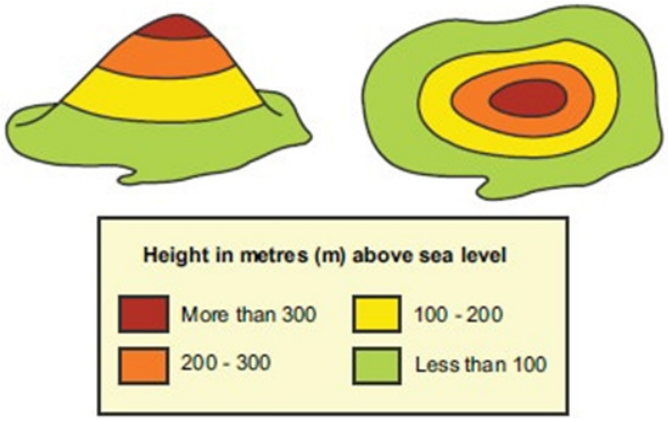


Fig. 4.11: Layer colouring (Mishra, 2015)

4. Form Lines

Form lines refer to contour lines that represent the shape and elevation or height of the land, but do not represent a specific elevation or height. They are used to provide additional detail about the land between the contour lines. These are lines drawn on maps to link places of approximately the same height. Thus, they are not as accurate as contours and may be used where contours are absent. In other words, form lines are approximate contours, drawn to show the nature of the land.

Fig. 4.12: Form Lines (Mishra, 2015)

5. Hill shading

Hill shading also known as relief shading, is a technique used on topographic maps to create the three-dimensional terrain or nature of a hill or mountain by showing the effects of light and shadow on the landscape.

It indicates relief by a shadow effect achieved by tone and colours that result in the darkening of one side of terrain features, such as hills and ridges. The darker the shading, the steeper the slope.

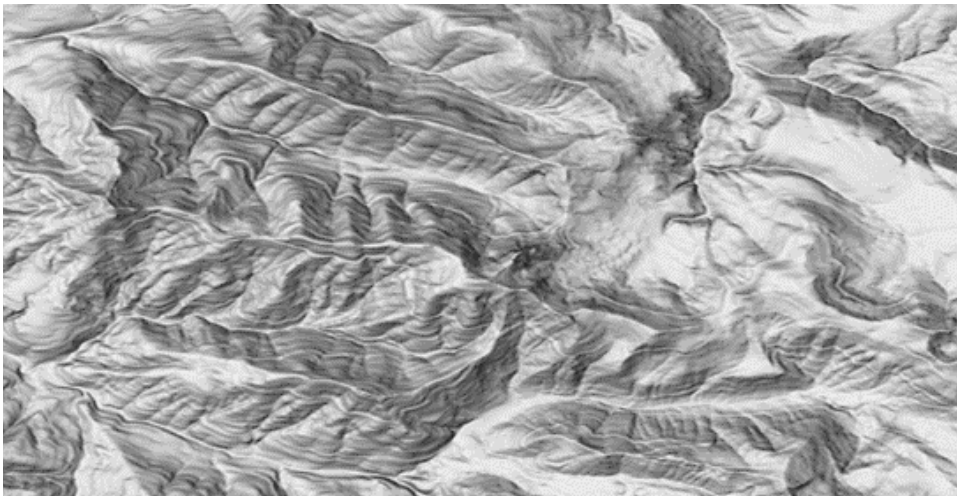


Fig. 4.13: Hill shading (Mishra, 2015)

6. Hachures

This method uses short lines known as Hachures in shading a map. Hachures are a type of relief representation used on topographic maps to depict the shape and steepness of the land. Specifically, hachures are short, roughly parallel lines that are used to indicate the direction of slopes and the relative steepness of the land. They are also short broken lines used to show relief. Hachures are sometimes used with contour lines. They do not represent exact heights but are mainly used to show large, rocky outcrop areas.

Fig. 4.14: Hachures (Mishra, 2015)

7. Contour Lines

A contour line is a line on a map that connects points of equal elevation or height on the Earth's surface. In other words, a contour line represents a constant height or altitude above (or below) a reference level, typically mean sea level. Contour lines are the most common method of showing relief and elevation on a standard topographic map. A contour line represents an imaginary line on the ground, above or below sea level. All points on one contour line have the same elevation or height. The elevation represented by contour lines is the vertical distance above or below sea level.

