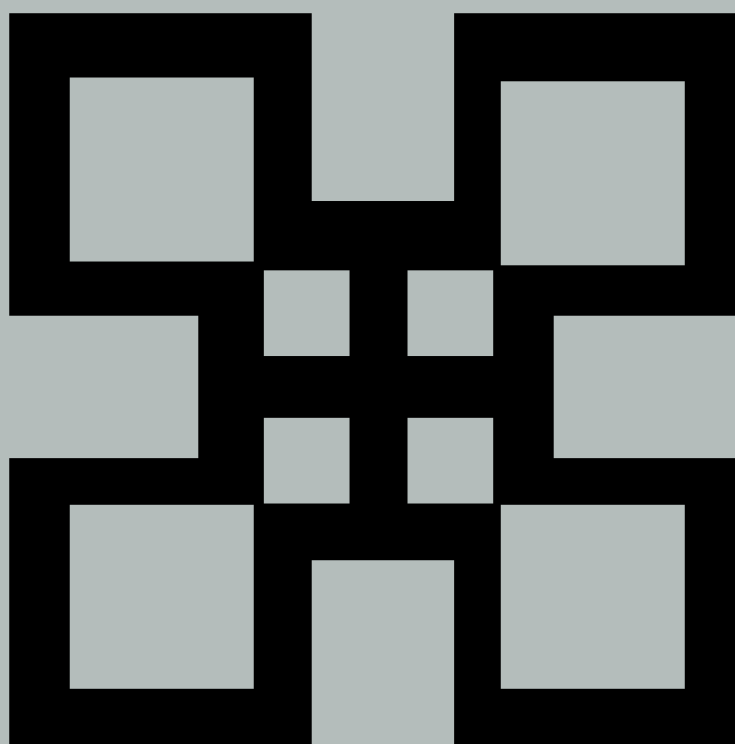


# Professional Learning Community Handbook

# Physics

Year One



Ghana Education  
Service (GES)



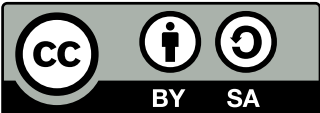
# Professional Learning Community Handbook

## Physics

Year One



REPUBLIC OF GHANA



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# Introduction

This Professional Learning Community (PLC) Handbook is designed to enable teachers to deliver effective lessons for Year One of the new Physics Curriculum. 'Effective' is defined as meaning that each lesson:

- i. Has a weekly learning plan which is aligned with the content and pedagogy set out in the relevant Teacher Manual;
- ii. Incorporates the relevant Learner Material which are available on the curriculum microsite;
- iii. Contains assessment strategies which are aligned with the Teacher Manual, Learner Material and Transcript Assessment Guidance;
- iv. Is delivered by the teacher in close adherence (Fidelity of Implementation) with i.) to iii.) above.

The PLC Handbook has a strong focus on assessment, outlining structured approaches to assessment derived from the Teacher Assessment Manual and Toolkit (TAMT), emphasising the attainment of learning outcomes, timely feedback to learners and recording learning outcomes accurately.

Additionally, this Handbook prescribes nine (9) main assessment events which teachers should score and record to constitute each learner's academic transcript for the academic year as follows: Two (2) Class exercises or Homework, one (1) Individual Portfolio, one (1) Group Project, two (2) Mid-semester examinations (in first and second semesters), two (2) End of Semester examinations (in first and second semester) and one (1) Individual project. It also promotes continuous weekly assessment for learning across all DoK levels, supporting teachers to deliver an all-inclusive education by inculcating 21<sup>st</sup> century skills, ICT, national values and support to special needs learners.

The TAMT identifies six modes of assessment which cover the nine events described above. The modes are described below.

- a. **Group project:** To enable learners to demonstrate specific skills or competencies, such as research, communication, teamwork, or creativity. It is recommended that group project work be given in week 2 and submitted in week 8 of the first semester.
- b. **Mid-semester examination:** To evaluate knowledge and understanding among learners on the learning outcome covering weeks 1-5 and administered in week 6 for 1<sup>st</sup> semester and week 13 – 17 and administered in week 18. It is recommended that multiple choice, essays and practical questions are used to assess the learning outcome. It is mandatory to have the scores of this examination recorded in the transcript
- c. **Homework: Prompt:** To reinforce learning, it is recommended that teachers give group and individual homework covering weeks 5,7,9,11,21, and 22, to learners covering the focal areas

- d. **End of semester examination:** This is the final assessment of each semester. It is recommended to be conducted at the end of the first and second semesters covering weeks 1-11 for the first semester and administer in week 12 and weeks 13 – 17 for the second semester to be administered in week 18. It is recommended that multiple choice, essays and practical questions are used to assess the learning outcomes. The scores for these assessments are to be recorded in the transcript in due date.
- e. **Class Exercise:** To allow for immediate feedback and clarification of concepts, it is recommended that teachers use week 1, 2, 3, 19, and 23 focal areas as class exercise. Ensure the assessment has all the DOK levels to help identify learners who may require special educational support on these focal areas.
- f. **Portfolio:** To adapt flexible assessment and determine learners' strengths and areas of intervention for improvement, it is recommended that teachers prompt learners in weeks 3, 5, 11, 15, 19, and 21 about creating their own portfolio to be submitted in week 22 for assessment.

# PLC SESSION 0: Internal Assessment Structure and Transcript System for SHS/SHTS and STEM Schools

## 1. Introduction (20 minutes)

This Professional Learning Community (PLC) session focuses on enhancing internal assessment and transcript system to ensure it aligns with the new Senior High School, Senior High Technical School and Science, Technology, Engineering and Mathematics curriculum and effectively supports student learning.

In this session, you will discuss the structure and frequency of assessments, strategies for involving learners in the assessment process, methods for providing constructive feedback and the implementation of a robust transcript system.

- 1.1 Share two ways in which you have used assessment in the past to support teaching and learning.
- 1.2 Share your observation on how a colleague used assessment in the past to support teaching and learning.

## 2. Internal assessment structure and frequency (60 minutes)

- 2.1 Read the purpose, learning outcome and learning indicators for the session.

### **Purpose**

The purpose of the session is to strengthen teachers' understanding and competence in assessment techniques to effectively teach and assess the new SHS, SHTS and STEM Curriculum.

### **Learning Outcome**

To ensure teachers understand the assessment structure and acquire the skill to design, administer and provide feedback of the assessments that accurately reflect the learning outcomes for each week.

### **Learning Indicators**

1. Discuss the formative and summative assessment strategies recommended for the new curriculum.
  2. Discuss in detail, the relevance and structure of the assessment transcript system and its use/implementation.
- 2.2 Discuss *formative assessment strategies* which can be used in your subject area.

### **E.g.**

*Questioning, etc.*



**2.3** Discuss *summative assessment strategies* which can be used in your subject area.

**E.g.**

*End of Semester Examinations, etc.*

**2.4** Discuss as a subject group how you would administer a given assessment strategy.

**E.g.**

*Class Exercise:*

- i. *Inform learners ahead of time*
- ii. *Write the questions on the board, etc.*

**2.5** Discuss methods of providing constructive feedback to learners on their performance.

**E.g.**

*Provide individual comments on learners' work, etc.*

**2.6** Discuss as a subject group some of the do's and don'ts of constructing assessment items/tasks.

**E.g.**

*Do: Align the purpose of the assessment with the task, etc.*

*Don't: Do not give clues in the stem, etc.*

**2.7** Discuss as a subject group the main assessments that would be recorded in the transcript system in the academic year.

**E.g.**

*Class exercise, etc.*

**2.8** Discuss how and where you would record and submit learners' assessments for the transcript system.

**E.g.**

*Record learners scores immediately, etc.*

### **3. Reflection (10 minutes)**

**3.1** Reflect and share your views on the session.

**3.2** Remember to:

- a) read PLC Session 1 and related Learner Material
- b) bring along your Teacher Manual, PLC Handbook and learning plan on *week 1* in preparation for the next session.

# PLC SESSION 1: Introduction to Physics and Matter

## 1. Introduction (20 minutes)

- 1.1 Share two things you did in the classroom based on your experience in the various PLC sessions you have attended (NTS 1a, 1b and 2e).
- 1.2 Share your observation on what a colleague did by way of application of lessons learned from previous PLC sessions attended (NTS 2e, 2f, 3d– 3j).

## 2. Review of learning plans (60 minutes)

- 2.1 Read the purpose, learning outcome and learning indicators for the session.

### Purpose

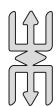
The purpose of the session is to review the learning plan for *week 1* by aligning the plan with the Learner Material and appropriate assessment strategies.

### Learning Outcome

Review your learning plan for *week 1* considering the cross-cutting issues (NTS 2b, 2c, 2e, 2f, 3a, 3d, 3e, 3g–3k and 3o).

### Learning Indicators

1. Review the activities in the Learner Material and identify appropriate activities based on the pedagogical approaches in the Teacher Manual that can support your lesson for the week.
  2. Discuss and develop assessment tasks and rubrics/marking scheme for the learning indicators for the week.
- 2.2 Review the pedagogical approaches proposed for teaching *week 1* in your learning plan, identify activities that align with those in the Learner Material. Indicate the activity (ies) in your learning plan (NTS 2a–2f, 3a–3j).



### Note

*The selected activities should be included in the teacher/learner activity section of the learning plan*

- 2.3 Develop assessment tasks/items based on the learning indicators for the week. This week's recommended mode of assessment is **class exercise (individual)** (NTS 3k, 3p).

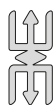
### E.g.

*Identify three Physics related careers in your community.*

*Refer to the Teacher Manual Book 1 page 14 or the Learner Material Section 1 for more assessment task.*

**Hint**

Give a task on portfolio in week 1 to be submitted in week 22. See **Appendix A** for the details of how to conduct portfolio assessment.

**Note**

- i. The assessment tasks may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.
- ii. The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities in the learning plan.

**2.4** Discuss (and agree as a subject group) how you will develop the marking scheme/ rubrics for scoring the assessment task(s)/item(s) for the week's recommended assessment (NTS 3n-3p).

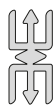
**E.g.**

*Physics related careers in the community such as, welding, vulcanising, Medicine, Engineering, Classical Mechanics, optics, thermodynamics, Quantum Mechanics etc.*

*Three of the above and other relevant response.*

*1 mark for each correct answer*

**Total – 3 marks**

**Note**

- i. The marking scheme and rubrics for scoring the assessment tasks/items should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities in the learning plan.
- ii. Take into consideration different modes of responses provided by learners.
- iii. Discuss how you will observe and integrate character qualities, national values and 21<sup>st</sup> century skills that align with the lesson for the week and include these in your scoring

**2.5** Discuss how you will administer the assessment tasks/item(s) as a subject group (NTS 3n-3p)

**E.g.**

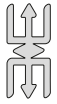
*Give clear instructions and move round the classroom to support learners with difficulty, etc.*

*Refer to the Teacher Assessment Manual and Toolkit page 79 for more information on how to administer class exercise.*

**2.6** Discuss how to provide feedback, and where appropriate, record and submit the assessment scores for each learner in the class (NTS 3l- 3n)

**E.g.**

*Share the scoring rubrics with the learners by projecting, printing or writing and discuss the results of the class exercise with learners highlighting their strength and areas of improvement, etc.*



#### Note

*In giving feedback on assessment tasks/items, guide learners to make the necessary corrections that will improve learning.*

### 3. Reflection (10 minutes)

**3.1** Reflect and share your views on the session (NTS 1a, 1b).

**3.2** Identify a critical friend to observe your lesson in relation to PLC Session 1 to provide feedback on your lesson (NTS 1f, 3g).

**3.3** Remember to:

- a) provide constructive feedback to learners and record their assessment scores in the required format and document where appropriate (NTS 3l – 3n).
- b) read PLC Session 2 and related Learner Material (NTS 3a).
- c) bring along your Teacher Manual, PLC Handbook and learning plan on *week 2* in preparation for the next session (NTS 3a).



## Appendix A: Example of Portfolio for Performance Assessment (Individual)

### Task

Build a portfolio of your academic journey for the year to help identify your strength and areas of improvement.

### Artefact (items) to be included in the Portfolio

#### E.g.

- a) Learner's class exercise and homework book for Physics.
- b) Individual project work
- c) A copy of group project.
- d) Research work/case study
- e) Reports of practical works

### Structure and organisation of the Portfolio

As part of the structure of the portfolio, ensure that the following information has been provided:

- a) Cover Page (Title, Student name, Class, Date of submission)
- b) Table of Contents

### Feedback

- a) Provide feedback at each checkpoint.
- b) Give detailed feedback on the entire portfolio to individual learners, highlighting their overall performance.

### Rubrics for scoring

#### E.g.

- |   |          |
|---|----------|
| a) Cover page   | 2 marks  |
| b) Table of content                                       | 3 marks  |
| c) Learner's class exercise and homework book for Physics | 10 marks |
| d) Individual project work                                | 10 marks |
| e) A copy of group project                                | 5 marks  |
| f) Research work  | 5 marks  |
| g) Reports of practical works                             | 5 marks  |

### Mode of Administration

- a) Determine the purpose of the portfolio and decide how the results of a portfolio evaluation will be used to inform the subject.

- b) *Identify the learning outcomes the portfolio will address and decide what learners will include in their portfolio.*
- c) *Establish standards of performance and examples (e.g., examples of a high, medium, and low-scoring portfolio).*
- d) *Prompt learners at intermittent interval to arouse the alertness for safe keeping of artefacts*
- e) *Mark and record learners' performances*

*Refer to Teacher Assessment Manual and Toolkit page 27 for more information on how to administer.*

# PLC SESSION 2: Introduction to Physics and Matter

## 1. Introduction (20 minutes)

**1.1** Share one thing on the lesson for *week 1* delivered last week that:

- a) went well (NTS 1a, 1b and 2a–2e)
- b) you found challenging (NTS 1a, 1b and 2a–2e)

**1.2** Share your experience in conducting and/or recording the assessment for the previous week.

**1.3** Share your observation on what a colleague did by way of application of lessons learned from the previous session for *week 1* that supported learning (NTS 2e, 2f, 3d–3j).

## 2. Review of Learning Plans (60 minutes)

**2.1** Read the purpose, learning outcome and learning indicators for the session:

### Purpose

The purpose of the session is to review the learning plan for *week 2* by aligning the learning plan with Learner Material and appropriate assessment strategies.

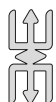
### Learning Outcome

Review your learning plan for *week 2* considering the cross-cutting issues (NTS 2b, 2c, 2e, 2f, 3a, 3d, 3e, 3g–3k and 3o).

### Learning Indicators

1. Review the activities in the Learner Material and identify appropriate activities based on the pedagogical approaches in the Teacher Manual that can support your lesson for the week.
2. Discuss and develop assessment tasks and rubrics/marking scheme for the learning indicators for the week.

**2.2** Review the pedagogical approaches proposed for teaching *week 2* in your learning plan, identify activities that align with these in the Learner Material. Indicate the activity (ies) in your learning plan (NTS 2a–2f, 3a–3j).



### Note

*The selected activities should be included in the teacher/learner activity section of the learning plan.*

**2.3** Develop assessment tasks/items based on the learning indicator(s) on assessment for the week. This week's recommended mode of assessment is **discussion** (NTS 3k, 3p).

**E.g.**

*Discuss why a reading can be precise but inaccurate.*

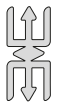
*Refer to the Teacher Manual page 17 and Learner Material section 1 for more assessment task*

#### Hint



*Give a group project work to learners this week (week 2). See Appendix B for a sample group project.*

#### Note



- i. *The assessment tasks/items may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.*
- ii. *The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities of the learning plan.*

**2.4** Discuss (and agree as a subject group) how you will develop the marking scheme/ rubrics for scoring the assessment task(s)/item(s) for the week's recommended assessment (NTS 3n–3p).

**E.g.**

*Relevant and clear example illustrating a situation where measurements are precise but inaccurate, effectively showing the concept such as:*

**Precision:** *consider key word as consistency or repeatability of measurements in learners' responses*

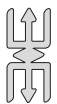
**Accuracy:** *consider key words as closeness of measurement, true or accepted value in learners' responses.*

*2 marks each for correct response with key word(s).*

*1 mark each for a response without key word(s).*

**Total – 4 marks**

#### Note



- i. *The marking scheme and rubrics for scoring the assessment tasks/items should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities in the learning plan.*
- ii. *Take into consideration different modes of responses provided by learners.*
- iii. *Discuss how you will observe and integrate character qualities, national values and 21<sup>st</sup> century skills that align with the lesson for the week and include these in your scoring.*



**2.5** Discuss how you will administer the assessment task(s)/item(s) as a subject group (NTS 3n–3p).

**E.g.**

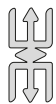
*Share the discussion guide with learners and give them targeted support by moving from group to group.*

*Refer to Teacher Assessment Manual and Toolkit (TAMT) pages 66 – 67 for more information on how to administer discussion.*

**2.6** Discuss how to provide feedback, and where appropriate, record and submit the assessment scores for each learner in the class (NTS 3l– 3n)

**E.g.**

*Assist learners to reflect on the discussion and relate it to the learning outcomes highlighting learners' strength and areas of improvement, etc.*



#### Note

*In giving feedback on assessment tasks/items, guide learners to make the necessary corrections that will improve learning.*

### 3. Reflection (10 minutes)

**3.1** Reflect and share your views on the session (NTS 1a, 1b).

**3.2** Identify a critical friend to observe your lesson in relation to PLC Session 2 and provide feedback on your lesson (NTS 1f, 3g).

**3.3** Remember to:

- a) provide constructive feedback to learners and record their assessment scores in the required format and document where appropriate (NTS 3l – 3n).
- b) read PLC Session 3 and related Learner Material (NTS 3a).
- c) bring along your Teacher Manual, PLC Handbook and learning plan on *week 3* in preparation for the next session (NTS 3a).



## Appendix B: Example of Group Project Work

### Task

Conduct research to explore the practical applications of physics in various aspects of everyday life and write a report on the findings.

### How to Administer

(A research report is a structured document that presents the results of a detailed investigation or study on a specific topic). Refer to the Teacher Assessment Manual and Toolkit pages 77–80 for more information on how to administer the project.

- a) At the beginning of lessons for week 2, inform learners that there will be a group project for them. Set out the questions and scoring guide before week 2 begins.
- b) Help the learners to form convenient groups in the classroom by leveraging on GESI, SEL, ability levels.
- c) Provide a list of potential topics related to the practical applications of physics in everyday life such as mechanics, energy and thermodynamics, electricity and magnetism or waves and optics.
- d) Outline the research objectives and expected outcomes, provide recommended sources, and encourage expert interviews if possible.
- e) Set clear deadlines for each phase of the project, such as topic selection, preliminary research, drafting, and final report submission as suggested in Table 1.1. Schedule periodic check-ins to monitor progress and provide feedback.
- f) Provide a template or guidelines for the report structure. A suggested outline might include.
  - i. **Title** – Topic or focus
  - ii. **Introduction** – Overview of the research work
  - iii. **Results and Findings** – Data presentation
  - iv. **Discussion** – Interpretation of findings
  - v. **Conclusion** – Summary and recommendations

Table 1.1 Project Report Timeline

Task	Description	Deadline
Group Formation	Organise learners into groups	week 2
Topic Selection	Choose and finalise the project topic	week 2
Preliminary Research	Gather initial information and resources.	week 4
Expert Interviews	Conduct interviews with professionals, if applicable.	week 5
Draft Report	Write the first draft of the project report.	week 6

Task	Description	Deadline
Feedback and Revisions	Receive feedback from peers/teachers and revise accordingly.	week 6
Final Report Submission	Submit the completed project report.	week 8

### **Feedback**

Have each group share their success stories and difficulties encountered during data collection for the project, as well as how they overcame them.