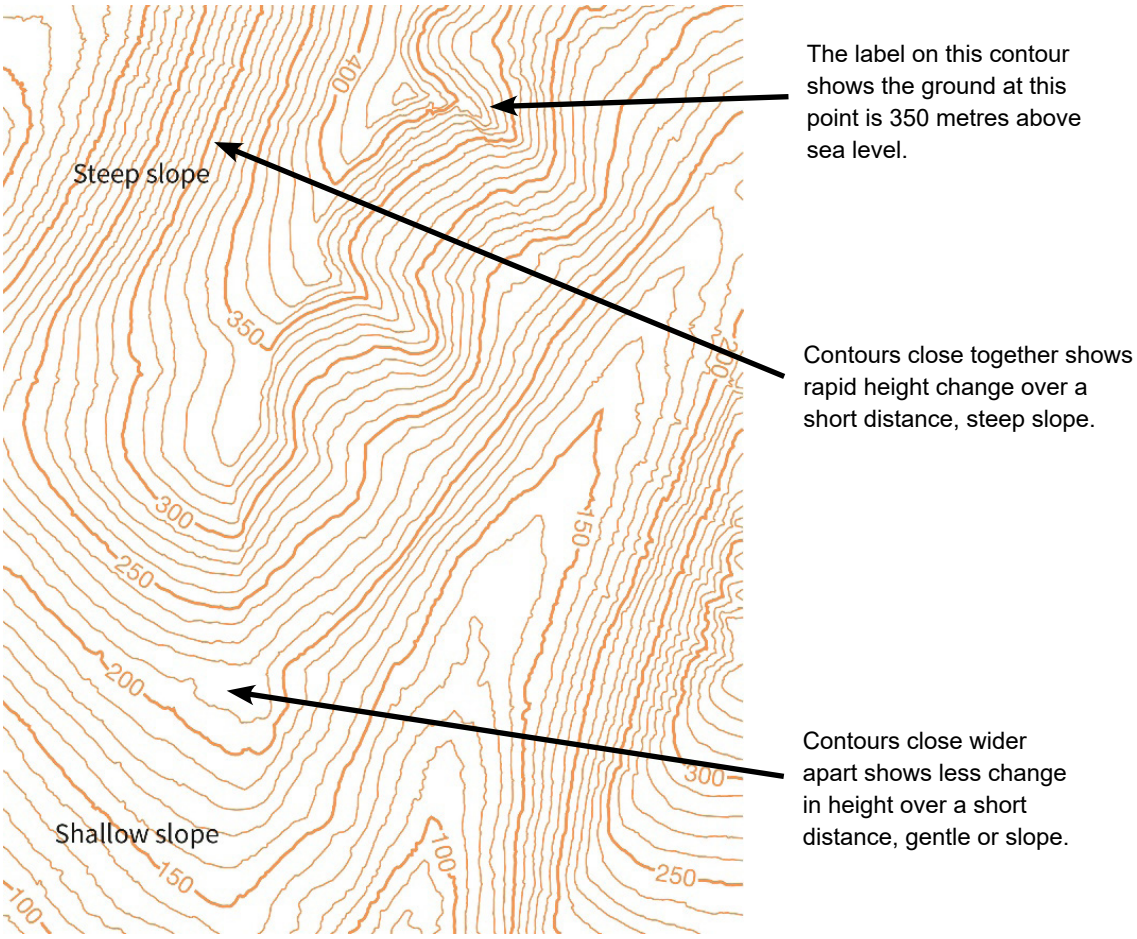


Fig. 4.15: Contours on a map

Activity 4.5

1. Using pencils, sheets of paper, rulers, and protractors, draw the following relief features that can be represented on maps:
   a. (i) spot heights (ii) trigonometrical stations (iii) hachures (iv) layer tinting (v) contour lines.
   b. How relevant are these methods in showing relief features in your everyday life?

USING CONTOURS TO REPRESENT RELIEF ON TOPOGRAPHIC MAPS

Contours:

- They are lines drawn on maps to show places of equal height above sea level. They are measured in feet or metres.
- Contours are used to determine the nature or topography (natural and human-caused features) of the land including their relative positions and elevation.
- On topographical maps, contours are shown with the colour brown and the heights may be written on them at pre-determined intervals.
- A *contour interval, also* known as *vertical interval* (VI) represents the difference in height between two adjacent contours.
- Contours which are thicker than the adjacent ones are called *index contours*.
- The thinner contour lines are known as *intermediate contours*.

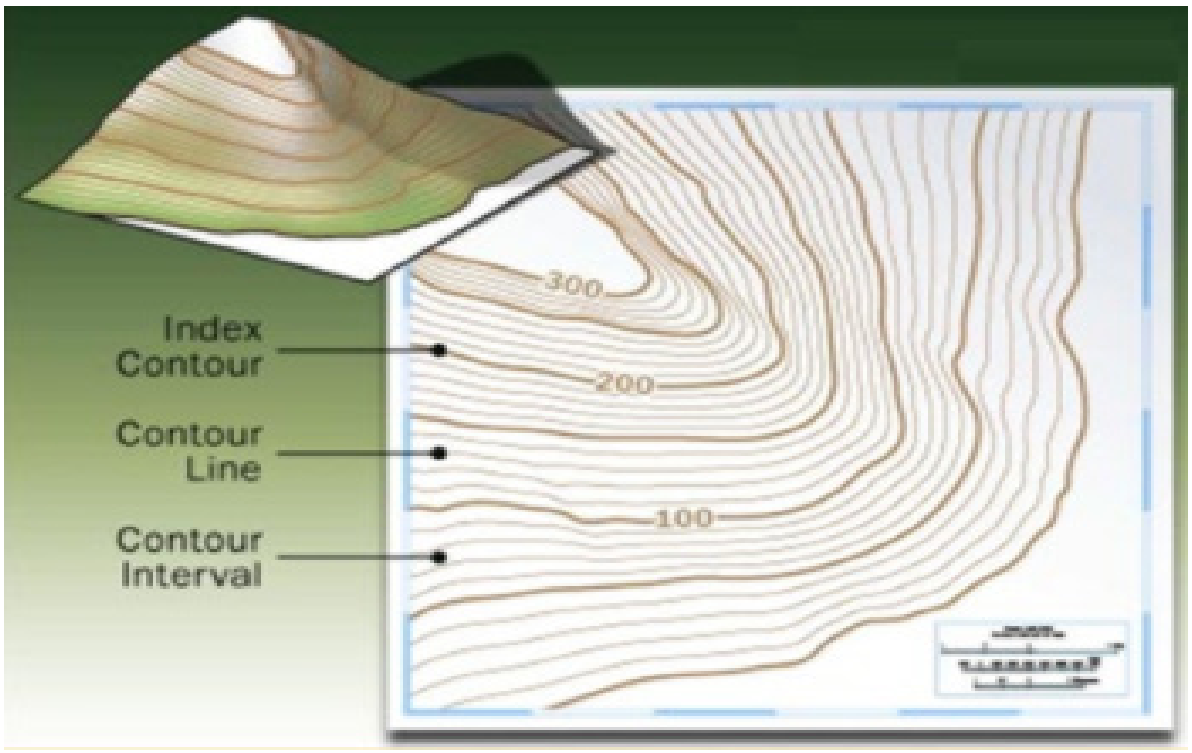


Fig. 4.16: Contour Line, Contour Interval and Index Contour (Mishra, 2015)

Slopes

A slope is the rate of change in elevation or height over a given horizontal distance. They are used to indicate the steepness and gentleness of a land. There are different types of slopes:

Types of Slopes

1. **Steep Slope:** On topographical maps, contours represent steep slopes when the lines are closely spaced showing a rapid elevation or height change.

Fig. 4.17: Steep slopes (Mishra, 2015)

2. **Gentle Slope:** On topographical maps, contours represent gentle slopes when the lines are spaced farther apart, indicating a gradual change in elevation or height over a longer distance.