### **Rubrics for scoring**

**E.g.**

30 marks in all

1. Clear and concise title and directly related to physics exploration (5 marks)
2. Provides a comprehensive overview with clear objectives and context for the introduction. (5 marks)
3. Report includes a wide range of sources and detailed understanding of physics applications and also effectively communicates findings with visual aids. (10 marks)
4. Provides insightful interpretation of findings with strong connections to the research question. (5 marks)
5. Provides a summary or conclusion. (5 marks)

# PLC SESSION 3: Introduction to Physics and Matter

## 1. Introduction (20 minutes)

**1.1** Share one thing on the lesson for *week 2* delivered last week that:

- a) Went well (NTS 1a, 1b and 2a-2e)
- b) You found challenging (NTS 1a, 1b and 2a-2e)

**1.2** Share your experience in conducting and/or recording the assessment for the previous week.

**1.3** Share your observation on what a colleague did by way of application of lessons learned from the previous session for *week 2* that supported learning (NTS 2e, 2f, 3d-3j).

## 1. Review of Learning Plans (60 minutes)

**2.1** Read the purpose, learning outcome and learning indicators for the session:

### Purpose

The purpose of the session is to review the learning plan for *week 3* by aligning the learning plan with Learner Material and appropriate assessment strategies.

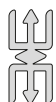
### Learning Outcome

Review your learning plan for *week 3* considering the cross-cutting issues (NTS 2b, 2c, 2e, 2f, 3a, 3d, 3e, 3g-3k and 3o).

### Learning Indicators

1. Review the activities in the Learner Material and identify appropriate activities based on the pedagogical approaches in the Teacher Manual that can support your lesson for the week.
2. Discuss and develop assessment tasks and rubrics/marking scheme for the learning indicators for the week.

**2.2** Review the pedagogical approaches proposed for teaching *week 3* in your learning plan, identify activities that align with these in the Learner Material. Indicate the activity (ies) in your learning plan (NTS 2a-2f, 3a-3j).



### Note

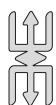
*The selected activities should be included in the teacher/learner activity section of the learning plan.*

**2.3** Develop assessment tasks/items based on the learning indicator(s) on assessment for the week. This week's recommended mode of assessment is **homework (individual)** (NTS 3k, 3p).

**E.g.**

- a. Convert the following:
  - i.  $20 \text{ cm}^2$  to  $\text{m}^2$ .
  - ii.  $72 \text{ kmhr}^{-1}$  to  $\text{ms}^{-1}$

Refer to Teacher Manual pages 21 – 22 and Learner Material section 1 for more task examples



#### Note

- i. The assessment tasks/items may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.
- ii. The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities of the learning plan.

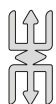
**2.4** Discuss (and agree as a subject group) how you will develop the marking scheme/rubrics for scoring the assessment task(s)/item(s) for the week's recommended assessment (NTS 3n-3p).

**E.g.**

Correctly converts 100 cm to 1 m (30 cm to 0.30 meters) = 1 mark

Clearly shows the correct method and all necessary calculations for converting 30 cm to meters such as  $20 \text{ cm}^2 = \frac{20}{100 \times 100} = 0.002 \text{ m}^2 = 2 \text{ mark}$

**Total – 3marks**



#### Note

- i. The marking scheme and rubrics for scoring the assessment tasks/items should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities in the learning plan.
- ii. Take into consideration different modes of responses provided by learners.
- iii. Discuss how you will observe and integrate character qualities, national values and 21<sup>st</sup> century skills that align with the lesson for the week and include these in your scoring.

**2.5** Discuss how you will administer the assessment task(s)/item(s) as a subject group (NTS 3n-3p).

**E.g.**

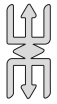
Give clear instruction about the homework and provide or direct learners to sources of materials for the performance of the homework.

Refer to the *Teacher Assessment Manual and Toolkit* pages 57–60 for information on how to conduct homework.

- 2.6** Discuss how to provide feedback, and where appropriate, record and submit the assessment scores for each learner in the class (NTS 3l– 3n).

**E.g.**

*Analyse learners' work to know if they have followed the instructions given to them, note their strengths and weaknesses, etc.*



#### Note

*In giving feedback on assessment tasks/items, guide learners to make the necessary corrections that will improve learning.*

### 3. Reflection (10 minutes)

- 3.1** Reflect and share your views on the session (NTS 1a, 1b).
- 3.2** Identify a critical friend to observe your lesson in relation to PLC Session 3 and provide feedback on your lesson (NTS 1f, 3g).
- 3.3** Remember to:
- Provide constructive feedback to learners and record their assessment scores in the required format and document where appropriate (NTS 3l – 3n).
  - Read PLC Session 4 and related Learner Material (NTS 3a).
  - Bring along your Teacher Manual, PLC Handbook and learning plan on *week 4* in preparation for the next session (NTS 3a).

# PLC SESSION 4: Introduction to Physics and Matter

## 1. Introduction (20 minutes)

**1.1** Share one thing on the lesson for *week 3* delivered last week that:

- a) went well (NTS 1a, 1b and 2a–2e)
- b) you found challenging (NTS 1a, 1b and 2a–2e)

**1.2** Share your experience in conducting and/or recording the assessment for the previous week.

**1.3** Share your observation on what a colleague did by way of application of lessons learned from the previous session for *week 3* that supported learning (NTS 2e, 2f, 3d–3j).

## 1. Review of Learning Plans (60 minutes)

**2.1** Read the purpose, learning outcome and learning indicators for the session:

### Purpose

The purpose of the session is to review the learning plan for *week 4* by aligning the learning plan with Learner Material and appropriate assessment strategies.

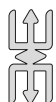
### Learning Outcome

Review your learning plan for *week 4* considering the cross-cutting issues (NTS 2b, 2c, 2e, 2f, 3a, 3d, 3e, 3g–3k and 3o).

### Learning Indicators

1. Review the activities in the Learner Material and identify appropriate activities based on the pedagogical approaches in the Teacher Manual that can support your lesson for the week.
2. Discuss and develop assessment tasks and rubrics/marking scheme for the learning indicators for the week.

**2.2** Review the pedagogical approaches proposed for teaching *week 4* in your learning plan, identify activities that align with these in the Learner Material. Indicate the activity (ies) in your learning plan (NTS 2a–2f, 3a–3j).



### Note

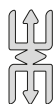
*The selected activities should be included in the teacher/learner activity section of the learning plan.*

**2.3** Develop assessment tasks/items based on the learning indicator(s) on assessment for the week. This week's recommended mode of assessment is **poster presentation** (NTS 3k, 3p)

**E.g.**

*Describe the molecular arrangement in solid, liquid and gas.*

*Refer to Teacher Manual pages 23 – 24 and Learner Material section 1 for more task examples*



#### Note

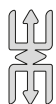
- i. *The assessment tasks/items may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.*
- ii. *The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities of the learning plan.*

**2.4** Discuss (and agree as a subject group) how you will develop the marking scheme/rubrics for scoring the assessment task(s)/item(s) for the week's recommended assessment (NTS 3n-3p).

**E.g.**

*Describes the molecular arrangement in solids, liquids, and gases with accurate explanations such as in solids, molecules are tightly packed and held together by strong intermolecular forces etc. for 2 marks each*

**Total = 6 marks**



#### Note

- i. *The marking scheme and rubrics for scoring the assessment tasks/items should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities in the learning plan.*
- ii. *Take into consideration different modes of responses provided by learners.*
- iii. *Discuss how you will observe and integrate character qualities, national values and 21<sup>st</sup> century skills that align with the lesson for the week and include these in your scoring.*

**2.2** Discuss how you will administer the assessment task(s)/item(s) as a subject group (NTS 3n-3p).

**E.g.**

*Provide resources to help learners prepare their presentations, and assist them to give feedback to each other on the presentation indicating the areas of strength and areas for improvement etc.*

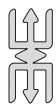
*Refer to Teacher Assessment Manual and Toolkit page 14 for more information on how to conduct poster presentation.*



- 2.6** Discuss how to provide feedback, and where appropriate, record and submit the assessment scores for each learner in the class (NTS 3l– 3n).

**E.g.**

*Give learners the opportunity to share what went well with their work and what was challenging, etc.*



**Note**

*In giving feedback on assessment tasks/items, guide learners to make the necessary corrections that will improve learning.*

### 3. Reflection (10 minutes)

- 3.1** Reflect and share your views on the session (NTS 1a, 1b).
- 3.2** Identify a critical friend to observe your lesson in relation to PLC Session 4 and provide feedback on your lesson (NTS 1f, 3g)

Remember to:

- a) Provide constructive feedback to learners and record their assessment scores in the required format and document where appropriate (NTS 3l – 3n).
- b) Read PLC Session 5 and related Learner Material (NTS 3a).
- c) Bring along your Teacher Manual, PLC Handbook and learning plan on *week 5* in preparation for the next session (NTS 3a).

## PLC SESSION 5: Motion and Pressure

### 1. Introduction (20 minutes)

**1.1** Share one thing on the lesson for *week 4* delivered last week that:

- a) Went well (NTS 1a, 1b and 2a–2e).
- b) you found challenging (NTS 1a, 1b and 2a–2e).

**1.2** Share your experience in conducting and/or recording the assessment for the previous week.

**1.3** Share your observation on what a colleague did by way of application of lessons learned from the previous session for *week 4* that supported learning (NTS 2e, 2f, 3d–3j).

### 2. Review of Learning Plans (60 minutes)

**2.1** Read the purpose, learning outcome and learning indicators for the session:

#### Purpose

The purpose of the session is to review the learning plan for *week 5* by aligning the learning plan with Learner Material and appropriate assessment strategies.

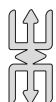
#### Learning Outcome

Review your learning plan for *week 5* considering the cross-cutting issues (NTS 2b, 2c, 2e, 2f, 3a, 3d, 3e, 3g–3k and 3o).

#### Learning Indicators

1. Review the activities in the Learner Material and identify appropriate activities based on the pedagogical approaches in the Teacher Manual that can support your lesson for the week.
2. Discuss and develop assessment tasks and rubrics/marking scheme for the learning indicators for the week.

**2.2** Review the pedagogical approaches proposed for teaching *week 5* in your learning plan, identify activities that align with these in the Learner Material. Indicate the activity (ies) in your learning plan (NTS 2a – 2f, 3a – 3j).



#### Note

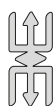
*The selected activities should be included in the teacher/learner activity section of the learning plan.*

**2.3** Develop assessment tasks/items based on the learning indicator(s) on assessment for the week. This week's recommended mode of assessment is **essay type** (NTS 3k, 3p).

**E.g.**

*Describe two types of motion and how it is applied to our every life.*

*Refer to the Teacher Manual pages 26 – 32 and LM section 2 for more information on the assessment task.*



#### Note

- i. *The assessment tasks/items may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.*
- ii. *The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities of the learning plan.*

**2.4** Discuss (and agree as a subject group) how you will develop the marking scheme/ rubrics for scoring the assessment task(s)/item(s) for the week's recommended assessment (NTS 3n-3p).

**E.g.**

a) *Provides a definition motion (consider continuous change in position of an object).*

*2 marks for a definition with the key terms/words*

*1 mark for a definition without key terms/words*

*Correct identification and description of two different types of motion (consider Translational Motion*

*Uniform Motion*

*Non-uniform Motion*

*Rotational Motion*

*Periodic Motion*

*Oscillatory Motion*

*Linear Motion.*

*Projectile Motion*

*Circular Motion*

*Relative Motion*

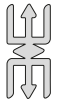
*Curvilinear Motion*

*Accelerated Motion*

*Any two of the above should be scored. Consider the type of motion equation, law and object movement in learners' response in description.*

*2 marks for each correct response*

**Total – 10 marks**



**Note**

- i. *The marking scheme and rubrics for scoring the assessment tasks/items should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities in the learning plan.*
- ii. *Take into consideration different modes of responses provided by learners.*
- iii. *Discuss how you will observe and integrate character qualities, national values and 21<sup>st</sup> century skills that align with the lesson for the week and include these in your scoring.*

**2.5** Discuss how you will administer the assessment task(s)/item(s) as a subject group (NTS 3n–3p).

**E.g.**

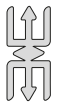
*Provide resources such as textbooks, online links/URL, or reference materials, to support learners in completing the assignment successfully, etc.*

*Refer to Teacher Assessment Manual and Toolkit page 97 for essay type as an assessment strategy*

**2.6** Discuss how to provide feedback, and where appropriate, record and submit the assessment scores for each learner in the class (NTS 3l– 3n).

**E.g.**

*Analyse learners' work to know if they have followed the instructions given to them, note their strengths and areas of improvement, etc.*



**Note**

*In giving feedback on assessment tasks/items, guide learners to make the necessary corrections that will improve learning.*

### 3. Reflection (10 minutes)

**3.1** Reflect and share your views on the session (NTS 1a, 1b).

**3.2** Identify a critical friend to observe your lesson in relation to PLC Session 5 to provide feedback on your lesson (NTS 1f, 3g).

**3.3** Remember to:

- a) provide constructive feedback to learners and record their assessment scores in the required format and document where appropriate (NTS 3l – 3n)
- b) read PLC Session 6 and related Learner Material (NTS 3a)
- c) bring along your Teacher Manual, PLC Handbook and learning plan on *week 6* in preparation for the next session (NTS 3a).

# PLC SESSION 6: Preparing for Mid-Semester Examination

## 1. Introduction (20 minutes)

**1.1** Share one thing on the lesson for *week 5* delivered last week that:

- a) went well (NTS 1a, 1b and 2a-2e)
- b) you found challenging (NTS 1a, 1b and 2a-2e)

**1.2** Share your experience in conducting and/or recording the assessment for the previous week.

**1.3** Share your observation on what a colleague did by way of application of lessons learned from the previous session for *week 5* that supported learning (NTS 2e, 2f, 3d-3j)

## 2. Review of Learning Plans (60 minutes)

**2.1** Read the purpose, learning outcome and learning indicators for the session:

### Purpose

The purpose of the session is to review the learning plan for *week 6 lessons and mid-semester examination* by aligning the learning plan with Learner Material and appropriate assessment strategies.

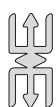
### Learning Outcome

Review your learning plan for *week 6 and prepare for mid-semester examination* considering the cross-cutting issues (NTS 2b, 2c, 2e, 2f, 3a, 3d, 3e, 3g-3k and 3o).

### Learning Indicators

- 1 Review the activities in the Learner Material and identify appropriate activities based on the pedagogical approaches in the Teacher Manual that can support your lesson for the week.
- 2 Discuss and develop assessment tasks and rubrics/marking scheme for the learning indicators for the week.

**2.2** Review the pedagogical approaches proposed for teaching *week 6* in your learning plan, identify activities that align with these in the Learner Material. Indicate the activity (ies) in your learning plan (NTS 2a – 2f, 3a – 3j)



### Note

The selected activities should be included in the teacher/learner activity section of the learning plan.

**2.3** Develop assessment tasks/items based on the learning indicator(s) on assessment for the week. This week's recommended mode of assessment is **mid-semester examination** (NTS 3k, 3p).

**E.g.**

1. Set 10 Multiple choice Questions (MCQs) from week 1 to 5

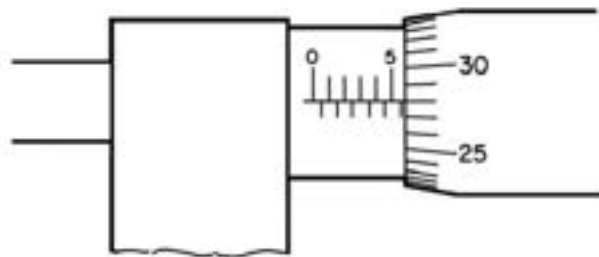
*Which of the following is a dimension of Force?*

- a)  $LT^{-1}$
- b)  $LT^{-2}$
- c)  $MLT^{-2}$
- d)  $MLT^{-3}$

1. Essay- 3 Questions (Learners should answer 1)

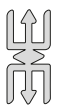
*A race car accelerates uniformly from  $18 \text{ m s}^{-1}$  to  $45 \text{ m s}^{-1}$  in 2 seconds. Determine the acceleration of the car.*

2. Practical (1 question)



*What is the reading of the micrometer screw gauge shown in the figure above?*

Refer to **Appendix C** for more details of the Table of Specification and nature of the mid-semester examination



#### Note

- i. The assessment tasks/items may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.
- ii. The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities of the learning plan.

**2.4** Discuss (and agree as a subject group) how you will develop the marking scheme/ rubrics for scoring the assessment task(s)/item(s) for the week's recommended assessment (NTS 3k, 3p)

**E.g.**

- a) Correct option (C)

*1 mark for each correct answer (10 questions)*

**Total – 10 marks**

- b) *Correctly identifying and writing the acceleration formula such as  $a = \frac{v - u}{t}$*

**Score 2 marks**

*Correct substitution of data such as  $a = \frac{45 - 18}{2}$  for 2 marks.*

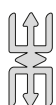
*Stating the correct final answer with appropriate units as acceleration of the car is  $13.5 \text{ m/s}^2 = 1 \text{ mark}$*

- c) *Accurately reading the main scale value such as 5.00 mm = 2 marks*

*Accurately reading the thimble scale such as 28 multiply by 0.01 accuracy 0.28mm = 2 marks*

*Correctly combining the main scale and thimble scale 5.28 mm = 1 mark*

**Total – 10 marks**



**Note**

- i. *The marking scheme and rubrics for scoring the assessment tasks/items should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities in the learning plan.*
- ii. *Take into consideration different modes of responses provided by learners.*
- iii. *Discuss how you will observe and integrate character qualities, national values and 21<sup>st</sup> century skills that align with the lesson for the week and include these in your scoring.*

- 2.5** Discuss how you will administer the assessment task(s)/item(s) as a subject group (NTS 3n-3p)

**E.g.**

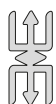
*Give specific instruction to learners for the mid-semester and move around the classroom to monitor in order to check cheating, etc.*

*Refer to Teacher Assessment Manual and Toolkit page 82 for more information on how to administer*

- 2.6** Discuss how to provide feedback, and where appropriate, record and submit the assessment scores for each learner in the class (NTS 3l – 3n).

**E.g.**

*Share the mid-semester results with learners after scoring and address challenging areas and highlight areas of strength.*



**Note**

*In giving feedback on assessment tasks/items, guide learners to make the necessary corrections that will improve learning.*

### 3. Reflection (10 minutes)

- 3.1 Reflect and share your views on the session (NTS 1a, 1b).
- 3.2 Identify a critical friend to observe your lesson in relation to PLC Session 6 and provide feedback on your lesson (NTS 1f, 3g).
- 3.3 Remember to:
  - a) Provide constructive feedback to learners and record their assessment scores in the required format and document where appropriate (NTS 3l – 3n)
  - b) Read PLC Session 7 and related Learner Material (NTS 3a)
  - c) Bring along your Teacher Manual, PLC Handbook and learning plan on *week 7* in preparation for the next session (NTS 3a).





## Appendix C: Table of Specification for Mid-Semester Examination

Weeks	Focal Area(s)	Type of Questions	DoK Levels				Total
			1	2	3	4	
1	1. Applications Of Physics In Various Sectors Of The Economy And Career Exploration 2. The Interplay of Mathematics and Physics in Conceptual Understanding and Real-World Applications. 3. Basic and Derived Units	<i>Multiple Choice</i>	1	1	1	-	3
		<i>Essay</i>	-	1			1
		<i>Practical</i>	-	-	-	-	-
2	1. Dimension. 2. Errors In the use of Measuring Instruments. 3. Errors in measurement	<i>Multiple Choice</i>	1	-	1	-	2
		<i>Essay</i>			1		1
		<i>Practical</i>					
3	1. Scientific notations and their unit multipliers. 2. Scalars and vectors	<i>Multiple Choice</i>	1	-	1	-	2
		<i>Essay</i>		1			1
		<i>Practical</i>					
4	1. States of matter 2. Molecular arrangement of the various states of matter	<i>Multiple Choice</i>	1	1	-	-	2
		<i>Essay</i>					
		<i>Practical</i>	-		1	-	1
5	1. Types of motion 2. Equations of motion	<i>Multiple Choice</i>				1	1
		<i>Essay</i>			1		1
		<i>Practical</i>		1			1
	Total		4	5	6	1	16

# PLC SESSION 7: Motion and Pressure

## 1. Introduction (20 minutes)

**1.1** Share one thing on the lesson for *week 6* and mid-semester examination that:

- a) went well (NTS 1f, 3g) (NTS 1a, 1b and 2a–2e).
- b) you found challenging (NTS 1a, 1b and 2a–2e).

**1.2** Share your experience in conducting and/or recording the assessment for the previous week.

**1.3** Share your observation on what a colleague did by way of application of lessons learned from the previous session for *week 6* that supported learning (NTS 2e, 2f, 3d–3j).

## 2. Review of Learning Plans (60 minutes)

**2.1** Read the purpose, learning outcome and learning indicators for the session:

### Purpose

The purpose of the session is to review the learning plan for *week 7* by aligning the learning plan with Learner Material and appropriate assessment strategies.

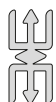
### Learning Outcome

Review your learning plan for *week 7* considering the cross-cutting issues (NTS 2b, 2c, 2e, 2f, 3a, 3d, 3e, 3g–3k and 3o).

### Learning Indicators

1. Review the activities in the Learner Material and identify appropriate activities based on the pedagogical approaches in the Teacher Manual that can support your lesson for the week.
2. Discuss and develop assessment tasks and rubrics/marking scheme for the learning indicators for the week.

**2.2** Review the pedagogical approaches proposed for teaching *week 7* in your learning plan, identify activities that align with these in the Learner Material. Indicate the activity (ies) in your learning plan (NTS 2a – 2f, 3a – 3j).



### Note

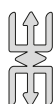
The selected activities should be included in the teacher/learner activity section of the learning plan.

**2.3** Develop assessment tasks/items based on the learning indicator(s) on assessment for the week. This week's recommended mode of assessment is **questioning** (NTS 3k, 3p).

**E.g.**

*State three applications of Pascal's principle in industry.*

*Refer to the Teacher Manual pages 36 – 40 and LM section 2 for more information on the assessment task.*



#### Note

- i. *The assessment tasks/items may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.*
- ii. *The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities of the learning plan.*

**2.4** Discuss (and agree as a subject group) how you will develop the marking scheme/ rubrics for scoring the assessment task(s)/item(s) for the week's recommended assessment (NTS 3n-3p).

**E.g.**

*Applications of Pascal's principle in industry, such as in the hydraulic systems and machines*

*Hydraulic lifter and elevator*

*Hydraulic braking system*

*Hydraulic presses*

*Hydraulic machines*

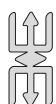
*Plastic injection modelling*

*Compressors*

*Any three of the above and other relevant responses*

*1 mark for each correct answer.*

**Total –3 marks**



#### Note

- i. *The marking scheme and rubrics for scoring the assessment tasks/items should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/ learner activities in the learning plan.*
- ii. *Take into consideration different modes of responses provided by learners.*
- iii. *Discuss how you will observe and integrate character qualities, national values and 21<sup>st</sup> century skills that align with the lesson for the week and include these in your scoring.*

**2.5** Discuss how you will administer the assessment task(s)/item(s) as a subject group (NTS 3n–3p).

**E.g.**

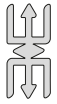
*Select the context and provide relevant information to give learners the basis for the questions, etc.*

*Refer to Teacher Assessment Manual and Toolkit pages 37 – 41 for more information on mode of assessment.*

**2.6** Discuss how to provide feedback, and where appropriate, record and submit the assessment scores for each learner in the class (NTS 3n–3p).

**E.g.**

*Arrange an individualised feedback session with learner to highlight areas of strength and areas of improvement on the task.*



#### Note

*In giving feedback on assessment tasks/items, guide learners to make the necessary corrections that will improve learning.*

### 3. Reflection (10 minutes)

**3.1** Reflect and share your views on the session (NTS 1a, 1b).

**3.2** Identify a critical friend to observe your lesson in relation to PLC Session 7 and provide feedback on your lesson (NTS 1f, 3g).

**3.3** Remember to:

- a) Provide constructive feedback to learners and record their assessment scores in the required format and document where appropriate (NTS 3l – 3n).
- b) Read PLC Session 8 and related Learner Material (NTS 3a).
- c) Bring along your Teacher Manual, PLC Handbook and learning plan on *week 8* in preparation for the next session (NTS 3a).

# PLC SESSION 8: Thermometers and Temperature

## 1. Introduction (20 minutes)

**1.1** Share one thing on the lesson for *week 7* delivered last week that:

- a) went well (NTS 1a, 1b and 2a–2e).
- b) you found challenging (NTS 1a, 1b and 2a–2e).

**1.2** Share your experience in conducting and/or recording the assessment for the previous week.

**1.3** Share your observation on what a colleague did by way of application of lessons learned from the previous session for *week 7* that supported learning (NTS 2e, 2f, 3d–3j).

## 2. Review of Learning Plans (60 minutes)

**2.1** Read the purpose, learning outcome and learning indicators for the session:

### Purpose

The purpose of the session is to review the learning plan for *week 8* by aligning the learning plan with Learner Material and appropriate assessment strategies.

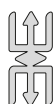
### Learning Outcome

Review your learning plan for *week 8* considering the cross-cutting issues (NTS 2b, 2c, 2e, 2f, 3a, 3d, 3e, 3g–3k and 3o).

### Learning Indicators

- 1 Review the activities in the Learner Material and identify appropriate activities based on the pedagogical approaches in the Teacher Manual that can support your lesson for the week.
- 2 Discuss and develop assessment tasks and rubrics/marking scheme for the learning indicators for the week.

**2.2** Review the pedagogical approaches proposed for teaching *week 8* in your learning plan, identify activities that align with these in the Learner Material. Indicate the activity (ies) in your learning plan (NTS 2a – 2f, 3a – 3j).



### Note

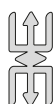
*The selected activities should be included in the teacher/learner activity section of the learning plan.*

**2.3** Develop assessment tasks/items based on the learning indicator(s) on assessment for the week. This week's recommended mode of assessment is **peer/self-assessment** (NTS 3k, 3p).

**E.g.**

*Describe two thermometric substances.*

*Refer to the Teacher Manual pages 43–44 and the Learner Material Section 3 for more assessment task.*



#### Note

- i. *The assessment tasks/items may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.*
- ii. *The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities of the learning plan.*

**2.4** Discuss (and agree as a subject group) how you will develop the marking scheme/rubrics for scoring the assessment task(s)/item(s) for the week's recommended assessment (NTS 3n–3p).

**E.g.**

*Description of thermometric substances*

*Gas thermometer*

*Resistance Temperature Detector*

*Mercury*

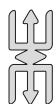
*Alcohol*

*Any two of the above and other relevant responses*

*1 mark for each correct response*

*3 marks for explanation (consider the use and properties of the thermometric substance)*

**Total – 8 marks**



#### Note

- i. *The marking scheme and rubrics for scoring the assessment tasks/items should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities in the learning plan.*
- ii. *Take into consideration different modes of responses provided by learners.*
- iii. *Discuss how you will observe and integrate character qualities, national values and 21<sup>st</sup> century skills that align with the lesson for the week and include these in your scoring.*

**2.5** Discuss how you will administer the assessment task(s)/item(s) as a subject group (NTS 3n–3p).

**E.g.**

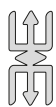
*Model peer/self-assessment by letting learners assess or review what is taught to open them up to the assessment to be conducted.*

*Refer to Teacher Assessment Manual and Toolkit pages 91– 94 for more information on mode of administration.*

**2.6** Discuss how to provide feedback, and where appropriate, record and submit the assessment scores for each learner in the class (NTS 3n–3p).

**E.g.**

*Allow learners to reflect on the activity and offer help or intervention in areas learners need help.*



**Note**

*In giving feedback on assessment tasks/items, guide learners to make the necessary corrections that will improve learning.*

### 3. Reflection (10 minutes)

**3.1** Reflect and share your views on the session (NTS 1a, 1b)

**3.2** Identify a critical friend to observe your lesson in relation to PLC Session 8 to provide feedback on your lesson (NTS 1f, 3g)

**3.3** Remember to:

- a) provide constructive feedback to learners and record their assessment scores in the required format and document where appropriate (NTS 3l – 3n)
- b) read PLC Session 9 and related Learner Material (NTS 3a)
- c) bring along your Teacher Manual, PLC Handbook and learning plan on *week 9* in preparation for the next session (NTS 3a)

# PLC SESSION 9: Thermometers and Temperature

## 1. Introduction (20 minutes)

**1.1** Share one thing on the lesson for *week 8* delivered last week that:

- a) Went well (NTS 1a, 1b and 2a-2e)
- b) You found challenging (NTS 1a, 1b and 2a-2e)

**1.2** Share your experience in conducting and/or recording the assessment for the previous week.

**1.3** Share your observation on what a colleague did by way of application of lessons learned from the previous session for *week 8* that supported learning (NTS 2e, 2f, 3d-3j)

## 2. Review of Learning Plans (60 minutes)

**2.1** Read the purpose, learning outcome and learning indicators for the session:

### Purpose

The purpose of the session is to review the learning plan for *week 9* by aligning the learning plan with Learner Material and appropriate assessment strategies.

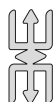
### Learning Outcome

Review your learning plan for *week 9* considering the cross-cutting issues (NTS 2b, 2c, 2e, 2f, 3a, 3d, 3e, 3g-3k and 3o).

### Learning Indicators

- 1 Review the activities in the Learner Material and identify appropriate activities based on the pedagogical approaches in the Teacher Manual that can support your lesson for the week.
- 2 Discuss and develop assessment tasks and rubrics/marking scheme for the learning indicators for the week.

**2.2** Review the pedagogical approaches proposed for teaching *week 9* in your learning plan, identify activities that align with these in the Learner Material. Indicate the activity (ies) in your learning plan (NTS 2a-2f, 3a-3j)



### Note

*The selected activities should be included in the teacher/learner activity section of the learning plan.*

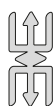


**2.3** Develop assessment tasks/items based on the learning indicator(s) on assessment for the week. This week's recommended mode of assessment is **debate** (NTS 3k, 3p)

**E.g.**

*Motion: temperature of a laboratory sample is not 50k.*

*Refer to the Teacher Manual pages 45–47 and Learner Material Section 3 for more assessment task*



#### Note

- i. *The assessment tasks/items may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.*
- ii. *The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities of the learning plan.*

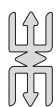
**2.4** Discuss (and agree as a subject group) how you will develop the marking scheme/rubrics for scoring the assessment task(s)/item(s) for the week's recommended assessment (NTS 3n–3p)

**E.g.**

- a) *Correctly names commonly used temperature scales such as Celsius, thermodynamic and Fahrenheit temperature scale = 1 mark each making 2 marks.*
- b) *Correct method and all necessary calculations for converting 150°C to Kelvin given as  $K = 0C - 273$ . 2 marks.*
- c) *Clear explanation relevance to -50 K cannot exist because the Kelvin scale is an absolute temperature scale where zero Kelvin represents the lowest possible temperature. = 6 marks.*

*Partly explained point with few key terms as indicated = 3 marks*

**Total – 13 marks**



#### Note

- i. *The marking scheme and rubrics for scoring the assessment tasks/items should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities in the learning plan.*
- ii. *Take into consideration different modes of responses provided by learners.*
- iii. *Discuss how you will observe and integrate character qualities, national values and 21<sup>st</sup> century skills that align with the lesson for the week and include these in your scoring.*

**2.5** Discuss how you will administer the assessment task(s)/item(s) as a subject group (NTS 3n–3p)

**E.g.**

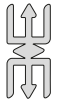
*Host the debate session and ensure an effective time management as you monitor and take notes, etc.*

*Refer to Teacher Assessment Manual and Toolkit pages 52 – 54 for more information on how to administer the assessment.*

**2.6** Discuss how to provide feedback, and where appropriate, record and submit the assessment scores for each learner in the class (NTS 3l– 3n)

**E.g.**

*Facilitate a debriefing session (Utilise the debriefing sessions to address any misunderstandings or questions that come up from the debate and highlight the key concepts ), etc.*



#### Note

*In giving feedback on assessment tasks/items, guide learners to make the necessary corrections that will improve learning.*

### 3. Reflection (10 minutes)

**3.1** Reflect and share your views on the session (NTS 1a, 1b)

**3.2** Identify a critical friend to observe your lesson in relation to PLC Session 9 and provide feedback on your lesson (NTS 1f, 3g)

**3.3** Remember to:

- a) provide constructive feedback to learners and record their assessment scores in the required format and document where appropriate (NTS 3l – 3n)
- b) read PLC Session 10 and related Learner Material (NTS 3a)
- c) bring along your Teacher Manual, PLC Handbook and learning plan on *week 10* in preparation for the next session (NTS 3a)

# PLC SESSION 10: Mirrors, Reflection and Refraction

## 1. Introduction (20 minutes)

**1.1** Share one thing on the lesson for *week 9* delivered last week that:

- a) went well (NTS 1a, 1b and 2a–2e)
- b) you found challenging (NTS 1a, 1b and 2a–2e)

**1.2** Share your experience in conducting and/or recording the assessment for the previous week.

**1.3** Share your observation on what a colleague did by way of application of lessons learned from the previous session for *week 9* that supported learning (NTS 2e, 2f, 3d–3j)

## 2. Review of Learning Plans (60 minutes)

**2.1** Read the purpose, learning outcome and learning indicators for the session:

### Purpose

The purpose of the session is to review the learning plan for *week 10* by aligning the learning plan with Learner Material and appropriate assessment strategies.

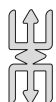
### Learning Outcome

Review your learning plan for *week 10* considering the cross-cutting issues (NTS 2b, 2c, 2e, 2f, 3a, 3d, 3e, 3g–3k and 3o).

### Learning Indicators

1. Review the activities in the Learner Material and identify appropriate activities based on the pedagogical approaches in the Teacher Manual that can support your lesson for the week.
2. Discuss and develop assessment tasks and rubrics/marking scheme for the learning indicators for the week.

**2.2** Review the pedagogical approaches proposed for teaching *week 10* in your learning plan, identify activities that align with these in the Learner Material. Indicate the activity (ies) in your learning plan (NTS 2a–2f, 3a–3j)



### Note

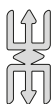
*The selected activities should be included in the teacher/learner activity section of the learning plan.*

**2.3** Develop assessment tasks/items based on the learning indicator(s) on assessment for the week. This week's recommended mode of assessment is **practical assessment** (NTS 3k, 3p).

**E.g.**

- a) You are provided with a plane mirror, trace sheets, cellulose board and either four optical pins or a laser pointer for conducting an experiment.
- b) Set up the mirror and create an incident ray at specific angles to the normal using the optical pins or laser. Set the incident angle to  $25^\circ$ ,  $30^\circ$ ,  $40^\circ$ , and  $50^\circ$ .
- c) Measure the corresponding angle of reflection for each angle of incidence
- d) Write down two precautions taken during the experiment that helped in arriving at an accurate result.

Refer to Teacher Manual pages 50–53 pages and Learning Material Section 4 for more assessment task.



#### Note

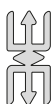
- i. The assessment tasks/items may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.
- ii. The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities of the learning plan.

**2.4** Discuss (and agree as a subject group) how you will develop the marking scheme/ rubrics for scoring the assessment task(s)/item(s) for the week's recommended assessment (NTS 3n–3p)

**E.g.**

- a) Mirror, optical pins or laser, and protractor set up correctly, with the normal line clearly marked. = **3 marks**
- b) Follows the procedure accurately, setting specific incident angles ( $25^\circ$ ,  $30^\circ$ ,  $40^\circ$ ,  $50^\circ$ ) and measuring angles of reflection = **3 marks**
- c) All angles of reflection are measured accurately, matching the incident angles within a small margin of error ( $\pm 1^\circ$ ) = **2 marks**.
- d) Correct stating of two precautions at 1 mark each = **2 marks**

**Total Score = 10 marks**



#### Note

- i. The marking scheme and rubrics for scoring the assessment tasks/items should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities in the learning plan.
- ii. Take into consideration different modes of responses provided by learners.

- iii. *Discuss how you will observe and integrate character qualities, national values and 21<sup>st</sup> century skills that align with the lesson for the week and include these in your scoring.*

**2.5** Discuss how you will administer the assessment task(s)/item(s) as a subject group (NTS 3n–3p)

**E.g.**

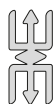
*Describe the step-by-step process in detail including how to control extraneous factors, along with any safety precautions, etc.*

*Refer to Teacher Assessment Manual and Toolkit pages 46 – 48 for more information on to conduct practical assessment.*

**2.6** Discuss how to provide feedback, and where appropriate, record and submit the assessment scores for each learner in the class (NTS 3l– 3n)

**E.g.**

*Give a concise visual summary of the results and address any restrictions or mistakes, etc.*



#### Note

*In giving feedback on assessment tasks/items, guide learners to make the necessary corrections that will improve learning.*

### 3. Reflection (10 minutes)

**3.1** Reflect and share your views on the session (NTS 1a, 1b)

**3.2** Identify a critical friend to observe your lesson in relation to PLC Session 9 and provide feedback on your lesson (NTS 1f, 3g)

**3.3** Remember to:

- a) provide constructive feedback to learners and record their assessment scores in the required format and document where appropriate (NTS 3l – 3n)
- b) read PLC Session 11 and related Learner Material (NTS 3a)
- c) bring along your Teacher Manual, PLC Handbook and learning plan on *week 11* in preparation for the next session (NTS 3a)

# PLC SESSION 11: Mirrors, Reflection and Refraction

## 1. Introduction (20 minutes)

**1.1** Share one thing on the lesson for *week 10* delivered last week that:

- a) Went well (NTS 1a, 1b and 2a–2e)
- b) You found challenging (NTS 1a, 1b and 2a–2e)

**1.2** Share your experience in conducting and/or recording the assessment for the previous week.

**1.3** Share your observation on what a colleague did by way of application of lessons learned from the previous session for *week 10* that supported learning (NTS 2e, 2f, 3d–3j)

## 2. Review of Learning Plans (60 minutes)

**2.1** Read the purpose, learning outcome and learning indicators for the session:

### Purpose

The purpose of the session is to review the learning plan for *week 11* by aligning the learning plan with Learner Material and appropriate assessment strategies.

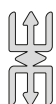
### Learning Outcome

Review your learning plan for *week 11* considering the cross-cutting issues (NTS 2b, 2c, 2e, 2f, 3a, 3d, 3e, 3g–3k and 3o).

### Learning Indicators

1. Review the activities in the Learner Material and identify appropriate activities based on the pedagogical approaches in the Teacher Manual that can support your lesson for the week.
2. Discuss and develop assessment tasks and rubrics/marking scheme for the learning indicators for the week.

**2.2** Review the pedagogical approaches proposed for teaching *week 11* in your learning plan, identify activities that align with these in the Learner Material. Indicate the activity (ies) in your learning plan (NTS 2a–2f, 3a–3j)



### Note

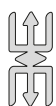
The selected activities should be included in the teacher/learner activity section of the learning plan.

**2.3** Develop assessment tasks/items based on the learning indicator(s) on assessment for the week. This week's recommended mode of assessment is **display and exhibition** (NTS 3k, 3p)

**E.g.**

*With the aid of a diagram, show how a virtual image may be produced by a concave mirror.*

*Refer to Teacher Manual pages 54–57 and Learner Material Section 4 for more assessment task.*



#### Note

- i. The assessment tasks/items may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.
- ii. The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities of the learning plan.

**2.4** Discuss (and agree as a subject group) how you will develop the marking scheme/rubrics for scoring the assessment task(s)/item(s) for the week's recommended assessment (NTS 3n–3p)

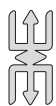
**E.g.**

- a) *Correctly identifies an everyday object that uses a convex or concave spherical mirror such as the car driving mirror = 2 marks*
- b) *i. Clearly defines the principal axis such as the principal axis of a spherical mirror is an imaginary line that passes through the centre of the mirror's spherical surface and is perpendicular to the mirror's surface. = 2 marks*  
 ii. *Accurately defines the pole = 2 marks*  
 iii. *Correctly defines the principal focus = 2 marks*
- c) *Correctly depicts the concave mirror, showing its reflective side = 2 marks*

*Correctly places the object between the mirror's surface and the focal point = 2 marks*

*Accurately draws the incident rays and their reflections, showing at least two rays (one parallel to the principal axis and one passing through the focal point) diverging after reflection and appearing to converge behind the mirror = 3 marks*

**Total marks = 15 marks.**



#### Note

- i. The marking scheme and rubrics for scoring the assessment tasks/items should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities in the learning plan.
- ii. Take into consideration different modes of responses provided by learners.
- iii. Discuss how you will observe and integrate character qualities, national values and 21st century skills that align with the lesson for the week and include these in your scoring.