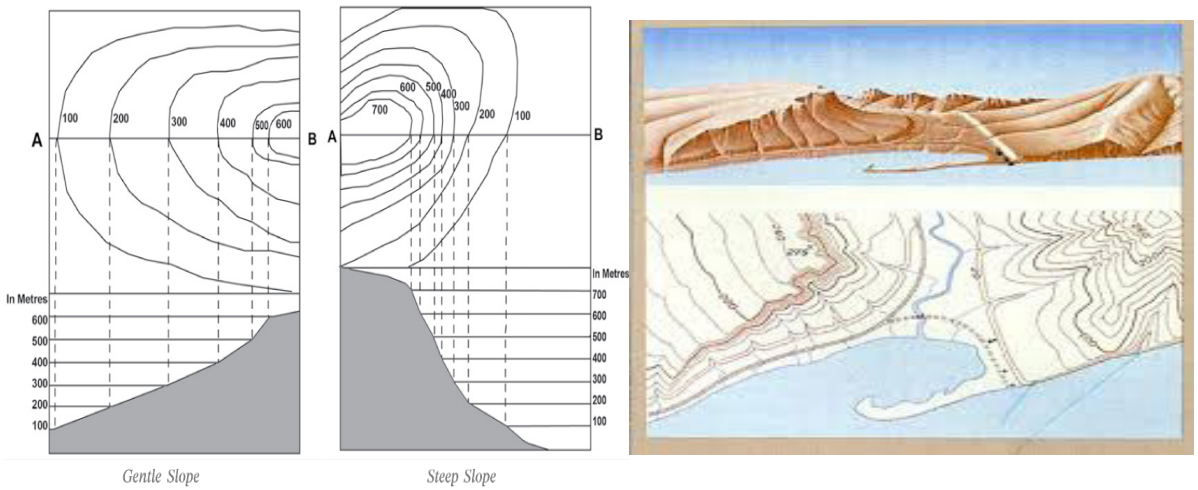


Fig. 4.18: Gentle and Steep slopes (Mishra, 2015)

3. **Concave Slope:** A slope with a gentle gradient in the lower parts of a relief feature and steepness in its upper parts is called a concave slope. Contours in this type of slope are widely spaced in the lower parts and closely spaced in the upper parts.

4. **Convex Slope:** A slope with a gentle gradient in the upper parts of a relief feature and steepness in its lower parts is called a convex slope. Contours in this type of slope are closely spaced in the lower parts and widely spaced in the upper parts.

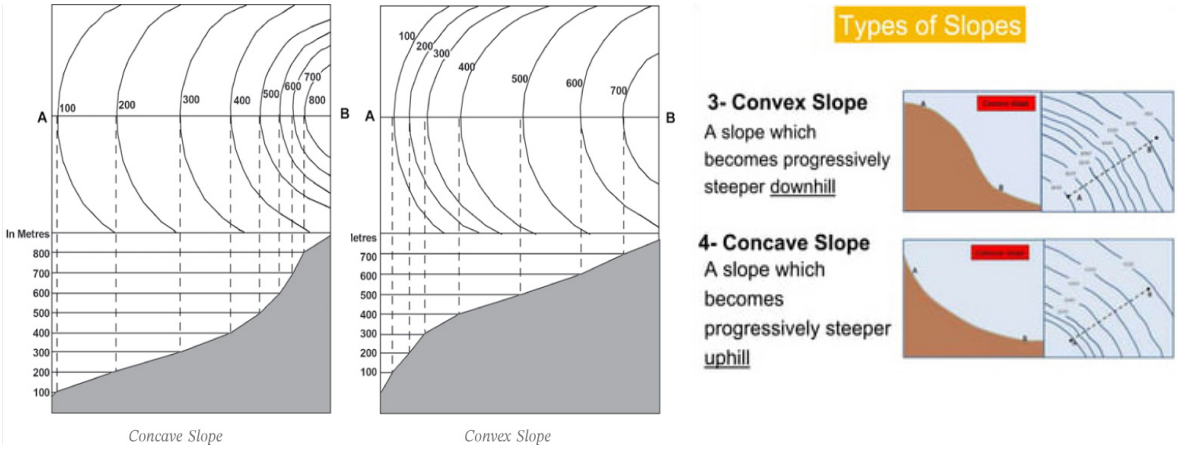
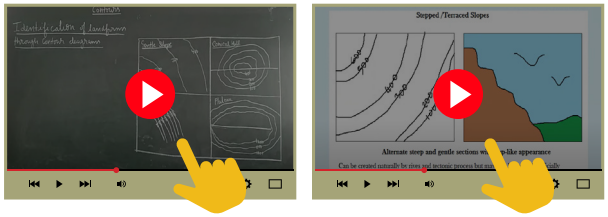


Fig. 4.19: Concave and Convex slopes (Mishra, 2015)

Visit this link below to watch videos about the types of slopes of the land



If you cannot access the video, check your school or local library or look for an internet café near your home.

5. **Valley:** A valley is a long and narrow depression between two hills or mountains. They are represented on topographic maps with closely packed V-shaped or U-shaped contour lines. The innermost contour line has the lowest value (height) while the outermost contour line has the highest value (height). It may contain water or not.

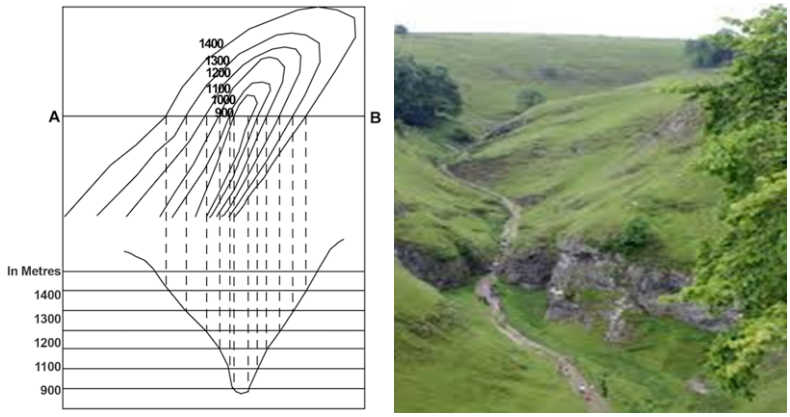


Fig. 4.20: V-shaped valley (Mishra, 2015)

6. **Spur:** A spur is explained as a projection of a highland into a lowland. It is referred to as a highland in between two lowlands. On topographical maps, spurs have contour patterns that are opposite of valleys. They are also represented with V-shape contours, but the inner contour has the highest value (height).