**2.5** Discuss how you will administer the assessment task(s)/item(s) as a subject group (NTS 3n–3p).

**E.g.**

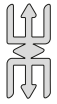
*Facilitate the displays and exhibits assessment by engaging learners in discussions and interactive exercises and use the assessment criteria to check learners' performance, etc.*

*Refer to Teacher Assessment Manual and Toolkit pages 54 – 57 for more information on how to administer the display and exhibition.*

**2.6** Discuss how to provide feedback, and where appropriate, record and submit the assessment scores for each learner in the class (NTS 3l– 3n)

**E.g.**

*Encourage learners to share their thoughts and feedback and seek clarification from the teacher or peers, etc*



#### Note

*In giving feedback on assessment tasks/items, guide learners to make the necessary corrections that will improve learning.*

### 3. Reflection (10 minutes)

**3.1** Reflect and share your views on the session (NTS 1a, 1b)

**3.2** Identify a critical friend to observe your lesson in relation to PLC Session 11 and provide feedback on your lesson (NTS 1f, 3g)

**3.3** Remember to:

- a) provide constructive feedback to learners and record their assessment scores in the required format and document where appropriate (NTS 3l – 3n)
- b) read PLC Session 12 and related Learner Material (NTS 3a)
- c) bring along your Teacher Manual, PLC Handbook and learning plan on *week 12* in preparation for the next session (NTS 3a)



# PLC SESSION 12: Preparing for End of Semester Examination

## 1. Introduction (20 minutes)

**1.1** Share one thing on the lesson for *week 11* delivered last week that:

- a) Went well (NTS 1a, 1b and 2a-2e)
- b) You found challenging (NTS 1a, 1b and 2a-2e)

**1.2** Share your experience in conducting and/or recording the assessment for the previous week.

**1.3** Share your observation on what a colleague did by way of application of lessons learned from the previous session for *week 11* that supported learning (NTS 2e, 2f, 3d-3j)

## 2. Review of Learning Plans (60 minutes)

**2.1** Read the purpose, learning outcome and learning indicators for the session:

### Purpose

The purpose of the session is to review the learning plan for *week 12 lessons and end of semester examination* by aligning the learning plan with Learner Material and appropriate assessment strategies.

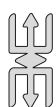
### Learning Outcome

Review your learning plan for *week 12 and prepare for end of semester examination* considering the cross-cutting issues (NTS 2b, 2c, 2e, 2f, 3a, 3d, 3e, 3g-3k and 3o).

### Learning Indicators

1. Review the activities in the Learner Material and identify appropriate activities based on the pedagogical approaches in the Teacher Manual that can support your lesson for the week.
2. Discuss and develop assessment tasks and rubrics/marking scheme for the learning indicators for the week.

**2.2** Review the pedagogical approaches proposed for teaching *week 12* in your learning plan, identify activities that align with these in the Learner Material. Indicate the activity (ies) in your learning plan (NTS 2a-2f, 3a-3j)



### Note

*The selected activities should be included in the teacher/learner activity section of the learning plan.*

**2.3** Develop assessment tasks/items based on the learning indicator(s) on assessment for the week. This week's recommended mode of assessment is **end of semester examination** (NTS 3n-3p)

**E.g.**

**1. Multiple Choice – 30 Questions**

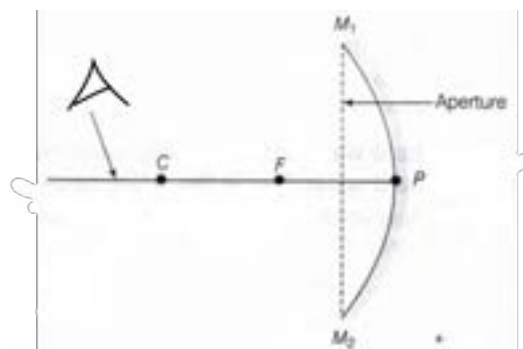
Which of the following is a scalar quantity?

- A. Displacement
- B. Force
- C. Temperature
- D. Velocity

**2. Essay – 5 Questions (Learners answer 3)**

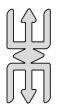
- a) State Newton's second law of motion.
- b) A car with a mass of 1,200 kg is initially traveling at a velocity of 20 m/s. To avoid a collision, the driver applies the brakes to bring the car to a complete stop. The car comes to a halt in 5 seconds.

**3. Practical – 1 Question**



From the diagram above, label the parts A, C, F and P of a converging mirror

Refer to the **Appendix D** below for the Table of Specification and the details of the examination.



**Note**

- i. The assessment tasks/items may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.
- ii. The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities of the learning plan.

**2.4** Discuss (and agree as a subject group) how you will develop the marking scheme/ rubrics for scoring the assessment task(s)/item(s) for the week's recommended assessment (NTS 3n-3p)

**E.g.**

a) Correct option (C)

1 mark for each correct answer (10 questions)

**Total – 10 marks**

#### **Deceleration Calculation**

Correct formula stated:  $a = \frac{v-u}{t}$   $a = \frac{v-u}{t}$  – **1 mark**

Correct substitution of values:  $a = \frac{0 \text{ m/s} - 20 \text{ m/s}}{5 \text{ s}}$   $a = \frac{0 \text{ m/s} - 20 \text{ m/s}}{5 \text{ s}}$  – **1 mark**

Correct final result:  $a = -4 \text{ m/s}^2$   $a = -4 \text{ m/s}^2$  – **2 marks**

#### **Force Calculation**

Correct formula stated:  $F = ma$   $F = ma$  (1 mark)

Correct substitution of values:  $F = 1200 \text{ kg} \cdot (-4 \text{ m/s}^2)$   $F = 1200 \text{ kg} \cdot (-4 \text{ m/s}^2)$  – **1 mark**

Correct final result:  $F = -4800 \text{ N}$   $F = -4800 \text{ N}$  – **1 mark**, with the negative sign for direction noted)

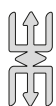
#### **Distance Calculation**

Correct formula stated:  $s = ut + \frac{1}{2}at^2$   $s = ut + \frac{1}{2}at^2$  – **1 mark**

Correct substitution and calculation showing intermediate steps:  $s = (20 \text{ m/s} \cdot 5 \text{ s}) + \frac{1}{2} \cdot (-4 \text{ m/s}^2) \cdot (5 \text{ s})^2$   $s = (20 \text{ m/s} \cdot 5 \text{ s}) + \frac{1}{2} \cdot (-4 \text{ m/s}^2) \cdot (5 \text{ s})^2$  leading to the final result – **2 mark**

Correct final result:  $s = 50 \text{ m}$   $s = 50 \text{ m}$

**Total – 10 marks**



#### **Note**

- i. The marking scheme and rubrics for scoring the assessment tasks/items should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/ learner activities in the learning plan.
- ii. Take into consideration different modes of responses provided by learners.
- iii. Discuss how you will observe and integrate character qualities, national values and 21<sup>st</sup> century skills that align with the lesson for the week and include these in your scoring.

**2.5** Discuss how you will administer the assessment task(s)/item(s) as a subject group (NTS 3n-3p)

**E.g.**

a) Prepare a table of test specifications or blueprints (see table of specification below).

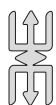
- b) *Supervise the class during the end of semester examination in a controlled the environment to prevent cheating, etc.*

*Refer to the Teacher Assessment Manual and Toolkit page 5 for more information on how to administer the end of semester examination.*

- 2.6** Discuss how to provide feedback, and where appropriate, record and submit the assessment scores for each learner in the class (NTS 3l- 3n)

**E.g.**

*Discuss the results of the end of semester examination with learners and encourage them to review the provided solutions and offer additional resources or support for areas they found challenging, etc.*



#### Note

*In giving feedback on assessment tasks/items, guide learners to make the necessary corrections that will improve learning.*

### 3. Reflection (10 minutes)

- 3.1** Reflect and share your views on the session (NTS 1a, 1b)
- 3.2** Identify a critical friend to observe your lesson in relation to PLC Session 12 and provide feedback on your lesson (NTS 1f, 3g)
- 3.3** Remember to:
- provide constructive feedback to learners and record their assessment scores in the required format and document where appropriate (NTS 3l – 3n)
  - read PLC Session 13 and related Learner Material (NTS 3a).
  - bring along your Teacher Manual, PLC Handbook and learning plan on *week 13* in preparation for the next session (NTS 3a)



## Appendix D: Table of Specification End of Semester Examination

Weeks	Focal Area(s)	Type of Questions	DoK Levels				Total
			1	2	3	4	
1	1. Applications Of Physics In Various Sectors Of The Economy And Career Exploration 2. The Interplay of Mathematics and Physics in Conceptual Understanding and Real-World Applications. 3. Basic and Derived Units	Multiple Choice	2	1	1	-	4
		Essay	-	1			1
		Practical	-	-	-	-	-
2	1. Dimension. 2. Errors In the use of Measuring Instruments. 3. Errors in measurement	Multiple Choice	1	1	1	-	3
		Essay			1		1
		Practical		1			1
3	1. Scientific notations and their unit multipliers. 2. Scalars and vectors	Multiple Choice	1	1	1	-	3
		Essay		1			1
		Practical					
4	1. States of matter 2. Molecular arrangement of the various states of matter	Multiple Choice	1	1	1	-	3
		Essay					
		Practical	-		1	-	1
5	1. Types of motion 2. Equations of motion	Multiple Choice	2	1			3
		Essay			1		1
		Practical	-	1	-		1
6	1. Newton's laws of motion 2. Relationship between force, mass and acceleration using newton's second law	Multiple Choice	1	1	-		2
		Essay		1			1
		Practical	-	-	-	-	
7	1. Pressure in a fluid 2. Pascal's principle 3. Brake systems and hydraulic press	Multiple Choice	1	1	1	-	3
		Essay		1			1
		Practical					

Weeks	Focal Area(s)	Type of Questions	DoK Levels				Total
			1	2	3	4	
8	1. Thermometric substances 2. Thermometers	Multiple Choice	1	1	1		3
		Essay					
		Practical					
9	1. Temperature scales 2. Relationship between the Celsius, Fahrenheit and the kelvin scales	Multiple Choice	1	2			3
		Essay		1			
		Practical					
10	1. Laws of reflection 2. Image formation in plane mirrors 3. Images formed by inclined mirrors	Multiple Choice	1	1			2
		Essay					
		Practical		1			
11	1. Terminologies associated with spherical mirrors. 2. Characteristics of image formation in spherical mirrors using ray diagram	Multiple Choice	1	1			2
		Essay					
		Practical		1			
	Total		11	21	9	-	40

# PLC SESSION 13: Behaviour of Light through Different Media

## 1. Introduction (20 minutes)

- 1.1** Share one thing on the lesson for *week 12* and end of semester examination that:
- went well (NTS 1a, 1b and 2a–2e)
  - you found challenging (NTS 1a, 1b and 2a–2e)
- 1.2** Share your experience in conducting and/or recording the assessment for the previous week.
- 1.3** Share your observation on what a colleague did by way of application of lessons learned from the previous session for *week 12* that supported learning (NTS 2e, 2f, 3d–3j)

## 2. Review of Learning Plans (60 minutes)

- 2.1** Read the purpose, learning outcome and learning indicators for the session:

### Purpose

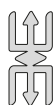
The purpose of the session is to review the learning plan for *week 13* by aligning the learning plan with Learner Material and appropriate assessment strategies.

### Learning Outcome

Review your learning plan for *week 13* considering the cross-cutting issues (NTS 2b, 2c, 2e, 2f, 3a, 3d, 3e, 3g–3k and 3o).

### Learning Indicators

- Review the activities in the Learner Material and identify appropriate activities based on the pedagogical approaches in the Teacher Manual that can support your lesson for the week.
  - Discuss and develop assessment tasks and rubrics/marking scheme for the learning indicators for the week.
- 2.2** Review the pedagogical approaches proposed for teaching *week 13* in your learning plan, identify activities that align with these in the Learner Material. Indicate the activity (ies) in your learning plan (NTS 2a–2f, 3a–3j)



### Note

The selected activities should be included in the teacher/learner activity section of the learning plan.

**2.3** Develop assessment tasks/items based on the learning indicator(s) on assessment for the week. This week's recommended mode of assessment is **case study** (NTS 3k, 3p)

**E.g.**

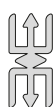
*On your way home, you saw a puddle of water a distance away. On reaching the place where the puddle was, you noticed there was no sign of one. How do you explain to your friends how this is caused with your knowledge of total internal reflection?*

*Refer to Teacher Manual year 1 book 2 pages 6 – 11 for more information on the assessment mode.*

#### Hint



*Prompt learner' to keep all the necessary artefact needed for the portfolio safe and clean for submission and assessment in week 22 as part as their transcript.*



#### Note

- i. *The assessment tasks/items may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.*
- ii. *The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities of the learning plan.*

**2.4** Discuss (and agree as a subject group) how you will develop the marking scheme/ rubrics for scoring the assessment task(s)/item(s) for the week's recommended assessment (NTS 3n–3p)

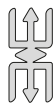
**E.g.**

- a) *Understanding of Total Internal Reflection (3 marks)*
  - i. *4 marks: Demonstrates an understanding of total internal reflection, including the conditions required (e.g., light moving from a medium with higher refractive index to lower refractive index, angle of incidence greater than the critical angle).*
  - ii. *3 marks: Shows a good understanding with minor inaccuracies.*
  - iii. *2 marks: Basic or partial understanding with significant inaccuracies.*
  - iv. *1 mark: No understanding demonstrated.*
- b) *Application to the Scenario (3 marks)*
  - i. *4 marks: Applies the concept of total internal reflection to explain why the puddle was not visible, possibly discussing phenomena such as mirages or reflection of light.*
  - ii. *3 marks: Applies the concept with some relevance but lacks full accuracy or detail.*
  - iii. *2 marks: Minimal or partially relevant application with significant gaps.*
  - iv. *1 mark: Fails to apply the concept to the scenario.*
- c) *Use of Correct Terminology (1 mark)*



- i. 2 marks: Uses relevant scientific terms accurately (e.g., refraction, critical angle, refractive index).
- ii. 1 mark: Fails to use correct terminology or uses terms inaccurately.

**Total – 10 marks**



**Note**

- i. The marking scheme and rubrics for scoring the assessment tasks/items should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities in the learning plan.
- ii. Take into consideration different modes of responses provided by learners.
- iii. Discuss how you will observe and integrate character qualities, national values and 21st century skills that align with the lesson for the week and include these in your scoring.

**2.5** Discuss how you will administer the assessment task(s)/item(s) as a subject group (NTS 3n–3p)

**E.g.**

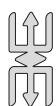
*Provide a structured assignment (rubric) to learners for them to know the criteria expected of them, etc.*

*Refer to Teacher Assessment Manual Toolkit pages 25–27 for more information.*

**2.6** Discuss how to provide feedback, and where appropriate, record and submit the assessment scores for each learner in the class (NTS 3l– 3n).

**E.g.**

*Provide specific, constructive comments highlighting strengths and areas for improvement in their understanding and explanation of mirages and total internal reflection, etc.*



**Note**

*In giving feedback on assessment tasks/items, guide learners to make the necessary corrections that will improve learning.*

### 3. Reflection (10 minutes)

**3.1** Reflect and share your views on the session (NTS 1a, 1b)

**3.2** Identify a critical friend to observe your lesson in relation to PLC Session 13 and provide feedback on your lesson (NTS 1f, 3g)

**3.3** Remember to:

- a) provide constructive feedback to learners and record their assessment scores in the required format and document where appropriate (NTS 3l – 3n)
- b) read PLC Session 14 and related Learner Material (NTS 3a)
- c) bring along your Teacher Manual, PLC Handbook and learning plan on week 14 in preparation for the next session (NTS 3a)

# PLC SESSION 14: Electrical Charge and Magnetism

## 1. Introduction (20 minutes)

**1.1** Share one thing on the lesson for *week 13* delivered last week that:

- a) went well (NTS 1a, 1b and 2a–2e)
- b) you found challenging (NTS 1a, 1b and 2a–2e)

**1.2** Share your experience in conducting and/or recording the assessment for the previous week.

**1.3** Share your observation on what a colleague did by way of application of lessons learned from the previous session for *week 13* that supported learning (NTS 2e, 2f, 3d–3j)

## 2. Review of Learning Plans (60 minutes)

**2.1** Read the purpose, learning outcome and learning indicators for the session:

### Purpose

The purpose of the session is to review the learning plan for *week 14* by aligning the learning plan with Learner Material and appropriate assessment strategies.

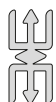
### Learning Outcome

Review your learning plan for *week 14* considering the cross-cutting issues (NTS 2b, 2c, 2e, 2f, 3a, 3d, 3e, 3g–3k and 3o).

### Learning Indicators

1. Review the activities in the Learner Material and identify appropriate activities based on the pedagogical approaches in the Teacher Manual that can support your lesson for the week.
2. Discuss and develop assessment tasks and rubrics/marking scheme for the learning indicators for the week.

**2.2** Review the pedagogical approaches proposed for teaching *week 14* in your learning plan, identify activities that align with these in the Learner Material. Indicate the activity (ies) in your learning plan (NTS 2a–2f, 3a–3j)



### Note

The selected activities should be included in the teacher/learner activity section of the learning plan.

**2.3** Develop assessment tasks/items based on the learning indicator(s) on assessment for the week. This week's recommended mode of assessment is **demonstration (group)** (NTS 3k, 3p).

**E.g.**

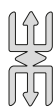
*Demonstrate and explain the proper use of the gold leaf electroscope in charging the electroscope, detecting charge and measuring the amount of charge*

*Refer to the Teacher Manual week 14 pages 16–17 and Learner Material Section 6 for more task examples.*

#### Hint



Teachers are reminded to give an individual project work to learners this week. See **Appendix C** for a sample individual project to be submitted by the 20<sup>th</sup> week.



#### Note

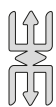
- i. The assessment tasks/items may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.
- ii. The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities of the learning plan.

**2.4** Discuss (and agree as a subject group) how you will develop the marking scheme/ rubrics for scoring the assessment task(s)/item(s) for the week's recommended assessment (NTS 3n–3p)

**E.g.**

- a) Clarity in explaining the purpose of each item = 3 marks
- b) Demonstration of one of the charging methods such as charging: use contact or induction methods to charge the electroscope = 5 marks.
- c) Clear explanation of the behaviour of the gold leaves during charging such as Measuring Charge: Compare with a standard or use capacitance and voltage measurements for quantification. = 5 marks
- d) Demonstration of charge detection such as detecting Charge: Observe leaf divergence in response to a known charge to identify the presence and type of charge = 5 marks

Total = 20 marks



#### Note

- i. The marking scheme and rubrics for scoring the assessment tasks/items should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities in the learning plan.
- ii. Take into consideration different modes of responses provided by learners.
- iii. Discuss how you will observe and integrate character qualities, national values and 21st century skills that align with the lesson for the week and include these in your scoring.

**2.5** Discuss how you will administer the assessment task(s)/item(s) as a subject group (NTS 3n–3p)

**E.g.**

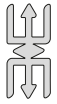
*Provide each group with a gold leaf electroscope, glass rod, silk cloth, and plastic rod for the demonstration and explain the demonstration's objective, procedure, and safety precautions etc.*

*Refer to Teacher Assessment Manual Toolkit page 161 for more information.*

**2.6** Discuss how to provide feedback, and where appropriate, record and submit the assessment scores for each learner in the class (NTS 3l–3n)

**E.g.**

*Provide each group with specific feedback on their understanding of the charging methods and the accuracy of their demonstrations, etc.*



#### Note

*In giving feedback on assessment tasks/items, guide learners to make the necessary corrections that will improve learning.*

### 3. Reflection (10 minutes)

**3.1** Reflect and share your views on the session (NTS 1a, 1b)

**3.2** Identify a critical friend to observe your lesson in relation to PLC Session 14 and provide feedback on your lesson (NTS 1f, 3g)

**3.3** Remember to:

- a) provide constructive feedback to learners and record their assessment scores in the required format and document where appropriate (NTS 3l–3n)
- b) read PLC Session 15 and related Learner Material (NTS 3a)
- c) bring along your Teacher Manual, PLC Handbook and learning plan on *week 15* in preparation for the next session (NTS 3a)



## Appendix C: Example of Individual Project Work

### Submission

Project should be submitted latest by the 20th week of the second semester. However, project could be submitted earlier depending on its nature. Project should be clear and easily understood by all learners.