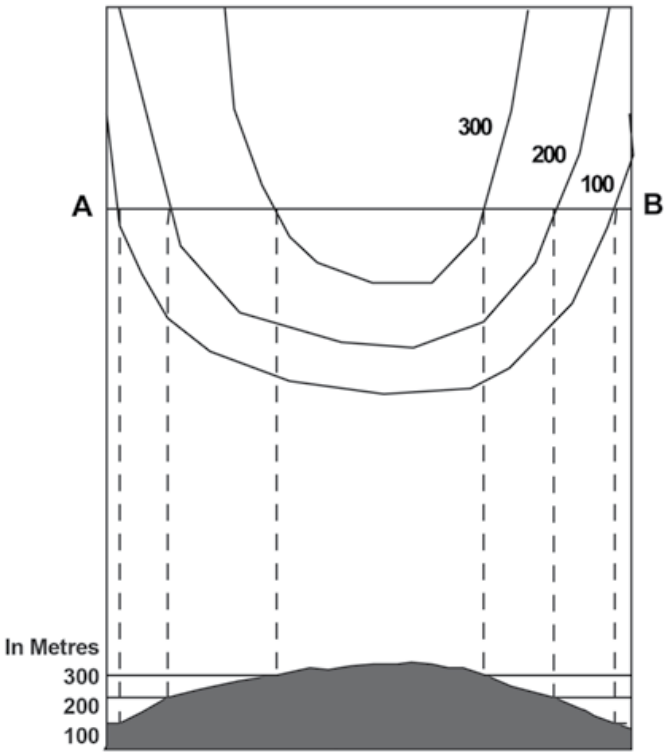


Fig. 4.21: Spur (Mishra, 2015)

Learners, can you identify the difference between a spur and a valley? The difference between them is that the V or the U shape of the valley points to the higher land while with the spur the V shape points to the lower land. This means that in a valley the height written against the contour line will be increasing towards the V or U side of the valley. While in spur, the height written against the contour line will decrease towards the V or U side of the spur.

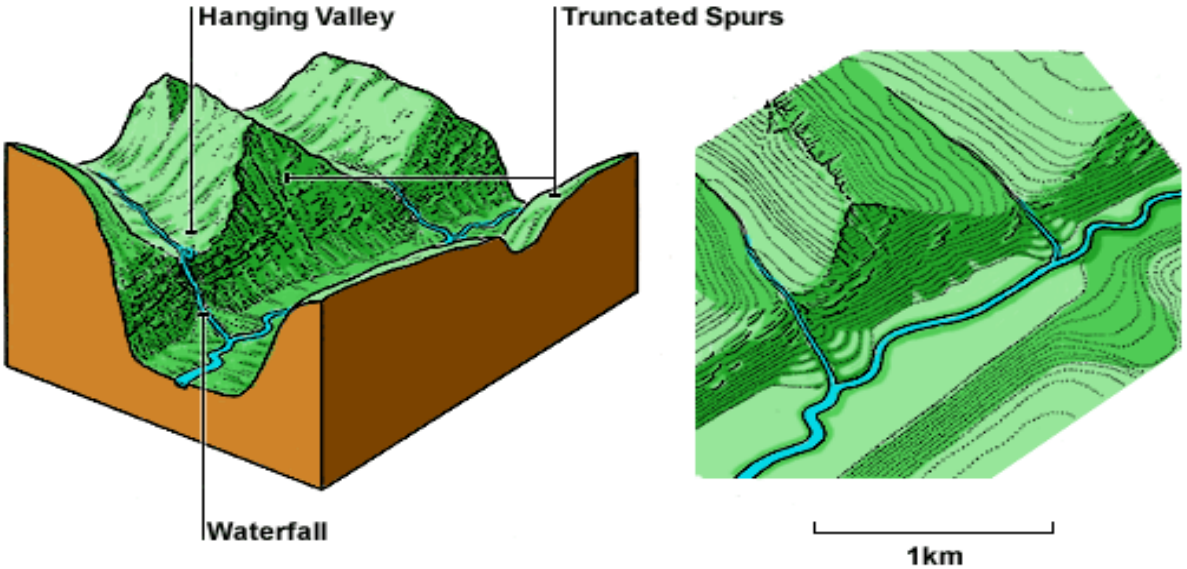


Fig. 4.22: Valley and a Spur

7. **Plateau:** A plateau is usually described as a high mountain with steep sides and a flat top. It is sometimes referred to as a table-top mountain. On a map, the contours appear very close at the sides with a vast space in the middle to indicate the flat surface.

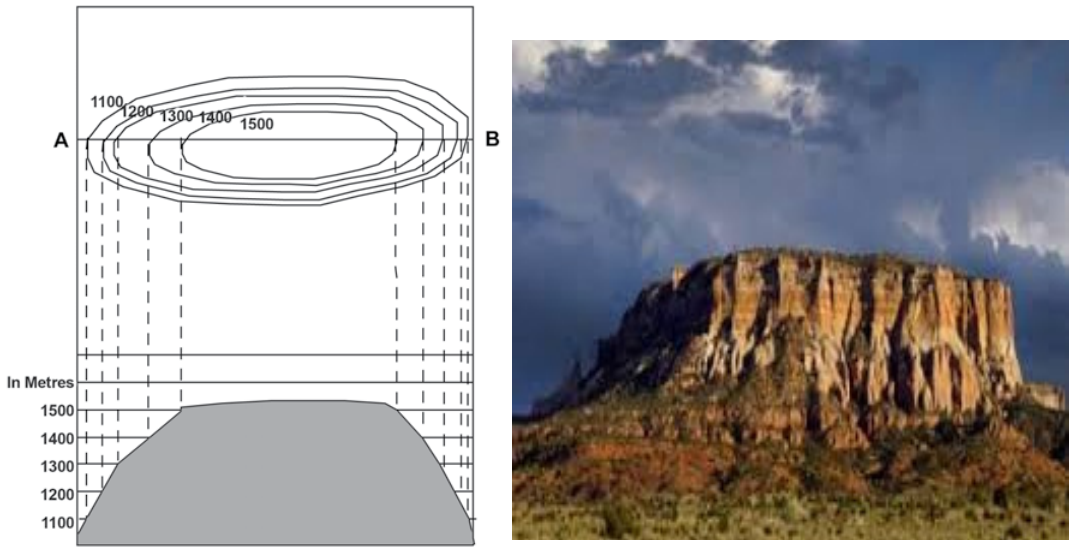


Fig. 4.23: Plateau (Mishra, 2015)

8. **Conical Hill:** A conical hill is a landform or relief feature that is shaped like a cone. It usually stands out from relatively low ground. It is usually represented with a few concentric rings of contours which are regularly spaced.