### E.g.

Design a simple device that uses both magnetic and non-magnetic materials, such as a doorbell or a small motor.

### How to Administer

A research report is a structured document that presents the results of a detailed investigation or study on a specific topic.

- a. Outline the Project objectives and expected outcomes, provide recommended sources, and encourage expert interviews if possible.
- b. Provide learners with a video (YouTube) to watch and any other material that will enable them to do the project (10min).
- c. Set clear deadlines for each phase of the project, such as topic selection, preliminary research, drafting, and final report submission as suggested in Table 1.1 below. Schedule periodic check-ins to monitor progress and provide feedback.
- d. Provide a template or guidelines for the report structure. A suggested outline might include.
  - i. **Title** – Topic or focus
  - ii. **Introduction** – Overview of the research work
  - iii. **Results and Findings** – Data presentation
  - iv. **Discussion** – Interpretation of findings
  - v. **Conclusion** – Summary and recommendations
- e. Ask individuals to present their findings to the whole class through written presentation (Each presentation will take 5 minutes) refer to TM year 1 book 2 page 24 for more information on the project.

Table 1.1 Project Report Timeline

Task	Description	Deadline
Individual Formation	Organise learners individually to understand the project	week 14
Topic Selection	Choose and finalise the project topic	week 15
Preliminary Research	Gather initial information and resources as well as online surf.	week 16
Expert Interviews	Conduct interviews with professionals, if applicable.	week 17

Task	Description	Deadline
<i>Draft Report</i>	<i>Write the first draft of the project report.</i>	<i>week 18</i>
<i>Feedback and Revisions</i>	<i>Receive feedback from peers/teachers and revise accordingly. Expect final write ups and diagrams.</i>	<i>week 19</i>
<i>Final Report Submission</i>	<i>Submit the completed project report and artefact.</i>	<i>week 20</i>

### **Rubrics for scoring**

**E.g.**

30 marks in all

- a) *Clear and concise title and directly related to physics exploration. (5 marks)*
- a) *Provides a comprehensive overview with clear objectives and context for the introduction. (5 marks)*
- b) *Report includes a wide range of sources and detailed understanding of physics applications and also effectively communicates findings with visual aids. (10 marks)*
- c) *Provides insightful interpretation of findings with strong connections to the research question. (5 marks)*
- d) *Provides a thorough summary or conclusion. (5 marks)*

### **Feedback**

- a) *Analyse learners' work to know if they have followed the instructions given to them.*
- b) *Share the scoring rubrics with the learners by either projecting, printing or writing on the board and discuss the results of the project with the groups.*
- c) *Have each group share their success stories and difficulties encountered during data collection for the project, as well as how they overcame them.*
- d) *Acknowledge and celebrate the learners' achievements to boost motivation and self-esteem.*

# PLC SESSION 15: Electrical Charge and Magnetism

## 1. Introduction (20 minutes)

**1.1** Share one thing on the lesson for *week 14* delivered last week that:

- a) went well (NTS 1a, 1b and 2a–2e)
- b) you found challenging (NTS 1a, 1b and 2a–2e)

**1.2** Share your experience in conducting and/or recording the assessment for the previous week.

**1.3** Share your observation on what a colleague did by way of application of lessons learned from the previous session for *week 14* that supported learning (NTS 2e, 2f, 3d–3j)

## 2. Review of Learning Plans (60 minutes)

**2.1** Read the purpose, learning outcome and learning indicators for the session:

### Purpose

The purpose of the session is to review the learning plan for *week 15* by aligning the learning plan with Learner Material and appropriate assessment strategies.

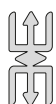
### Learning Outcome

Review your learning plan for *week 15* considering the cross-cutting issues (NTS 2b, 2c, 2e, 2f, 3a, 3d, 3e, 3g–3k and 3o).

### Learning Indicators

1. Review the activities in the Learner Material and identify appropriate activities based on the pedagogical approaches in the Teacher Manual that can support your lesson for the week.
2. Discuss and develop assessment tasks and rubrics/marking scheme for the learning indicators for the week.

**2.2** Review the pedagogical approaches proposed for teaching *week 15* in your learning plan, identify activities that align with these in the Learner Material. Indicate the activity (ies) in your learning plan (NTS 2a–2f, 3a–3j)



### Note

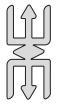
The selected activities should be included in the teacher/learner activity section of the learning plan.

**2.3** Develop assessment tasks/items based on the learning indicator(s) on assessment for the week. This week's recommended mode of assessment is **group research work** (NTS 3k, 3p)

**E.g.**

*Research on how the electrostatic phenomena occurs using the following materials balloons, wool and plastic wrap.*

*Refer to Teacher Manual pages 18 – 22 and Learner Material section 6 for more assessment task*



#### Note

- i. *The assessment tasks/items may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.*
- ii. *The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities of the learning plan.*

**2.4** Discuss (and agree as a subject group) how you will develop the marking scheme/rubrics for scoring the assessment task(s)/item(s) for the week's recommended assessment (NTS 3n–3p)

**E.g.**

*Understanding of Electrostatic Phenomena (5 marks)*

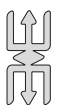
- i. **5 marks:** *Demonstrates understanding of electrostatic phenomena, including concepts such as static electricity, charge transfer, Coulomb's law, and the behaviour of charged objects.*
- ii. **4 marks:** *Shows a good understanding with minor gaps or minor inaccuracies.*
- iii. **3 marks:** *Adequate understanding with some significant gaps or inaccuracies.*
- iv. **2 marks:** *Limited understanding with considerable misconceptions.*
- v. **1 mark:** *Minimal understanding with major misconceptions.*
- vi. **0 mark:** *No understanding demonstrated.*

**Total – 5 marks**

#### Hints



*Prompt learner' to keep all the necessary artefacts needed for the portfolio safe and clean for submission and assessment in week 22*



#### Note

- i. *The marking scheme and rubrics for scoring the assessment tasks/items should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities in the learning plan.*
- ii. *Take into consideration different modes of responses provided by learners.*



- iii. *Discuss how you will observe and integrate character qualities, national values and 21<sup>st</sup> century skills that align with the lesson for the week and include these in your scoring.*

**2.5** Discuss how you will administer the assessment task(s)/item(s) as a subject group. (NTS 3n–3p)

**E.g.**

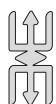
*Provide necessary resources, materials, and support to help learners succeed in their research work.*

*Refer to Teacher Assessment Manual and Toolkit pages 77 – 78 for more information on how to administer.*

**2.6** Discuss how to provide feedback, and where appropriate, record and submit the assessment scores for each learner in the class (NTS 3l– 3n).

**E.g.**

*Guide learners in reflecting on their research findings to identify areas which could have been added to enhance the findings, etc.*



#### Note

*In giving feedback on assessment tasks/items, guide learners to make the necessary corrections that will improve learning.*

### 3. Reflection (10 minutes)

**3.1** Reflect and share your views on the session (NTS 1a, 1b)

**3.2** Identify a critical friend to observe your lesson in relation to PLC Session 15 and provide feedback on your lesson (NTS 1f, 3g)

**3.3** Remember to:

- a) provide constructive feedback to learners and record their assessment scores in the required format and document where appropriate (NTS 3l – 3n)
- b) read PLC Session 16 and related Learner Material (NTS 3a)
- c) bring along your Teacher Manual, PLC Handbook and learning plan on *week 16* in preparation for the next session (NTS 3a)

# PLC SESSION 16: Magnetic and Non-Magnetic Materials

## 1. Introduction (20 minutes)

**1.1** Share one thing on the lesson for *week 15* delivered last week that:

- a) went well (NTS 1a, 1b and 2a-2e)
- b) you found challenging (NTS 1a, 1b and 2a-2e)

**1.2** Share your experience in conducting and/or recording the assessment for the previous week.

**1.3** Share your observation on what a colleague did by way of application of lessons learned from the previous session for *week 15* that supported learning (NTS 2e, 2f, 3d-3j)

## 2. Review of Learning Plans (60 minutes)

**2.1** Read the purpose, learning outcome and learning indicators for the session:

### Purpose

The purpose of the session is to review the learning plan for *week 16* by aligning the learning plan with Learner Material and appropriate assessment strategies.

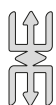
### Learning Outcome

Review your learning plan for *week 16* considering the cross-cutting issues (NTS 2b, 2c, 2e, 2f, 3a, 3d, 3e, 3g-3k and 3o).

### Learning Indicators

1. Review the activities in the Learner Material and identify appropriate activities based on the pedagogical approaches in the Teacher Manual that can support your lesson for the week.
2. Discuss and develop assessment tasks and rubrics/marking scheme for the learning indicators for the week.

**2.2** Review the pedagogical approaches proposed for teaching *week 16* in your learning plan, identify activities that align with these in the Learner Material. Indicate the activity(ies) in your learning plan (NTS 2a-2f, 3a-3j)



### Note

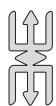
The selected activities should be included in the teacher/learner activity section of the learning plan.

**2.3** Develop assessment tasks/items based on the learning indicator(s) on assessment for the week. This week’s recommended mode of assessment is **practical or experimental work** (NTS 3k, 3p).

**E.g.**

*Design a safe procedure for demagnetising electronic devices such as mobile phones and laptops before disposal.*

*Refer to year 1 book 2 Teacher Material pages 23 –27 and Learner Material Section 6 for more task examples.*



**Note**

- i. *The assessment tasks/items may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.*
- i. *The selected activities should be included in the ‘Assessment DoK aligned to Curriculum and TM’ section below teacher/learner activities of the learning plan.*

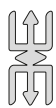
**2.4** Discuss (and agree as a subject group) how you will develop the marking scheme/ rubrics for scoring the assessment task(s)/item(s) for the week’s recommended assessment (NTS 3n–3p)

**E.g.**

Criteria	Excellent (4 marks)	Good (3 marks)	Satisfactory (2 marks)	Need Improvement (1 mark)
Procedure Design	<p><i>step-by-step procedure that effectively ensures safe and complete demagnetisation of devices.</i></p> <p><i>Example:</i></p> <ol style="list-style-type: none"> <li>1. <i>Turn off and unplug the device.</i></li> <li>2. <i>Wear gloves and goggles.</i></li> <li>3. <i>Use a degaussing machine to remove the magnetic field by moving it around the device, etc.</i></li> </ol>	<p><i>procedure with most necessary steps included, minor omissions present.</i></p> <p><i>Example:</i></p> <ol style="list-style-type: none"> <li>1. <i>Disconnect the device from power.</i></li> <li>2. <i>Use protective gear.</i></li> <li>3. <i>Apply a demagnetising tool to the device, etc.</i></li> </ol>	<p><i>Produces a step by step procedure but lacks clarity and completeness in several areas.</i></p> <p><i>Example:</i></p> <ol style="list-style-type: none"> <li>1. <i>Turn off the device.</i></li> <li>2. <i>Use a demagnetiser, etc.</i></li> </ol>	<p><i>Procedure is unclear, incomplete, or contains significant errors that could compromise safety or effectiveness.</i></p> <p><i>Example</i></p> <p><i>Try to demagnetise it, etc.</i></p>

Criteria	Excellent (4 marks)	Good (3 marks)	Satisfactory (2 marks)	Need Improvement (1 mark)
Safety Measures	<p>Incorporates at least 4 relevant safety precautions and identifying potential hazards and how to mitigate them.</p> <p>Example: Before starting, wear appropriate PPE such as gloves and safety goggles to protect against accidental sparks, Ensure the workspace is well-ventilated and free from flammable materials, before disposal to ensure that residual magnetism does not interfere with future data storage or compromise data security, etc.</p>	<p>Incorporates at least 3 relevant safety precautions and identifying potential hazards and how to mitigate them.</p> <p>Example: Use gloves and goggles while demagnetising devices. Make sure the area is safe and free from hazards, etc.</p>	<p>Incorporates at least 2 relevant safety precautions and identifying potential hazards and how to mitigate them.</p> <p>Example: Wear protective gear and handle devices carefully to avoid injuries, etc.</p>	<p>Incorporates at least 1 relevant safety precautions and identifying potential hazards and how to mitigate them.</p> <p>Example: Be careful to avoid electric shocks, etc.</p>

**Total – 8 marks**



#### Note

- i. The marking scheme and rubrics for scoring the assessment tasks/items should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities in the learning plan.
- ii. Take into consideration different modes of responses provided by learners.
- iii. Discuss how you will observe and integrate character qualities, national values and 21<sup>st</sup> century skills that align with the lesson for the week and include these in your scoring.

**2.4** Discuss how you will administer the assessment task(s)/item(s) as a subject group (NTS 3n–3p).

**E.g.**

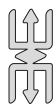
Provide clear instruction to the learners on the research task, etc.

*Refer to Teacher Assessment Manual and Toolkit pages 46 – 48 for more information on the mode of administration*

**2.5** Discuss how to provide feedback, and where appropriate, record and submit the assessment scores for each learner in the class (NTS 3l– 3n).

**E.g.**

*Provide targeted feedback to learners on area where they have done well and areas where they need improvement, etc.*



**Note**

*In giving feedback on assessment tasks/items, guide learners to make the necessary corrections that will improve learning.*

### 3. Reflection (10 minutes)

**3.1** Reflect and share your views on the session (NTS 1a, 1b).

**3.2** Identify a critical friend to observe your lesson in relation to PLC Session 16 and provide feedback on your lesson (NTS 1f, 3g).

**3.3** Remember to:

- a) provide constructive feedback to learners and record their assessment scores in the required format and document where appropriate (NTS 3l – 3n).
- b) read PLC Session 17 and related Learner Material (NTS 3a).
- c) bring along your Teacher Manual, PLC Handbook and learning plan on *week 17* in preparation for the next session (NTS 3a).

# PLC SESSION 17: Semi-Conductors, Transducers and their Applications

## 1. Introduction (20 minutes)

**1.1** Share one thing on the lesson for *week 16* delivered last week that:

- a) went well (NTS 1a, 1b and 2a-2e)
- b) you found challenging (NTS 1a, 1b and 2a-2e)

**1.2** Share your experience in conducting and/or recording the assessment for the previous week.

**1.3** Share your observation on what a colleague did by way of application of lessons learned from the previous session for *week 16* that supported learning (NTS 2e, 2f, 3d-3j)

## 2. Review of Learning Plans (60 minutes)

**2.1** Read the purpose, learning outcome and learning indicators for the session:

### Purpose

The purpose of the session is to review the learning plan for *week 17* by aligning the learning plan with Learner Material and appropriate assessment strategies.

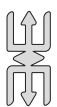
### Learning Outcome

Review your learning plan for *week 17* considering the cross-cutting issues (NTS 2b, 2c, 2e, 2f, 3a, 3d, 3e, 3g-3k and 3o).

### Learning Indicators

1. Review the activities in the Learner Material and identify appropriate activities based on the pedagogical approaches in the Teacher Manual that can support your lesson for the week.
2. Discuss and develop assessment tasks and rubrics/marking scheme for the learning indicators for the week.

**2.2** Review the pedagogical approaches proposed for teaching *week 17* in your learning plan, identify activities that align with these in the Learner Material. Indicate the activity(ies) in your learning plan (NTS 2a-2f, 3a-3j)



### Note

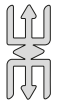
The selected activities should be included in the teacher/learner activity section of the learning plan.

**2.3** Develop assessment tasks/items based on the learning indicator(s) on assessment for the week. This week's recommended mode of assessment is **case study** (NTS 3k, 3p).

**E.g.**

*How do diodes help mobile phone in everyday life.*

*Refer to year 1 book 2 Teacher Manual pages 31 and 32 and Learner Material Section 7 for more task examples.*



#### Note

- i. *The assessment tasks/items may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.*
- ii. *The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities of the learning plan.*

**2.1** Discuss (and agree as a subject group) how you will develop the marking scheme/ rubrics for scoring the assessment task(s)/item(s) for the week's recommended assessment (NTS 3n-3p).

**E.g.**

*Effective application of theories and concepts with strong evidence such as Rectification in Power Supplies like phone chargers, laptops, and TVs use diodes in their power supplies to provide stable DC power, LEDs (Light Emission Diodes) etc.*

#### 10 marks

a) *Understanding of Diodes (3 marks)*

*Look out for key components like the ones highlighted (1 mark each)*

*3 marks: A diode is an **electronic component** that allows **electricity** to flow in only **one direction or path**.*

b) *Examples of expected response of application in Mobile Phones (2 marks)*

i. **3 marks:** *In mobile phones, diodes help manage the flow of electricity to protect the phone's circuits from damage caused by incorrect voltage or current.*

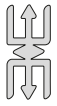
ii. **2 marks:** *Diodes in mobile phones help control electricity.*

iii. **1 mark:** *Diodes are in mobile phones.*

c) *Explanation of Benefits in Everyday Life (1 mark)*

i. **2 marks:** *Diodes help electronic devices run safely and efficiently, making sure they work correctly and last longer.*

ii. **1 mark:** *Diodes make devices work better.*

**Note**

- i. *The marking scheme and rubrics for scoring the assessment tasks/items should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities in the learning plan.*
- ii. *Take into consideration different modes of responses provided by learners.*
- iii. *Discuss how you will observe and integrate character qualities, national values and 21<sup>st</sup> century skills that align with the lesson for the week and include these in your scoring.*

**2.2** Discuss how you will administer the assessment task(s)/item(s) as a subject group (NTS 3n-3p).

**E.g.**

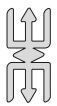
*Bring the whole class together and invite each group to share their findings, solutions, or recommendations etc.*

*Refer to Teacher Assessment Manual and Toolkit pages 25-27 for more information on how to administer.*

**2.3** Discuss how to provide feedback, and where appropriate, record and submit the assessment scores for each learner in the class (NTS 3l- 3n)

**E.g.**

*Guide the learners to reflect on their learning process, such as what they learned and how it will help them future decisions, etc.*

**Note**

*In giving feedback on assessment tasks/items, guide learners to make the necessary corrections that will improve learning.*

### 3. Reflection (10 minutes)

**3.1** Reflect and share your views on the session (NTS 1a, 1b)

**3.2** Identify a critical friend to observe your lesson in relation to PLC Session 17 and provide feedback on your lesson (NTS 1f, 3g)

**3.3** Remember to:

- a) provide constructive feedback to learners and record their assessment scores in the required format and document where appropriate (NTS 3l - 3n)
- b) read PLC Session 18 and related Learner Material (NTS 3a)
- c) bring along your Teacher Manual, PLC Handbook and learning plan on *week 18* in preparation for the next session (NTS 3a)



# PLC SESSION 18: Preparing for Mid-Semester Examination

## 1. Introduction (20 minutes)

**1.1** Share one thing on the lesson for *week 17* delivered last week that:

- a) went well (NTS 1a, 1b and 2a-2e)
- b) you found challenging (NTS 1a, 1b and 2a-2e)

**1.2** Share your experience in conducting and/or recording the assessment for the previous week.

**1.3** Share your observation on what a colleague did by way of application of lessons learned from the previous session for *week 17* that supported learning (NTS 2e, 2f, 3d-3j)

## 2. Review of Learning Plans (60 minutes)

**2.1** Read the purpose, learning outcome and learning indicators for the session:

### Purpose

The purpose of the session is to review the learning plan for *week 18 lessons and mid-semester examination* by aligning the learning plan with Learner Material and appropriate assessment strategies.

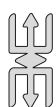
### Learning Outcome

Review your learning plan for *week 18 and mid-semester examination* considering the cross-cutting issues (NTS 2b, 2c, 2e, 2f, 3a, 3d, 3e, 3g-3k and 3o).

### Learning Indicators

1. Review the activities in the Learner Material and identify appropriate activities based on the pedagogical approaches in the Teacher Manual that can support your lesson for the week.
2. Discuss and develop assessment tasks and rubrics/marking scheme for the learning indicators for the week.

**2.2** Review the pedagogical approaches proposed for teaching *week 18* in your learning plan, identify activities that align with these in the Learner Material. Indicate the activity(ies) in your learning plan (NTS 2a-2f, 3a-3j)



### Note

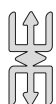
The selected activities should be included in the teacher/learner activity section of the learning plan.