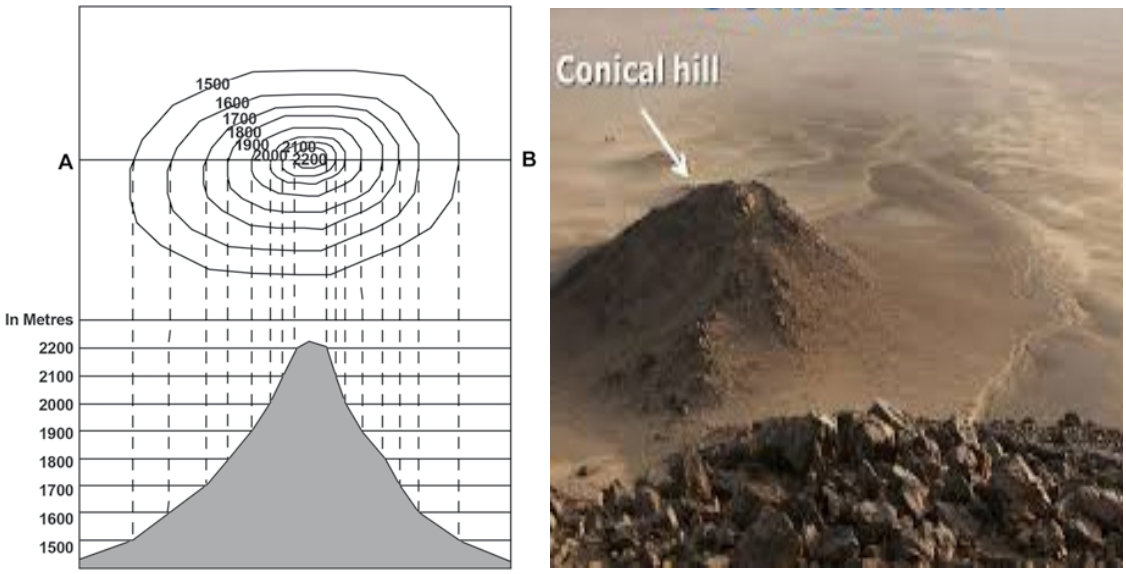


Fig. 4.24: Conical Hill (Mishra, 2015)

9. **Cliff:** A cliff is a vertical or near-vertical feature; it is an abrupt change of the land. When a slope is so steep that the contour lines converge into one "carrying" contour of contours, this last contour line has tick marks pointing toward low ground. Cliffs are also shown by contour lines very close together and, in some instances, touching each other.

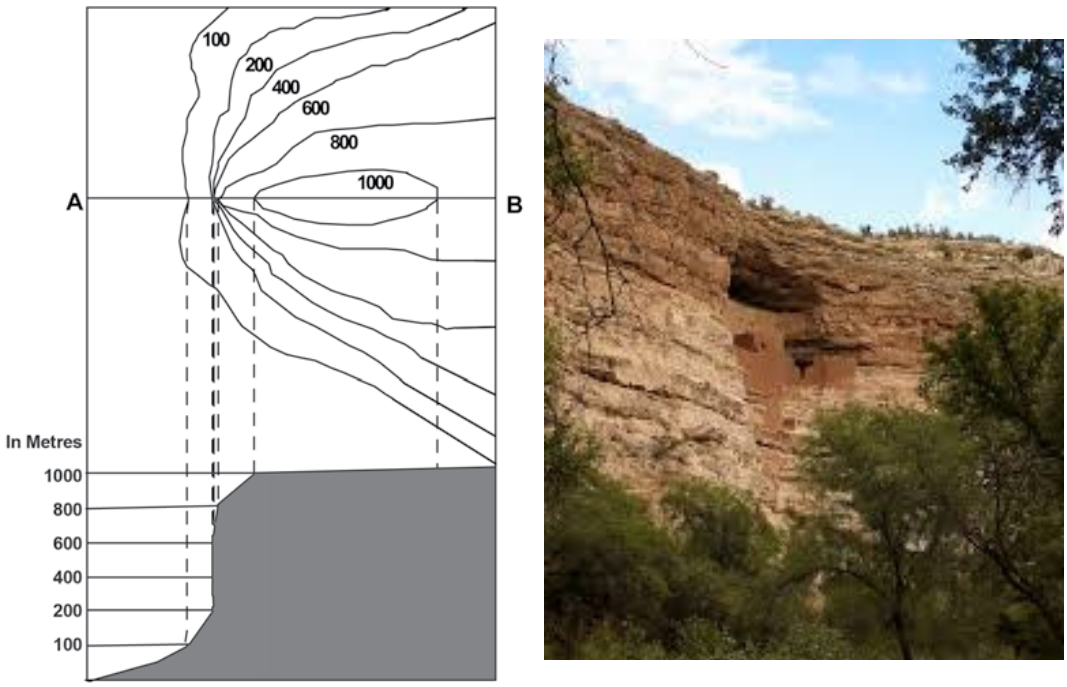


Fig. 4.25: Cliff (Mishra, 2015)

10. **Escarpment:** An **escarpment** usually refers to a long mountain with one side steep and another side gentle. The steep side is referred to as the scarp while the gentle side is referred to as the dip. The contour representations on the scarp are closely packed while that of the dip are widely spaced.