**2.3** Develop assessment tasks/items based on the learning indicator(s) on assessment for the week. This week's recommended mode of assessment is **mid-semester examination** (NTS 3k, 3p)

**E.g.**

- a) Set questions to cover lessons thought from week 13– 17 and allocate 30% out of 100 marks for the mid semester.
- b) The questions should include multiple choice questions, essay type and paper practical test or experimental test

Refer the Teacher manual year 1 book 2 pages 6–34 and Learner Manual for sample questions.



**Note**

- i. The assessment tasks/items may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.
- ii. The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities of the learning plan.

**2.4** Discuss (and agree as a subject group) how you will develop the marking scheme/ rubrics for scoring the assessment task(s)/item(s) for the week's recommended assessment (NTS 3n–3p).

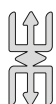
**E.g**

Set:

- a) Multiple Choice – A (1 mark for correct answer)
- b) Essay – 3 marks

Look out for these key words (1 mark for each)

- i. 3 marks: Magnetisation is the process by which a material becomes magnetically ordered, resulting in the **alignment** of its **magnetic domains** so that the material exhibits a net **magnetic field**.
  - ii. 2 marks: Magnetisation occurs when the **magnetic domains** in a material align, causing the material to become **magnetic**.
  - iii. 1 mark: Magnetisation is when a material becomes a **magnet**.
- 0 marks: Magnetisation is related to magnets



**Note**

- i. The marking scheme and rubrics for scoring the assessment tasks/items should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/ learner activities in the learning plan.
- ii. Take into consideration different modes of responses provided by learners.
- iii. Discuss how you will observe and integrate character qualities, national values and 21<sup>st</sup> century skills that align with the lesson for the week and include these in your scoring.

**2.5** Discuss how you will administer the assessment task(s)/item(s) as a subject group (NTS 3n-3p).

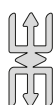
**E.g.**

*Discuss the structure of examination including the number of questions, duration of the examination and scoring rubrics, etc*

**2.6** Discuss how to provide feedback, and where appropriate, record and submit the assessment scores for each learner in the class (NTS 3l- 3n)

**E.g.**

*Ask learners to reflect, self- and peer-assess their mid-semester score and provide remedial where necessary and mark the examination and give feedback to learners to keep track of their progress and address learners challenging areas, etc.*



**Note**

*In giving feedback on assessment tasks/items, guide learners to make the necessary corrections that will improve learning.*

### 3. Reflection (10 minutes)

**3.1** Reflect and share your views on the session (NTS 1a, 1b)

**3.2** Identify a critical friend to observe your lesson in relation to PLC Session 18 and provide feedback on your lesson (NTS 1f, 3g)

**3.3** Remember to:

- a. provide constructive feedback to learners and record their assessment scores in the required format and document where appropriate (NTS 3l - 3n)
- b. read PLC Session 19 and related Learner Material (NTS 3a)
- c. bring along your Teacher Manual, PLC Handbook and learning plan on *week 19* in preparation for the next session (NTS 3a).



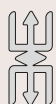
## Appendix D: Table of Specification for Mid-Semester Examination

### Nature

- The mid-semester examination should cover weeks 13 – 17 focal areas
- The questions should be distributed fairly using the percentages 30%, 40%, 30% on the DoK levels.
- Select the appropriate assessment strategies that fit your school's needs

### Resources

- Answer booklets
- Teacher Manual
- Learner Material
- Teacher Assessment Manual Toolkit



### Note

Teachers are to design assessment tasks that fit the need of their schools taking into consideration the number of learners in the class, available resources, etc.

Table of Specification for Mid Semester Examination

Weeks	Focal Area(s)	Type of Questions	DoK Levels				Total
			1	2	3	4	
13	1. Refractive Index of a Medium	Multiple Choice	1	1	1	-	3
	2. Total Internal Reflection	Essay	-	1			1
	3. Relationship Between The Real Depth, Apparent Depth And The Refractive Index	Practical	-	-	-	-	-
14	1. Gold Leaf Electroscope	Multiple Choice	1	-	1	-	2
	2. Electrons as Mobile Charge Carriers	Essay			1		1
	3. Charge Carriers in Conductors, Semiconductors	Practical					
15	1. Charge	Multiple Choice	1	-	1	-	2
	2. Distribution of Charges on Surfaces	Essay		1			1
	3. Positive and Negative Charges.	Practical					

Weeks	Focal Area(s)	Type of Questions	DoK Levels				Total
			1	2	3	4	
16	1. Magnetic and Non-Magnetic Materials	Multiple Choice	1	1	-	-	2
		Essay					
	2. Magnetic Field 3. Magnetisation and Demagnetisation	Practical	-		1	-	1
17	1. N-Type and P-Type Semiconductors.	Multiple Choice				1	1
		Essay			1		1
	2. P-N Junction Diodes	Practical		1			1
	Total		4	5	6	1	16

# PLC SESSION 19: Transducer

## 1. Introduction (20 minutes)

- 1.1 Share one thing on the lesson for *week 18* and mid-semester examination that:
  - a) went well (NTS 1a, 1b and 2a-2e)
  - b) you found challenging (NTS 1a, 1b and 2a-2e)
- 1.2 Share your experience in conducting and/or recording the assessment for the previous week.
- 1.3 Share your observation on what a colleague did by way of application of lessons learned from the previous session for *week 18* that supported learning (NTS 2e, 2f, 3d-3j)

## 2. Review of Learning Plans (60 minutes)

- 2.1 Read the purpose, learning outcome and learning indicators for the session:

### Purpose

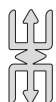
The purpose of the session is to review the learning plan for *week 19* by aligning the learning plan with Learner Material and appropriate assessment strategies.

### Learning Outcome

Review your learning plan for *week 19* considering the cross-cutting issues (NTS 2b, 2c, 2e, 2f, 3a, 3d, 3e, 3g-3k and 3o).

### Learning Indicators

1. Review the activities in the Learner Material and identify appropriate activities based on the pedagogical approaches in the Teacher Manual that can support your lesson for the week.
  2. Discuss and develop assessment tasks and rubrics/marking scheme for the learning indicators for the week.
- 2.2 Review the pedagogical approaches proposed for teaching *week 19* in your learning plan, identify activities that align with these in the Learner Material. Indicate the activity(ies) in your learning plan (NTS 2a-2f, 3a-3j).



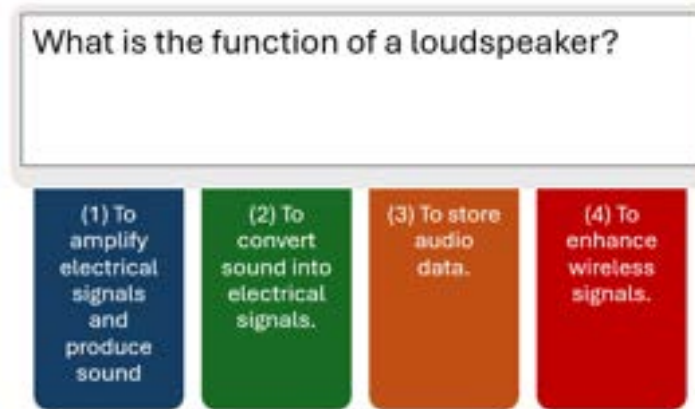
### Note

The selected activities should be included in the teacher/learner activity section of the learning plan.

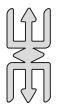
**2.3** Develop assessment tasks/items based on the learning indicator(s) on assessment for the week. This week's recommended mode of assessment is **test of practical knowledge** (NTS 3k, 3p).

**E.g.**

*In 20 seconds, select the colour or number that numbers the question (10 marks)*



Refer to *Teacher Manual pages 38 – 40* and *Learner Material Section 7* for more information on task examples.



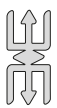
#### Note

- i. The assessment tasks/items may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.
- ii. The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities of the learning plan.

**2.4** Discuss (and agree as a subject group) how you will develop the marking scheme/ rubrics for scoring the assessment task(s)/item(s) for the week's recommended assessment (NTS 3n-3p).

**E.g.**

- a) *Stating the appropriate function of the loudspeaker such as to convert electrical signals into sound waves, allowing us to hear audio contents like music, amplification, frequency response, impedance matching, sensitivity and dispersion etc. 3 marks*
- b) *Correct explanation of how a low-voltage DC motor converts electrical energy into mechanical motion such as electromagnetic principles. When a low-voltage DC power supply is connected to the motor, electrical current flows through the brushes and into the commutator, which is attached to the rotor for mechanical movement 3 marks*



#### Note

- i. The marking scheme and rubrics for scoring the assessment tasks/items should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities in the learning plan.
- ii. Take into consideration different modes of responses provided by learners.

iii. *Discuss how you will observe and integrate character qualities, national values and 21<sup>st</sup> century skills that align with the lesson for the week and include these in your scoring.*

**2.5** Discuss how you will administer the assessment task(s)/item(s) as a subject group (NTS 3n–3p).

**E.g.**

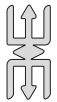
*Provide guidance for the completion of the performance task etc.*

*Refer to Teacher Assessment Manual and Toolkit pages 41 – 43 for more information on the how to administer test of practical knowledge.*

**2.6** Discuss how to provide feedback, and where appropriate, record and submit the assessment scores for each learner in the class (NTS 3l– 3n).

**E.g.**

*Provide an overall evaluation on the performance product and inform learners how the evaluation data would be used etc.*



#### Note

*In giving feedback on assessment tasks/items, guide learners to make the necessary corrections that will improve learning.*

### 3. Reflection (10 minutes)

**3.1** Reflect and share your views on the session (NTS 1a, 1b)

**3.2** Identify a critical friend to observe your lesson in relation to PLC Session 19 and provide feedback on your lesson (NTS 1f, 3g)

**3.3** Remember to:

- a) provide constructive feedback to learners and record their assessment scores in the required format and document where appropriate (NTS 3l – 3n).
- b) read PLC Session 20 and related Learner Material (NTS 3a).
- c) bring along your Teacher Manual, PLC Handbook and learning plan on *week 20* in preparation for the next session (NTS 3a)



# PLC SESSION 20: Electromagnetism

## 1. Introduction (20 minutes)

**1.1** Share one thing on the lesson for *week 19* delivered last week that:

- a) went well (NTS 1a, 1b and 2a–2e)
- b) you found challenging (NTS 1a, 1b and 2a–2e)

**1.2** Share your experience in conducting and/or recording the assessment for the previous week.

**1.3** Share your observation on what a colleague did by way of application of lessons learned from the previous session for *week 19* that supported learning (NTS 2e, 2f, 3d–3j)

## 2. Review of Learning Plans (60 minutes)

**2.1** Read the purpose, learning outcome and learning indicators for the session:

### Purpose

The purpose of the session is to review the learning plan for *week 20* by aligning the learning plan with Learner Material and appropriate assessment strategies.

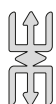
### Learning Outcome

Review your learning plan for *week 20* considering the cross-cutting issues (NTS 2b, 2c, 2e, 2f, 3a, 3d, 3e, 3g–3k and 3o).

### Learning Indicators

1. Review the activities in the Learner Material and identify appropriate activities based on the pedagogical approaches in the Teacher Manual that can support your lesson for the week.
2. Discuss and develop assessment tasks and rubrics/marking scheme for the learning indicators for the week.

**2.2** Review the pedagogical approaches proposed for teaching *week 20* in your learning plan, identify activities that align with these in the Learner Material. Indicate the activity(ies) in your learning plan (NTS 2a–2f, 3a–3j).



### Note

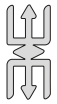
*The selected activities should be included in the teacher/learner activity section of the learning plan.*

**2.3** Develop assessment tasks/items based on the learning indicator(s) on assessment for the week. This week's recommended mode of assessment is **practical work (group)** (NTS 3k, 3p).

**E.g.**

*Design the process by which a BJT can function as a switch, including the role of the base current in this functionality.*

*Refer to Teacher Manual pages 41 – 43 and Learner Material section 7 for more information.*



#### Note

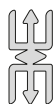
- i. The assessment tasks/items may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.
- ii. The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities of the learning plan.

**2.4** Discuss (and agree as a subject group) how you will develop the marking scheme/ rubrics for scoring the assessment task(s)/item(s) for the week's recommended assessment (NTS 3n-3p).

**E.g.**

Criteria	Excellent - 5	Very good - 4	Good - 3	Satisfactory - 2
<b>Understanding of BJT Operation</b>	Demonstrates a thorough understanding of BJT operation modes (cut-off, active, saturation) with detailed explanations and examples.	Demonstrates a thorough understanding of BJT operation modes (cut-off, active, saturation) with detailed explanations but no examples.	Demonstrates a thorough understanding of BJT operation modes (cut-off, active, saturation) without detailed explanations and examples.	Demonstrates a thorough understanding of only one BJT operation mode (cut-off, active, saturation) without detailed explanations and examples.
<b>Circuit Design</b>	Circuit diagram is drawn, clearly labelled, and accurately represents a BJT switch configuration.	Circuit diagram is drawn, clearly labelled, but do not represent a BJT switch configuration	Circuit diagram is drawn, but not clearly labelled, and do not represent a BJT switch configuration	Circuit described but not drawn,
<b>Role of Base Current</b>	Clearly explains the role of base current in switching, including calculations for base current and collector current with examples.	Clearly explains the role of base current in switching, including calculations for base current and collector current without examples	Clearly explains the role of base current in switching, including calculations for base current only current without examples	Clearly explains the role of base current in switching, without calculations for base current and collector current and examples

**Total - 15 marks**

**Note**

- i. *The marking scheme and rubrics for scoring the assessment tasks/items should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities in the learning plan.*
- ii. *Take into consideration different modes of responses provided by learners.*
- iii. *Discuss how you will observe and integrate character qualities, national values and 21<sup>st</sup> century skills that align with the lesson for the week and include these in your scoring.*

**2.5** Discuss how you will administer the assessment task(s)/item(s) as a subject group (NTS 3n–3p).

**E.g.**

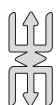
*Make a list of the tools and supplies you will need ensure that the necessary materials are available etc.*

*Refer to Teacher Assessment Manual and Toolkit page 153 for more facts on mode of assessment.*

**2.6** Discuss how to provide feedback, and where appropriate, record and submit the assessment scores for each learner in the class (NTS 3l–3n).

**E.g.**

*Give a concise visual summary of the results and address any restrictions or mistakes, etc.*

**Note**

*In giving feedback on assessment tasks/items, guide learners to make the necessary corrections that will improve learning.*

### 3. Reflection (10 minutes)

**3.1** Reflect and share your views on the session (NTS 1a, 1b)

**3.2** Identify a critical friend to observe your lesson in relation to PLC Session 20 and provide feedback on your lesson (NTS 1f, 3g)

**3.3** Remember to:

- a) provide constructive feedback to learners and record their assessment scores in the required format and document where appropriate (NTS 3l – 3n)
- b) read PLC Session 21 and related Learner Material (NTS 3a)
- c) bring along your Teacher Manual, PLC Handbook and learning plan on *week 21* in preparation for the next session (NTS 3a)

# PLC SESSION 21: Electromagnetism

## 1. Introduction (20 minutes)

**1.1** Share one thing on the lesson for *week 20* delivered last week that:

- a) went well (NTS 1a, 1b and 2a–2e)
- b) you found challenging (NTS 1a, 1b and 2a–2e)

**1.2** Share your experience in conducting and/or recording the assessment for the previous week.

**1.3** Share your observation on what a colleague did by way of application of lessons learned from the previous session for *week 20* that supported learning (NTS 2e, 2f, 3d–3j)

## 2. Review of Learning Plans (60 minutes)

**2.1** Read the purpose, learning outcome and learning indicators for the session:

### Purpose

The purpose of the session is to review the learning plan for *week 21* by aligning the learning plan with Learner Material and appropriate assessment strategies.

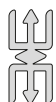
### Learning Outcome

Review your learning plan for *week 21* considering the cross-cutting issues (NTS 2b, 2c, 2e, 2f, 3a, 3d, 3e, 3g–3k and 3o).

### Learning Indicators

1. Review the activities in the Learner Material and identify appropriate activities based on the pedagogical approaches in the Teacher Manual that can support your lesson for the week.
2. Discuss and develop assessment tasks and rubrics/marking scheme for the learning indicators for the week.

**2.2** Review the pedagogical approaches proposed for teaching *week 21* in your learning plan, identify activities that align with these in the Learner Material. Indicate the activity(ies) in your learning plan (NTS 2a–2f, 3a–3j).



### Note

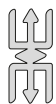
*The selected activities should be included in the teacher/learner activity section of the learning plan.*

**2.3** Develop assessment tasks/items based on the learning indicator(s) on assessment for the week. This week's recommended mode of assessment is **pop/unannounced quiz** (NTS 3k, 3p).

**E.g.**

*List the three common transistor configurations and briefly mention one key characteristic of each.*

*Refer to Teacher Manual pages 44 – 45 and Learner Material Section 7 for more information on pop quiz*



#### Note

- i. *The assessment tasks/items may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.*
- ii. *The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities of the learning plan.*

**2.4** Discuss (and agree as a subject group) how you will develop the marking scheme/rubrics for scoring the assessment task(s)/item(s) for the week's recommended assessment (NTS 3n–3p).

**E.g.**

*Listing the three common transistor configurations such as*

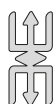
*Common Emitter (CE) Configuration,*

*Common Base (CB) Configuration,*

*Common Collector (CC) Configuration*

*2 mark each for mentioning of common transistor configuration*

**Total – 6 marks**



#### Note

- i. *The marking scheme and rubrics for scoring the assessment tasks/items should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities in the learning plan.*
- ii. *Take into consideration different modes of responses provided by learners.*
- iii. *Discuss how you will observe and integrate character qualities, national values and 21<sup>st</sup> century skills that align with the lesson for the week and include these in your scoring.*

**2.5** Discuss how you will administer the assessment task(s)/item(s) as a subject group (NTS 3n–3p).

**E.g.**

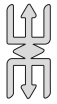
*Provide a range of assessment options, such as written assignments, oral presentations, projects, or multimedia presentations. etc.*

*Refer to Teacher Assessment Manual and Toolkit pages 15 for more information on pop/unannounced quiz.*

- 2.6** Discuss how to provide feedback, and where appropriate, record and submit the assessment scores for each learner in the class (NTS 3l– 3n).

**E.g.**

*Provide constructive feedback for group performance for discussions in their next lesson and clear all necessary misconceptions, etc.*



#### Note

*In giving feedback on assessment tasks/items, guide learners to make the necessary corrections that will improve learning.*

### 3. Reflection (10 minutes)

- 3.1** Reflect and share your views on the session (NTS 1a, 1b).
- 3.2** Identify a critical friend to observe your lesson in relation to PLC Session 21 and provide feedback on your lesson (NTS 1f, 3g)
- 3.3** Remember to:
- provide constructive feedback to learners and record their assessment scores in the required format and document where appropriate (NTS 3l – 3n)
  - read PLC Session 22 and related Learner Material (NTS 3a)
  - bring along your Teacher Manual, PLC Handbook and learning plan on *week 22* in preparation for the next session (NTS 3a)

# PLC SESSION 22: Atomic and Nuclear Physics

## 1. Introduction (20 minutes)

**1.1** Share one thing on the lesson for *week 21* delivered last week that:

- a) went well (NTS 1a, 1b and 2a–2e)
- b) you found challenging (NTS 1a, 1b and 2a–2e)

**1.2** Share your experience in conducting and/or recording the assessment for the previous week.

**1.3** Share your observation on what a colleague did by way of application of lessons learned from the previous session for *week 21* that supported learning (NTS 2e, 2f, 3d–3j)

## 2. Review of Learning Plans (60 minutes)

**2.1** Read the purpose, learning outcome and learning indicators for the session:

### Purpose

The purpose of the session is to review the learning plan for *week 22* by aligning the learning plan with Learner Material and appropriate assessment strategies.

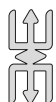
### Learning Outcome

Review your learning plan for *week 22* considering the cross-cutting issues (NTS 2b, 2c, 2e, 2f, 3a, 3d, 3e, 3g–3k and 3o).

### Learning Indicators

1. Review the activities in the Learner Material and identify appropriate activities based on the pedagogical approaches in the Teacher Manual that can support your lesson for the week.
2. Discuss and develop assessment tasks and rubrics/marking scheme for the learning indicators for the week.

**2.2** Review the pedagogical approaches proposed for teaching *week 22* in your learning plan, identify activities that align with these in the Learner Material. Indicate the activity(ies) in your learning plan (NTS 2a–2f, 3a–3j)



### Note

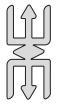
*The selected activities should be included in the teacher/learner activity section of the learning plan.*

**2.3** Develop assessment tasks/items based on the learning indicator(s) on assessment for the week. This week's recommended mode of assessment is **computational task** (NTS 3k, 3p).

**E.g.**

*An electron jumps from an energy level of  $-1.6\text{ eV}$  to one of  $-10.4\text{ eV}$  in an atom. Calculate the energy of the emitted radiation.*

*Refer to Teacher Manual pages 48–51 and Learner Material Section 8 for more assessment task*



#### Note

- i. *The assessment tasks/items may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.*
- ii. *The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities of the learning plan.*

**2.4** Discuss (and agree as a subject group) how you will develop the marking scheme/rubrics for scoring the assessment task(s)/item(s) for the week's recommended assessment (NTS 3n–3p).

**E.g.**

*Stating the equation 2 marks such as  $E = h \times f$*

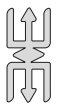
*Where:*

- *E is the energy of the photon,*
- *f is the frequency of the photon,*
- *h is Planck's constant, approximately  $6.626 \times 10^{-34}$  joule-seconds (J-s) 2 marks 4 marks.*

a) *Calculating the energy level correctly  $E_{\text{emitted}} = E_i - E_f = (-1.6\text{eV}) - (-10.4\text{eV})$*

*$E_{\text{emitted}} = 8.8\text{eV}$  (6 marks)*

**Total – 10 marks**



#### Note

- i. *The marking scheme and rubrics for scoring the assessment tasks/items should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities in the learning plan.*
- ii. *Take into consideration different modes of responses provided by learners.*
- iii. *Discuss how you will observe and integrate character qualities, national values and 21<sup>st</sup> century skills that align with the lesson for the week and include these in your scoring.*



**2.5** Discuss how you will administer the assessment task(s)/item(s) as a subject group (NTS 3n–3p).

**E.g.**

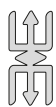
*Administer and Supervise by distributing the task to learners, closely monitor their progress and ensure a fair and cheating-free assessment environment etc.*

*Refer to Teacher Assessment Manual and Toolkit pages 49 – 51 for information on how to conduct computational assessment.*

**2.6** Discuss how to provide feedback, and where appropriate, record and submit the assessment scores for each learner in the class (NTS 3l– 3n).

**E.g.**

*Collect completed tasks and evaluate learners' work using predetermined criteria, assigning scores, and providing feedback.*



#### Note

*In giving feedback on assessment tasks/items, guide learners to make the necessary corrections that will improve learning.*

### 3. Reflection (10 minutes)

**3.1** Reflect and share your views on the session (NTS 1a, 1b)

**3.2** Identify a critical friend to observe your lesson in relation to PLC Session 22 and provide feedback on your lesson (NTS 1f, 3g)

**3.3** Remember to:

- a) provide constructive feedback to learners and record their assessment scores in the required format and document where appropriate (NTS 3l – 3n)
- b) read PLC Session 23 and related Learner Material (NTS 3a)
- c) bring along your Teacher Manual, PLC Handbook and learning plan on *week 23* in preparation for the next session (NTS 3a)

# PLC SESSION 23: Atomic Physics

## 1. Introduction (20 minutes)

**1.1** Share one thing on the lesson for *week 22* delivered last week that:

- a) went well (NTS 1a, 1b and 2a–2e)
- b) you found challenging (NTS 1a, 1b and 2a–2e)

**1.2** Share your experience in conducting and/or recording the assessment for the previous week.

**1.3** Share your observation on what a colleague did by way of application of lessons learned from the previous session for *week 22* that supported learning (NTS 2e, 2f, 3d–3j)

## 2. Review of Learning Plans (60 minutes)

**2.1** Read the purpose, learning outcome and learning indicators for the session:

### Purpose

The purpose of the session is to review the learning plan for *week 23* by aligning the learning plan with Learner Material and appropriate assessment strategies.

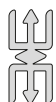
### Learning Outcome

Review your learning plan for *week 23* considering the cross-cutting issues (NTS 2b, 2c, 2e, 2f, 3a, 3d, 3e, 3g–3k and 3o).

### Learning Indicators

1. Review the activities in the Learner Material and identify appropriate activities based on the pedagogical approaches in the Teacher Manual that can support your lesson for the week.
2. Discuss and develop assessment tasks and rubrics/marking scheme for the learning indicators for the week.

**2.2** Review the pedagogical approaches proposed for teaching *week 23* in your learning plan, identify activities that align with these in the Learner Material. Indicate the activity(ies) in your learning plan (NTS 2a–2f, 3a–3j)



### Note

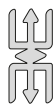
*The selected activities should be included in the teacher/learner activity section of the learning plan.*

**2.3** Develop assessment tasks/items based on the learning indicator(s) on assessment for the week. This week's recommended mode of assessment **poster presentation (concept map)** (NTS 3k, 3p).

**E.g.**

*Explore the concept of nuclides and how variations in the number of protons and neutrons affect the stability of nuclides.*

*Refer to Teacher Manual pages 52–55 and Learner Material section 8 for more assessment task*



### Note

- i. *The assessment tasks/items may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.*
- ii. *The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities of the learning plan.*

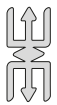
**2.4** Discuss (and agree as a subject group) how you will develop the marking scheme/rubrics for scoring the assessment task(s)/item(s) for the week's recommended assessment (NTS 3n–3p).

**E.g.**

Criteria	Excellent -5	Very good	Good	Satisfactory
<b>Protons and Neutrons</b>	<i>Explains the roles of protons and neutrons in determining the identity and stability of nuclides, including isotopes.</i>	<i>Explains the roles of protons and neutrons in determining the identity and stability of nuclides, without isotopes</i>	<i>Explains the roles of protons and neutrons in determining the identity without stability and isotopes</i>	<i>Explains the roles either of protons and neutrons in determining the identity and stability of nuclides, without isotopes</i>
<b>Graphical Representation</b>	<i>Provides clear and accurate graphical representations (e.g., charts of neutron-to-proton ratios) and insights drawn from them.</i>	<i>Provides clear and accurate graphical representations (e.g., charts of neutron-to-proton ratios) without insights drawn from them.</i>	<i>Provides information without representations (e.g., charts of neutron-to-proton ratios) and insights drawn from them.</i>	<i>Do not provide graphical representations (e.g., charts of neutron-to-proton ratios) and insights drawn from them.</i>
<b>Role of Strong Nuclear Force</b>	<i>Explains the strong nuclear force's role in nuclear stability in relation to protons and neutrons</i>	<i>Explains the strong nuclear force's role in nuclear stability not in relation to protons and neutrons</i>	<i>Do not explain the strong nuclear force's role in nuclear stability in relation to protons and neutrons but reduces</i>	<i>Mentioning the strong nuclear force's role in nuclear stability in relation to protons and neutrons</i>

Criteria	Excellent –5	Very good	Good	Satisfactory
<b>Real-World Applications</b>	Discusses real-world applications of nuclides and their stability, such as medical or energy uses, with relevant examples.	Discusses real-world applications of nuclides and their stability, such as medical or energy uses, without relevant examples.	Discusses real-world applications of nuclides and their stability, such as medical or energy uses, without relevant examples.	Discusses real-world applications of nuclides without stability, such as medical or energy uses, without relevant examples.

**Total – 20 marks**



### Note

- i. The marking scheme and rubrics for scoring the assessment tasks/items should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities in the learning plan.
- ii. Take into consideration different modes of responses provided by learners.
- iii. Discuss how you will observe and integrate character qualities, national values and 21<sup>st</sup> century skills that align with the lesson for the week and include these in your scoring.

**2.5** Discuss how you will administer the assessment task(s)/item(s) as a subject group (NTS 3n–3p).

**E.g.**

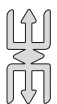
Use diagnostic assessment to identify learners with diverse needs (For example, if your class consists of learners with varying levels of prior knowledge or skills, diagnostic assessment can help you to differentiate teaching and learning processes to meet their varied learning needs).

Refer the Teacher Assessment Manual and Toolkit page 12 for more information on the mode of administration.

**2.6** Discuss how to provide feedback, and where appropriate, record and submit the assessment scores for each learner in the class (NTS 3l– 3n).

**E.g.**

Tell learners the content and expected learning outcome(s) for the next teaching and learning process to help in the diagnostic assessment.



### Note

In giving feedback on assessment tasks/items, guide learners to make the necessary corrections that will improve learning.

### 3. Reflection (10 minutes)

- 3.1 Reflect and share your views on the session (NTS 1a, 1b)
- 3.2 Identify a critical friend to observe your lesson in relation to PLC Session 23 and provide feedback on your lesson (NTS 1f, 3g)
- 3.3 Remember to:
  - a) provide constructive feedback to learners and record their assessment scores in the required format and document where appropriate (NTS 3l – 3n)
  - b) read PLC Session 24 and related Learner Material (NTS 3a)
  - c) bring along your Teacher Manual, PLC Handbook and learning plan on *week 24* in preparation for the next session (NTS 3a)

# PLC SESSION 24: Preparing for End of Semester Examination

## 1. Introduction (20 minutes)

**1.1** Share one thing on the lesson for *week 23* delivered last week that:

- a) went well (NTS 1a, 1b and 2a–2e).
- b) you found challenging (NTS 1a, 1b and 2a–2e).

**1.2** Share your experience in conducting and/or recording the assessment for the previous week.

**1.3** Share your observation on what a colleague did by way of application of lessons learned from the previous session for *week 23* that supported learning (NTS 2e, 2f, 3d–3j).

## 2. Review of Learning Plans (60 minutes)

**2.1** Read the purpose, learning outcome and learning indicators for the session:

### Purpose

The purpose of the session is to review the learning plan for *week 24* lessons and end of semester examination by aligning the learning plan with Learner Material and appropriate assessment strategies.

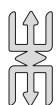
### Learning Outcome

Review your learning plan for *week 24* and prepare for end of semester examination considering the cross-cutting issues (NTS 2b, 2c, 2e, 2f, 3a, 3d, 3e, 3g–3k and 3o).

### Learning Indicators

1. Review the activities in the Learner Material and identify appropriate activities based on the pedagogical approaches in the Teacher Manual that can support your lesson for the week.
2. Discuss and develop assessment tasks and rubrics/marking scheme for the learning indicators for the week.

**2.2** Review the pedagogical approaches proposed for teaching *week 24* in your learning plan, identify activities that align with these in the Learner Material. Indicate the activity (ies) in your learning plan (NTS 2a–2f, 3a–3j).



### Note

The selected activities should be included in the teacher/learner activity section of the learning plan.

**2.3** Develop assessment tasks/items based on the learning indicator(s) on assessment for the week. This week's recommended mode of assessment is **end of semester examination** (NTS 3k, 3p).

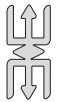
**E.g.**

*Multiple Choice Questions – 30 Questions*

1. *The fundamental units of force are*
  - A. *Kgms*
  - B. *Kgms<sup>-1</sup>*
  - C. *Kgms<sup>2</sup>*
  - D. *Kgms<sup>-2</sup>*

*Essay type Questions – 5 Questions (Learners answer 3)*

1. *A ladder leans against a wall with its foot 4 m away from the wall. If the ladder is 5 m long, how high does it reach on the wall?*



**Note**

- i. *The assessment tasks/items may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.*
- ii. *The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities of the learning plan.*

**2.4** Discuss (and agree as a subject group) how you will develop the marking scheme/ rubrics for scoring the assessment task(s)/item(s) for the week's recommended assessment (NTS 3n-3p).

**E.g.**

*Multiple Choice*

*Correct answer – C*

*I mark for each correct answer (20 questions)*

**Total – 20 marks**

*Essay*

*Solution:*

*Using Pythagoras theorem*



*Height<sup>2</sup> = Ladder<sup>2</sup> - Base<sup>2</sup> – 1 mark*

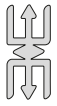
*Height =  $\sqrt{5^2 - 4^2}$  – 1 mark*

*Height =  $\sqrt{25 - 16}$  – 1 mark*

*Height =  $\sqrt{9}$  – 1 mark*

*Height = 3 m – 1 mark*

**Total- 5marks**

**Note**

- i. *The marking scheme and rubrics for scoring the assessment tasks/items should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities in the learning plan.*
- ii. *Take into consideration different modes of responses provided by learners.*
- iii. *Discuss how you will observe and integrate character qualities, national values and 21<sup>st</sup> century skills that align with the lesson for the week and include these in your scoring.*

**2.5** Discuss how you will administer the assessment task(s)/item(s) as a subject group (NTS 3n–3p).

**E.g.**

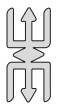
- a) *Prepare a table of test specifications or blueprints (see table of specification below).*
- b) *Supervise the class during the end of semester examination. Discuss the purpose of the exams and the structure etc.*

*Refer to Teacher Assessment Manual and Toolkit page 5 for more information on the mode of administration.*

**2.6** Discuss how to provide feedback, and where appropriate, record and submit the assessment scores for each learner in the class (NTS 3l–3n).

**E.g.**

*Encourage learners to review the provided solutions and offer additional resources or support for areas they found challenging etc.*

**Note**

*In giving feedback on assessment tasks/items, guide learners to make the necessary corrections that will improve learning.*

### 3. Reflection (10 minutes)

**3.1** Reflect and share your views on the session (NTS 1a, 1b)

**3.2** Identify a critical friend to observe your lesson in relation to PLC Session 24 and provide feedback on your lesson (NTS 1f, 3g).

**3.3** Remember to provide constructive feedback to learners and record their assessment scores in the required format and document where appropriate (NTS 3l–3n).





## Appendix G: Table of Specification for End of Semester Examination

Weeks	Focal Area(s)	Type of Questions	DoK Levels				Total
			1	2	3	4	
13	1. Refractive Index of a Medium.	Multiple Choice	1	1	1	-	3
	2. Total Internal Reflection.	Essay	-	1			1
	3. Relationship Between The Real Depth, Apparent Depth And The Refractive Index	Practical	1	-	-	-	1
14	1. Gold Leaf Electroscope.	Multiple Choice	1	-	1	-	2
	2. Electrons as Mobile Charge Carriers.	Essay			1		1
	3. Charge Carriers in Conductors, Semiconductors	Practical		1			
15	1. Charge.	Multiple Choice	1	-	1	1	3
	2. Distribution of Charges on Surfaces.	Essay		1			1
	3. Positive and Negative Charges.	Practical					
16	1. Magnetic and Non-Magnetic Materials.	Multiple Choice	1	1	-	-	2
	2. Magnetic Field.	Essay					
	3. Magnetisation and Demagnetisation	Practical	-		1	-	1
17	1. N-Type and P-Type Semiconductors.	Multiple Choice				1	1
	2. P-N Junction Diodes	Essay			1		1
		Practical	1				1
18	1. Leds and Zener Diodes.	Multiple Choice	1	2	1		4
	2. Effect of Temperature Changes on Resistance	Essay					
		Practical					
19	1. Transducer.	Multiple Choice	1	1			2
	2. Processes of Some Transducers	Essay					
		Practical					

Weeks	Focal Area(s)	Type of Questions	DoK Levels				Total
			1	2	3	4	
20	1. Bipolar Junction Transistor (BJT) 2. Transistor Biasing	<i>Multiple Choice</i>	1	1	1		3
		<i>Essay</i>					
		<i>Practical</i>					
21	Various Transistor Configurations.	<i>Multiple Choice</i>	1	1		1	3
		<i>Essay</i>					
		<i>Practical</i>					
22	1. Atomic Models and Their Limitations. 2. Transition Of An Electron	<i>Multiple Choice</i>	1	2	1		4
		<i>Essay</i>					
		<i>Practical</i>					
23	1. The Structure Of The Nucleus 2. Radioactivity	<i>Multiple Choice</i>	1	1	1		3
		<i>Essay</i>					
		<i>Practical</i>					
	Total		12	13	10	3	47

## Appendix 1: Structure of The Senior High School Internal Assessment and Transcript System

### Introduction

This document provides details on the structure of the internal assessment and transcript system for effective implementation of the standards-based curriculum at the SHS level. The structure of the internal assessment involves a comprehensive and systematic approach to evaluating learners' performance and learning progress. The frequency of assessment is carefully planned to ensure regular and consistent monitoring, typically occurring at multiple points throughout the academic term. It is crucial to capture learner assessment scores promptly and accurately for the transcript. Therefore, guidance has been provided to ensure that each assessment is recorded in a timely manner. Effective management of the transcript system requires meticulous organisation and updated technology to handle and store data efficiently. Capacity building and training on effective internal assessment are essential for teachers, heads, assessments officers, providing them with the skills and knowledge to conduct assessments that are fair, ethical and align with learning outcomes for valid results. Engaging learners in internal school assessments fosters a sense of responsibility and self-awareness, encouraging them to take an active role in their educational journey through prompt and effective feedback.

### A. Structure

#### Formative Assessment

This assessment may be conducted during a class period, after completing or during a practical activity, or after a teacher completes a sub-strand, strand, or a learning indicator(s). Distinct types of assessment tools can be used for Formative Assessment. These include:

- Observation during in-class activities
- Standard homework exercise for class discussion
- Question and answer sessions (formal and informal)
- Quizzes (e.g. class pop-ups)
- In-class activities and presentations (individuals and groups)
- Project work (individuals and groups)
- Practical assessments
- Field trips/Presentation of Reports

- Class assignments/Self/Peer Assessments
- Class tests
- Portfolios
- Performance assessments (roleplay, demonstration oral/aural)

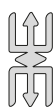
### Summative Assessment

Summative Assessment is conducted at the end of the learning sequence (end of semester). It records the learners' overall achievement/performance at the end of the learning sequence. The type of tools used may include:

- Mid-semester examination
- End of semester examination
- Project work/Portfolio/Research/Practical assessments

**TABLE 1: Proposed Structure, assessment activities and marks distribution**

	Mode of Assessment	Contribution/ Weight	Submission per Year
1	Class Assessments (e.g., Classwork, Quizzes, Homework, Debate, Presentation, Drama & Roleplay, Case Study)	10 %	2
2	Mid-Semester Examination (Assessment/Project/ Research)	10%	2
3	Practical or Portfolio or Performance Assessment (Individual)	10 %	1
4	Group Projects, Research, or Case Studies, Practical/Lab work, Workshops, Performances, Presentations (Out of Class)	10 %	1
5	Individual Projects, Research, or Case Studies, Practical/Lab work, Workshops, Performances, Presentations (Out of Class)	20%	1
6	Supervised Individual Semester Assessment/Project/ Research/ End of Semester Examination	40 %	2
	Total	100 %	9



#### Note

**Character Qualities/National, Values, 21<sup>st</sup> Century Skills:** Teachers should make a conscious effort to observe these soft skills as learners go about their activities in the class, take notes, and award marks appropriately. Assessment of these skills should be deliberately embedded in the various modes of assessment outlined in the table above.

## B. Frequency of Assessment

Table 2 provides a suggested schedule of internal assessment for SHS. It is important to note that whilst assessments should comply with the specific learning outcomes of the subject area, they should cover the 21<sup>st</sup> century skills and competencies, GESI, SEL and National values as espoused in the TAMT using diversity in assessment modes as suggested in Table 1. Teachers may increase the frequency of assessments using other assessment strategies. The schedules presented should serve as **milestones** for schools to comply with.