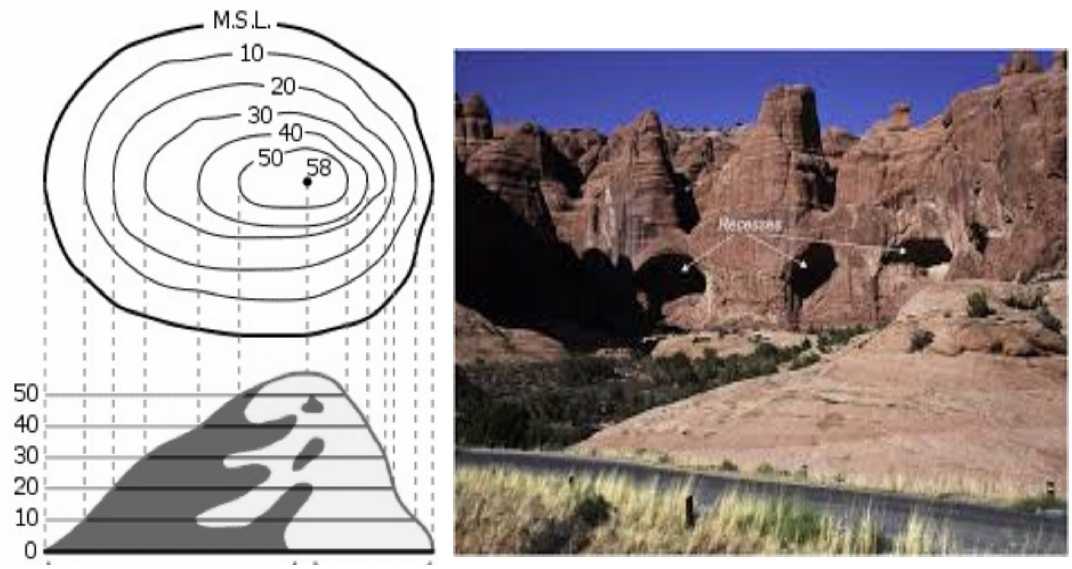


Fig. 4.26: Escarpment (Mishra, 2015)

11. **A ridge:** A ridge refers to a long, narrow, elevated area of land. It is also a type of topographic feature that is often found in mountainous or hilly terrain or area.

Fig. 4.27: A Ridge

12. **Saddle:** This is a wide or broad depression separating two high grounds or summits on a highland. It is important for road construction see Figure 4.28.
13. **Col:** This a shallow depression separating two summits. Not as broad as a saddle it is also good for road construction as shown in Figure 4.28.
14. **A Pass or Gap:** This is a very deep depression on a highland with the land on both sides of it standing very high with steep slopes as shown in Figure 4.28.

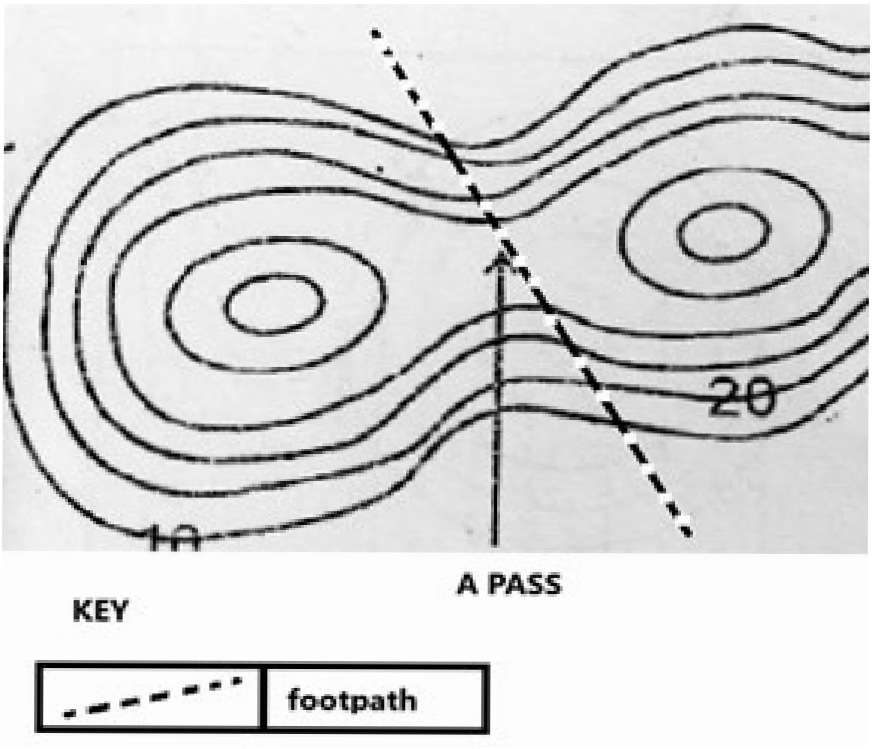


Fig. 4.28: A Saddle, a Col and a Pass or a Gap

15. **Knoll:** Knoll is a low, rounded hill or elevation or height that rises above the surrounding land, but is not as tall or prominent as a hill or mountain. Knolls are typically less than 30 meters (100 feet) in height as shown in Figure 4.29.

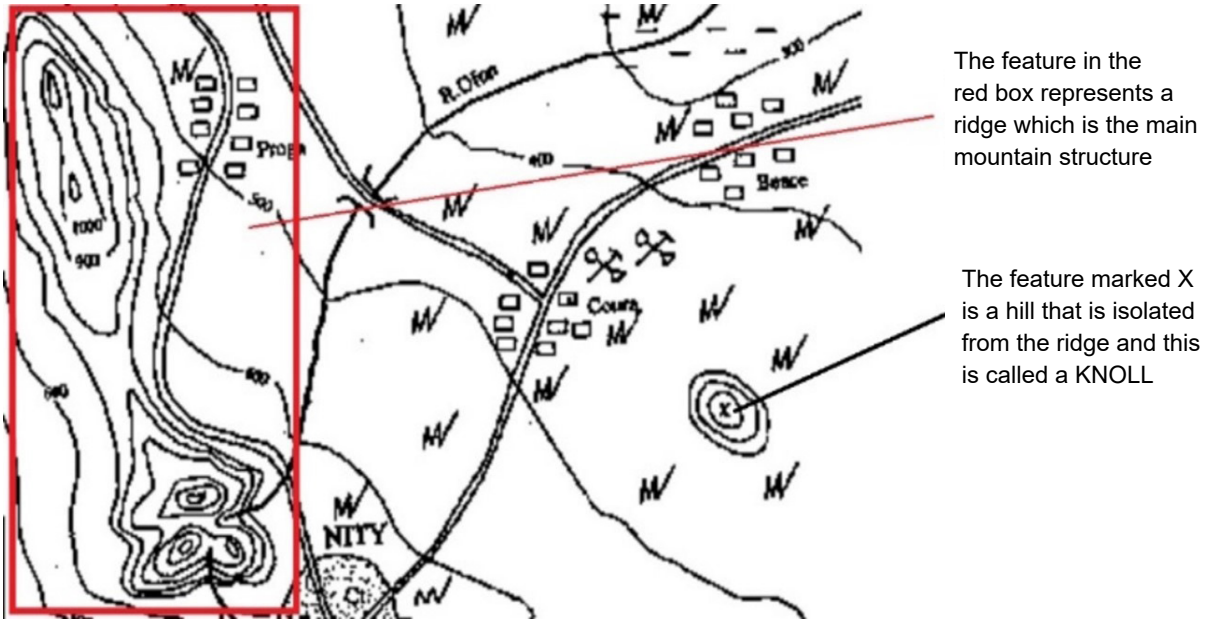


Fig. 4.29: A Knoll

16. **A gorge:** A gorge is a type of landform that refers to a deep, narrow valley with steep, rocky walls. The walls of a gorge are typically very steep, sometimes even cliff-like, giving the gorge a very deep, narrow appearance. as shown in Figure 4.30.

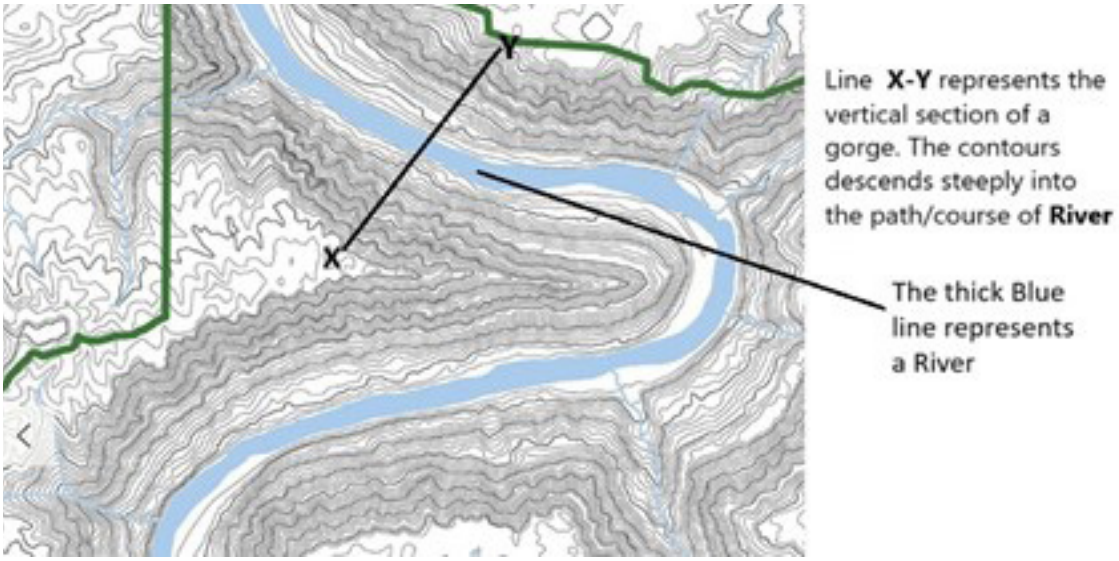
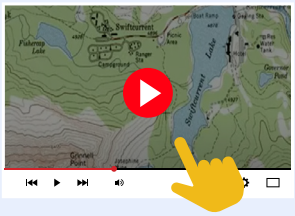


Fig. 4.30: A gorge

Activity 4.6

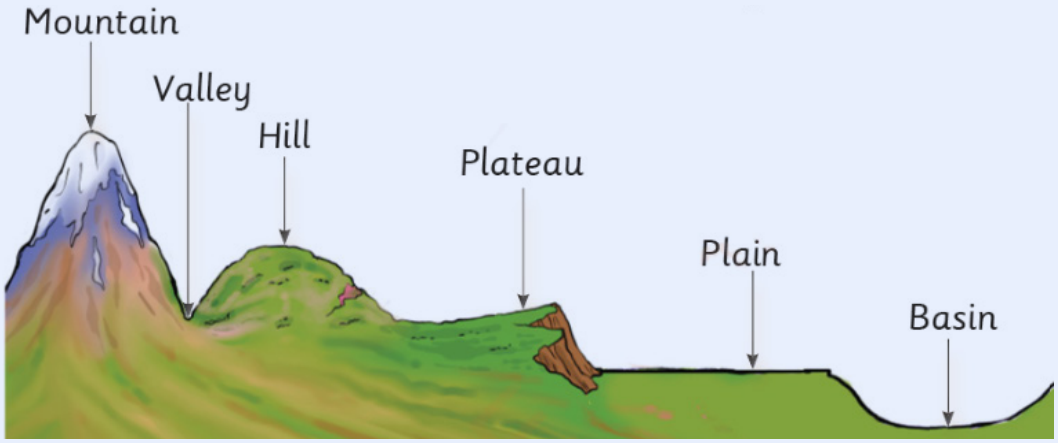
1. Visit the link below to watch videos on ways of showing relief on maps



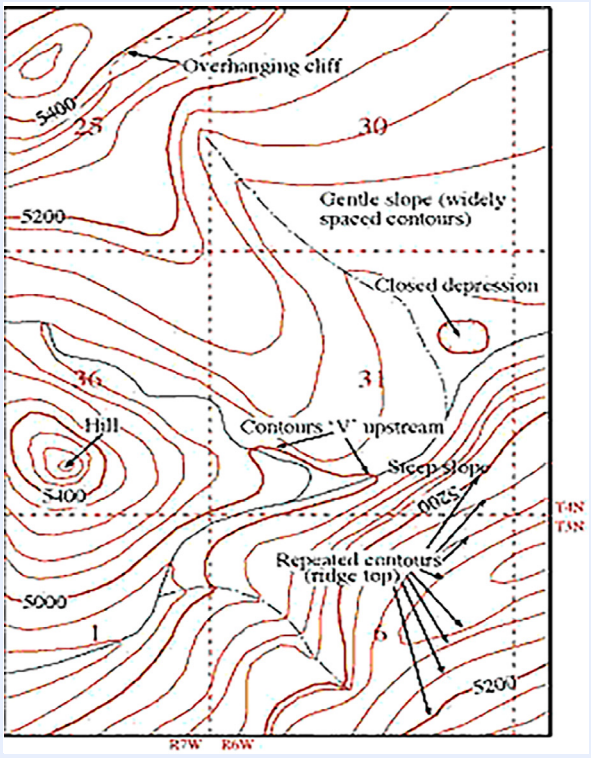
If you cannot access the video, check your school or local library or look for an internet café near your home.

2. Using a pencil and paper, sketch common contour line patterns, to represent the following:
   - Concentric circles (indicating a hill or mountain peak)
   - V-shaped contours (indicating a valley or stream)
   - Closely spaced contours (indicating a steep slope)
   - Widely spaced contours (indicating a gentle slope)

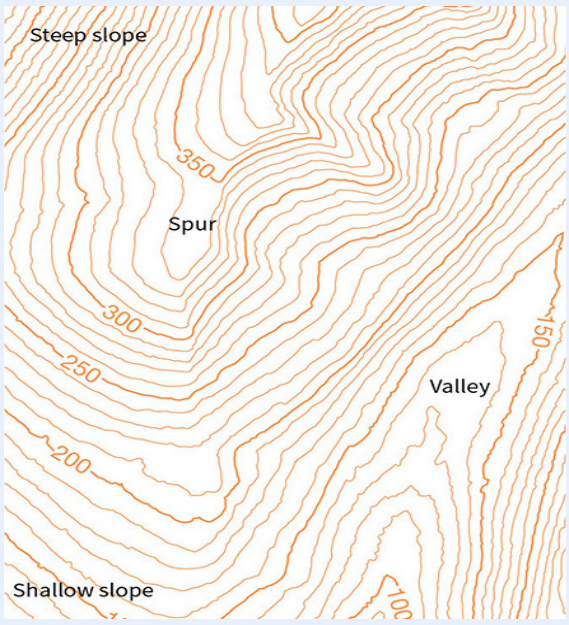
3. With the aid of the diagram below, write two characteristics of each of the relief features in the figure below



4. Using the given topographical map below, identify various relief features represented with contours. Mark and name the following specific landforms with the letters in the brackets and justify the answer.
   - Interlocking spurs (IS)
   - One cliff (CF)
   - One concave slope (CE)
   - One convex slope (CX)



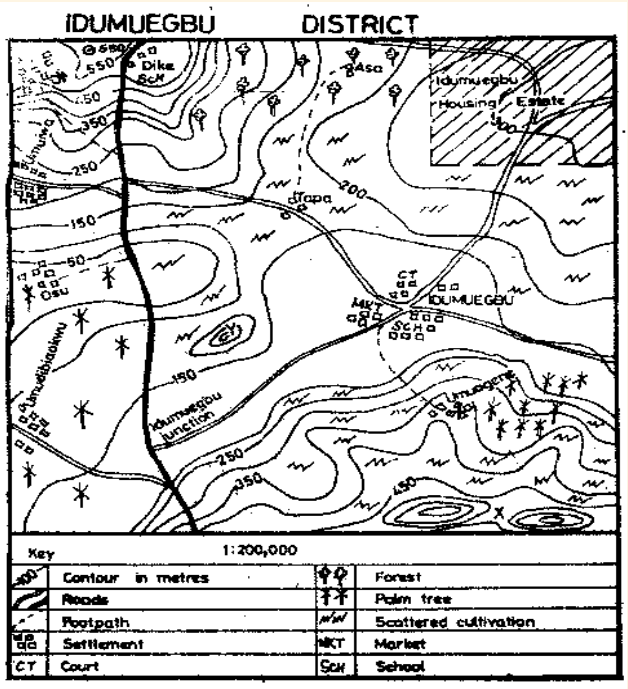
5. Use the contour map below to explain the concept of using three-dimensional (3D) maps to represent relief. At this stage, (demonstrate how contours show slopes,
   - explain what an index contour.
   - explain what an intermediate contour.
   - what the vertical interval (VI) represents and demonstrate how it is calculated.



What did I learn?

Review Questions

1. Refer to maps in a book or an Atlas, identify and discuss the purpose for the following map elements:
   a. Title
   b. Legend\Key
   c. Scale
   d. Date
   e. Authorship
2. How do maps help in the following activities?
   a. Navigation
   b. Town planning
   c. Population census
   d. National elections
3. Work in pairs and explain what the RF scale 1:100,000 means. Explain how it helps to measure distances on the ground.
4. Study the map of IDUMUEGBU DISTRICT and use it to answer this question



   a. Using compass points name and describe the relief features shown on the map area.
   b. Describe the types of slopes you can identify on the map.
   c. What is the name of the feature marked by X at the south-eastern corner of the map?

d. What is the name of the feature marked by Y in the middle of the map?
e. What is the contour interval of the map?

5. How do you understand the term relief on maps
6. With the aid of a diagram explain the following terms:
   a. Cliff
   b. Plateau
   c. Spur
7. How is a valley different from a spur?
8. What is the importance of the following in showing relief features
   a. index Contour
   b. intermediate contours.
   c. vertical interval

Extended Reading

- Acheampong P. K. (2014) Statistical mapping and map interpretation for Africa. UCC Press: Cape Coast. (*Map scales, types and their conversions*)
- Bunnett, R. (2003, April 28). General Geography in Diagrams. Longman. (*Methods of showing Relief on Map)*
- Dadson I. Y., Adu-Boahen K. & Owusu A. B. (2019). Essentials of physical geography (2nd Ed). Ghana: UCC Press.

Reference

1. Mishra, R. K. (2015). Mapping the knowledge topography: A critical appraisal of Geography textbook questions, *International Research in Geographical and Environmental Education*, 24(2), 118-130.
2. Tsibu, B. (2022). *Physical Geography for Senior High Schools*, Abundance of Grace Ent: Kumasi
3. Acheampong P. K. (2014) Statistical mapping and map interpretation for Africa. UCC Press: Cape Coast.
4. Bunnett, R. B. (2014). *General Geography in Diagrams,* Pearson Education: Singapore
5. Timesofindia.com (2023). Planets in our Solar System explained. *The Times of India.* https://timesofindia.indiatimes.com/education/learning-with-toi/planets-in-our-solar-system-explained/amp_articleshow/99595058.cms

Acknowledgements

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