**Table 2: Suggested schedules of internal assessment for SHS**

Semester One															
SN	Modes of Assessment	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Individual Class Assessment(s)				→										
2	Practical or Portfolio** or Performance Assessments (Individual)					→	→	→	→	→	→				
3	Group Projects, Research or Case Studies (out of class)	→	→	→	→	→	→	→	→	→	→				
4	Supervised Individual Semester Assessment													→	→
Semester Two															
SN	Modes of Assessment	15	16	17	18	19	20	21	22	23	24	25	26	27	28
5	Individual Class Assessment(s)				→										
6	Group work or Exercises					→	→	→	→	→					
7	Practical or Portfolio or Performance Assessments (Individual)	→	→	→	→	→	→	→	→	→					
8	Individual Project work or Research or Case Study		→	→	→	→	→	→	→	→	→				
9	Supervised Individual Semester Assessment													→	→

**Note: How and when to capture learner assessment scores for the Transcript.**

1. **Individual Class Assessment:** This can include individual classwork. This assessment can begin before week 4, but the evaluation scores should be ready by weeks 4 and 18.
2. **Individual Practical/Performance Assessment:** This form of assessment should include orientation of learners at the beginning to provide enough information

concerning the deliverables, progress review, and feedback processes. The assessment score should be ready by the end of weeks 5 through 10, and 15 through 22.

3. **Group Projects/ Research/Case Studies:** Learners should be grouped to work on a common project, case study or research-based problem. The learners should be given orientation concerning the rubrics and ethical or professional conduct concerning the assessment. The problems, projects, research assignments, or case studies should be related to the learners’ environment. The assessment score should be ready by week 10.
4. **Supervised Individual Semester Assessment:** This may be a written examination or project work. It must be noted that regardless of the mode of assessment, there should be supervision throughout. This assessment should be completed by weeks 13/14 and 27/28.
5. **Individual Project Work/Research/Case Study:** This can include mini-design assignments, investigative or case studies or research-based assignments. The assessment score should be ready by week 24.

Assessments should cover the scope of the 21<sup>st</sup> century skills and competencies, GESI, SEL and national values espoused in the TAMT. Table 3 gives examples of the scope. Refer to the TAMT for a comprehensive list of the scope.

**Table 3: Examples of 21st Century skills and competencies, GESI, SEL and National Values to be covered by scope of assessment**

21 <sup>st</sup> Century Skills & Competencies	GESI & SEL	National Values
<ul style="list-style-type: none"> <li>• Critical Thinking and Problem Solving</li> <li>• Creativity</li> <li>• Innovation</li> <li>• Collaboration</li> <li>• Communication</li> <li>• Global and Local Citizenship</li> <li>• Learning for life</li> <li>• Leadership</li> <li>• Analytic skills</li> <li>• Digital Literacy</li> </ul>	<ul style="list-style-type: none"> <li>• Gender Equality and Social Inclusion</li> <li>• Self-Awareness</li> <li>• Self-Management</li> <li>• Social Awareness</li> <li>• Relationship Skills</li> <li>• Responsible Decision Making</li> <li>• Tolerance</li> </ul>	<ul style="list-style-type: none"> <li>• Respect</li> <li>• Truth and Integrity</li> <li>• Tolerance</li> <li>• Respect</li> <li>• Equity</li> <li>• Communalism</li> <li>• Appreciation</li> <li>• Stewardship</li> <li>• Time Management</li> </ul>

Table 4 shows the recommended assessment strategies for the scope in Table 3.

**Table 4:** Recommended assessment strategies for 21st century skills and competencies

21 <sup>st</sup> Century Skills & Competencies	Assessment Strategies
Critical Thinking, Problem Solving, Analytical skills	<ul style="list-style-type: none"> <li>• Debates</li> <li>• Analysis of Case Studies based on learners' environment.</li> <li>• Research &amp; Project work.</li> <li>• Objective and Essay type questions/items</li> </ul>
Creativity and Innovation	<ul style="list-style-type: none"> <li>• Individual and group projects</li> <li>• Analysis of Case Studies based on learners' environment.</li> <li>• Design &amp; product creation to solve societal problems</li> </ul>
Communication and Collaboration	<ul style="list-style-type: none"> <li>• Debates</li> <li>• Group projects.</li> <li>• Presentations</li> <li>• Drama &amp; Role play</li> </ul>
Global and Local Citizenship	<ul style="list-style-type: none"> <li>• Research &amp; Project work.</li> <li>• Analysis of Case Studies based on cultural and global issues</li> </ul>
Leadership and learning for life	<ul style="list-style-type: none"> <li>• Individual and Group projects</li> <li>• Presentations</li> </ul>
Digital Literacy	<ul style="list-style-type: none"> <li>• Research &amp; Project work.</li> <li>• Presentations using ICT tools.</li> <li>• individual and group projects</li> </ul>

The TAMT details the rubrics for the assessment strategies suggested in Table 3. A combination of the assessment strategies could provide diversity and ensure that the assessment scope is effectively covered during formative and summative assessments. It is important to note that the GESI, SEL and National values espoused in the TAMT should be incorporated into the assessment strategies.

## C. Learner Involvement

### What should learners contribute?

Learners' involvement in the internal assessment processes in schools offers valuable insights into how the learner perceives and experiences of the assessment process. This engagement process grants learners the opportunity to explain areas of confusion, frustration, or unfairness, and these help teachers refine their assessment approaches.

Again, learner involvement fosters communication between teachers and students. This can help clarify expectations, address concerns, and create a more positive learning environment.

#### *When to involve learners*

As part of the initial needs assessment for teacher training, gather learner input on areas needing improvement in the Internal Assessment Score (IAS) process. This helps to incorporate learner feedback in developing appropriate teacher training materials.

#### *How should learners be involved?*

Teachers should organise focus group sessions, to gather learner feedback on past assessments. This feedback can be used to inform future training sessions for teachers. e.g., Mock assessments and Co-creation of rubric.

Guide learners on the learning outcome expected. Involve them in the development of the assessment rubrics, and checklists to evaluate their progress and identify areas for improvement. Learners would demonstrate respect for diverse perspectives and the ability to work cooperatively with others.

### **Reflection**

Integrate reflective activities such as journaling or discussions where students can analyse their learning experiences and identify areas for growth.

By actively involving teachers and learners in the SBA process, we create a dynamic learning environment. This empowers students to take ownership of their learning journey while equipping teachers with the tools to effectively guide and assess student progress.

### **Transparency and Setting Goals**

At the beginning of a lesson, communicate clearly, the assessment criteria to the learners using appropriate language and structure. Present the information in an organised and coherent manner.

### **Self-assessment**

Incorporate opportunities for self-assessment throughout the learning process. Learners can use rubrics or checklists to evaluate their progress and identify areas for improvement. Learners would demonstrate respect for diverse perspectives and the ability to work cooperatively with others.

### **Goal Setting**

Encourage learners to set achievable learning goals aligned with the assessment criteria. This empowers them to take ownership of their learning journey.

### **Peer Assessment**

Strategically incorporate peer assessment activities where students evaluate each other's work based on established criteria. This fosters critical thinking and collaboration skills.



## Student-led presentations or projects

Provide opportunities for students to display their learning through presentations or projects. This allows them to develop communication and presentation skills.

By actively involving teachers and learners in the SBA process, we create a dynamic learning environment. This empowers students to take ownership of their learning journey while equipping teachers with the tools to effectively guide and assess student progress.

## D. Feedback Mechanism

A feedback mechanism is a systematic approach for providing learners with information about their performance. This information helps them understand their strengths, identify areas for improvement, and achieve their learning goals. In the multi-subject environment of senior high school, timely and constructive feedback is crucial.

Timely means that feedback is provided soon enough for learners to act upon it after each assessment. Here are suggested general timelines to consider for the following types of assessments:

Type of Assessment	Expected Timeline for Feedback
Individual class assessments (mostly written)	1-3 days
Group assignments	1 week, with interim check-ins for assignments over extended periods of time.
Project work/Semester paper/End of Semester examinations	after key milestones and a final comprehensive review upon completion

For feedback to be constructive, it should focus on the task and not the learner's personality. It should be specific, actionable, and delivered in a way that motivates improvement.

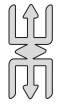
In providing feedback, use the sandwich method (CCC), which starts with a positive aspect of the work (*compliment*), followed by constructive criticism (*correction*), and concludes with another positive note (*compliment*). To set the stage for effective feedback, clearly communicate the learning objectives, expectations, and scoring rubrics before any assessment.

Learners must maintain an "assessment portfolio" where they compile all their assignments, reports, and feedback. Parents and other stakeholders review this portfolio during open days, parent-teacher meetings, or monitoring activities.

Feedback can be delivered using different methods after the assessment is done and marked. The choice of delivery should be guided by best practices and constraints that may exist, such as available time and class sizes. The following are some delivery methods to consider:

- Whole Class Feedback:** The teacher facilitates a discussion about the assessment with all the learners. During the discussion, the teacher should highlight common strengths and weaknesses, provide clarifications, and share best practices.

- **Individual Feedback:** The teacher gives learners personalised (one-on-one) guidance or written comments. Provide *prompts to guide learners* to self-correct their wrong responses.



#### Note

*Provide checklists or rubrics that learners can use to assess their own work before submitting it. This helps them independently identify errors and make the necessary adjustments.*

- **Group Feedback:** The teacher groups learners facing similar challenges for targeted instruction and provides them with feedback.
- **Peer Review Feedback:** The teacher allows learners to learn from one another by giving constructive feedback to peers.
- **Self-Reflection:** After receiving feedback, the teacher should encourage learners to analyse their work, identify areas for improvement, and set goals using rubrics as a guide.
- **External Feedback:** In specific cases, the teacher should consider feedback from subject experts, teachers from other institutions, parents, and other stakeholders.

Regardless of the chosen feedback mechanism, note that self-reflection is essential. This allows learners to internalise feedback, set personal targets for improvement, and develop a growth mindset. Following the feedback, teachers are to provide opportunities for learners to correct mistakes through targeted exercises and reassessments.

By implementing these feedback strategies, teachers can empower senior high school learners to become active participants in their learning journey.

## E. Transcript System

Effective data management is crucial for informed decision-making in today's dynamic educational landscape. The computerised transcript system achieves this purpose by offering second-cycle institutions with a comprehensive record of learner performance. The transcript system is a centralised repository for learner information. It gathers key details such as learner profiles, semester information, subjects taken with their respective scores (including continuous assessments and end of semester examination), credits, grades, semester, and overall Grade Point Averages (GPAs). Additionally, a dedicated section captures brief descriptions of learners' character qualities at the end of each semester.

There should be at least three individual class assessments, at least one group work and at least one project work.

## Appendix 2: Excerpts from The Teacher Assessment Manual and Toolkit

### A. Principles of Effective Assessment

As a process of determining the nature and extent of learning and development among learners, it is important to ensure that the assessment process meets the following principles:

1. Validity
2. Reliability
3. Fairness and ethics
4. Transparency
5. Inclusivity
6. Practicability
7. Assessment utility

#### Developing a valid assessment (Validity of Assessment Results)

To ensure that assessment scores or results are useful and interpreted appropriately, the teacher should:

- i. Clearly state the purpose of the assessment (e.g., what the test will be used for).
- ii. Create a learning and assessment plan (i.e., table of test specification tots)
- iii. Write assessment items or tasks that measure important learning outcomes of the curriculum (e.g., Skills, competencies, collaborative efforts, and lifelong learning).
- iv. Clearly define the performance criteria or standards/schemes/rubrics (i.e., define the specific knowledge, skill or behaviour that learners should demonstrate)
- v. Score or grade assessment task based on the performance criteria to avoid biases, stereotyping, among others.
- vi. Ensure that the content of the assessment aligns closely with the defined criteria (thus, the assessment questions, tasks, or activities should directly measure what they want to assess).
- vii. Interpret the assessment results based on the purpose and the performance criteria.

#### Reliability (Consistency of Assessment Results)

In assessment, consistent standards of teacher assessment and fairness are important goals to aim for. The ‘connoisseur’ approach to assessment; that is, ‘I know it when I see it, but I can’t put it into words’ is not acceptable. Reliable results must be dependable for decision making.

For an Assessment result to be reliable, the teacher should:

- i. Clearly identify the learning outcomes to be assessed.
- ii. Give learners work or completed assessment tasks and activities to other teacher(s) to review.
- iii. Use multiple assessment strategies to measure the same or similar learning outcomes (e.g., giving the tasks or items of a class exercise as another class exercise or homework or group project) or using different item formats to assess learning outcomes.
- iv. Prepare scoring rubrics or marking schemes with specific weighting (marks) allocated to the items and use it consistently.
- v. Give rubrics of tasks/activities in the case of performance or practical assessment ahead of time.
- vii. Ensure that the load or the length of the tasks are appropriate to the level of the learner (e.g., 25 minutes for 20 items; a project for a week or the term/ semester).
- viii. Administer assessment in a conducive environment that minimise disruption (e.g., noise, lightening, ventilation, among others) and devoid of any cheating.

### **Fairness and Ethics**

Assessment strategies should give learners equitable opportunity to demonstrate what they know and can do taking into consideration their ability, learning styles, gender, special educational needs (SEN), among others. The teacher should:

- i. Ensure that the assessment tasks/activities align with the learning outcomes and content covered in class.
- ii. Use different forms of assessment tasks to assess learning outcomes (e.g., oral assessment, class exercises, class tests, homework, assignments, written tests, projects, and practical demonstrations as well as the end-of-term/ semester assessment).
- iii. Provide clear and detailed instructions to learners about the assessment's format, expectations, and criteria for evaluation.
- iv. Identify learners with SEN and make the necessary adaptation by providing extra time, alternative formats and other necessary accommodations.
- v. Avoid using culturally biased or discriminatory content, unfamiliar words, questioning, or examples in assessments.
- vi. Communicate the assessment plan in advance. For example, date, time, location, and any other relevant logistics.

### **Transparency**

Transparency in assessment refers to making the assessment process and criteria clear and understandable to learners. The teacher should:

- i. Make learners aware of the demand of the assessment tasks.
- ii. Share performance criteria and indicate what will constitute the pass mark.
- iii. Readily share assessment results with the appropriate stakeholders (learners, parents/guidance, teachers).
- iv. Provide opportunity for learners to seek review and redress.
- v. Share the learning outcomes the assessment is designed to measure with learners.
- vi. be ready to share assessment criteria or rubrics when the need arises.

### **Inclusivity**

Inclusivity in assessment will allow teachers to create assessment practices that are fair and accessible to ALL learners (GESI, SEL and SEN).

The teacher should:

- i. Familiarise with the section of inclusivity on the national pre-tertiary learning and assessment framework (NPLAF, page 32).
- ii. Select assessment strategies that are appropriate for different learning needs.
- iii. Assign workload in connection with the developmental and learning needs of learners.
- iv. Work with special education experts in the school system to adapt and accommodate assessment to the needs of all learners (i.e., extra time, alternative formats, or other necessary accommodations should be available).
- v. Make use of different formats (braille, oral translation, text-to-speech, ai, sign language interpretation and other assistive technology forms).
- vi. Develop rubrics that are inclusive (taking into consideration grammar, vocabulary, handwriting, presentation of ideas).

### **Practicability**

For assessment strategies or processes to be feasible, convenient, efficient and successful.

The teacher should:

- i. Ensure that appropriate and adequate assessment materials, resources and security are available.
- ii. Consider appropriate assessment format to match the learning outcome(s), class size, age and ability levels.
- iii. Consider the time available to develop, administer, score and give constructive feedback.

### **Assessment Utility (utilisation and benefits)**

To enhance the usefulness and practical value of assessment tasks/activities, the teacher should:

- i. Clearly state the intended use of the assessment results.
- ii. Identify the essential learning outcome(s) to be covered in the assessment.
- iii. Construct assessment tasks/activities that are well aligned to real-life situations.
- iv. Select and allocate the appropriate resources for the assessment activities.
- v. Provide constructive feedback to learners on their performances.
- vi. Provide credible information that are useful to learners and other stakeholders (teachers, parent/guardians).
- vii. Weigh and indicate the benefits and the cost of the assessment strategies
- viii. to be used.
- ix. Justify the selection of a particular assessment format over the others (objective-type, essay, project, portfolio, demonstration, etc.).

## **B. Ethical considerations in Assessment**

### **1. Designing and Developing the Assessment**

- i. Identify the specific learning outcome(s) to be assessed.
- ii. State clearly the purpose of the assessment(s).
- iii. Specify the content area (i.e. Content Standards and/or Indicators) to be assessed and align them to the learning outcome(s).
- iv. Select appropriate format or strategy that should be in line with the learner's characteristics, learning outcome(s) and resources.
- v. Design different versions (differentiated assessment) of the assessment including the use of alternative strategies of assessment.
- vi. Avoid biased assessment tasks (e.g., task favouring a group of learners such as males among others).
- vii. Avoid using unfamiliar language and materials in writing the assessment tasks.
- viii. Adapt different versions to suit the needs of all learners. For example, make provision for learners with visual impairment by enlarging the font sizes of the assessment instrument and providing braille versions.
- ix. Develop the marking scheme/ scoring rubrics when developing the assessment task.
- x. Include mark allocation on the individual questions that are given when necessary.
- xi. Ensure that the assessment task is stored securely.
- xii. Provide clear direction for administration of the assessments.
- xiii. Consider logistics.

## 2. Administering the Assessment

- i. Communicate the assessment nature/structure/format, time, content coverage and location of the assessment tasks clearly to learners.
- ii. Ensure the setting is suitable and conducive for the assessment (e.g., lighting, ventilation, less noise among others).
- iii. For learners with SEN establish rapport and communicate in simple and clear language. Provide alternative settings for learners with SEN to meet their specific needs. (e.g., providing individualised accommodations such as writing the assessment in a separate room).
- iv. Provide needed logistics (e.g., answer booklets, first aid, pens and pencils among others) for the assessment task.
- v. For learners with SEN make room for the use of translators, assistive devices such as hearing aids, braille, computers, recorders, and other technologies that are relevant to their needs.
- vi. Administer assessments within appropriate time limits to enhance validity and to minimise the chance for cheating. Provide additional time for learners with SEN.
- vii. For learners with SEN, make room for varied modes such as oral, written, the use of a computer (text-to-speech and speech-to-text) among others.
- viii. Avoid anxiety, intimidating language, and unnecessary announcements.
- ix. Provide learners with anonymous identifiers and codes instead of names to enhance reliability and validity.
- x. In the case of practical/performance assessments, share rubrics and marking schemes with learners.
- xi. Ensure controlled and supervised distribution of assessment materials to avoid leaks or unauthorised sharing.

## 3. Scoring the Assessment

- i. Consistently make use of the marking scheme/ scoring rubrics.
- ii. Ensure multiple ratings or scoring/grading are done where necessary (e.g., for essay-type questions, practical/performance assessment).
- iii. Focus on the content (i.e., what is being assessed) instead of handwriting, spelling, punctuations, concord, and vocabulary when scoring.
- iv. For learners with SEN considerations should be made for vocabulary, spelling, and grammar especially in the English language.
- v. Provide opportunity for remarking, review, or redress where necessary.
- vi. Record the actual scores/grades of learners as a reflection of their performance. Do not add or subtract marks based on personal influences.
- vii. Keep assessment results of the learners safe (either manually or digitally).

- viii. Consider the use of professional scorers, judges, or raters in the case of External Assessments.

#### **4. Reporting and Feedback in Assessment**

- i. Ensure that the learner is aware of those who will be receiving the report.
- ii. Communicate results to authorised persons such as parents/guardians and other teachers.
- iii. Seek permission (informed consent) from the learner or parent/guardian if a third party may be involved.
- iv. Ensure that the true performance of the learner is reported (do not manipulate or distort the results).
- v. Present assessment results without stereotyping or biases.
- vi. Use language and terminology that is respectful and GESI responsive when reporting reports.
- vii. Provide clear and meaningful interpretation of the assessment results.
- viii. Adhere to legal requirements, ethical guidelines and institutional policies governing the reporting of assessment results.

#### **5. Feedback**

- i. Provide constructive feedback timely and promptly.
- ii. Emphasise the learner's strengths and opportunities for improvement rather than focusing solely on weaknesses.
- iii. Ensure that the feedback given to the learner, parents/guardians and other teachers reflects the performance of the learner.
- iv. Consider and adjust the mode of providing feedback to suit the needs of learners (consider GESI and SEN issues).
- v. Provide feedback based on the assessment criteria and not on personal influence.
- vi. Avoid displaying and announcing learners' performance unofficially.
- vii. Create opportunities for learners to readily access their results through creation of portals, portfolios and files for individual learners and other stakeholders.
- viii. Ensure collaborative assessment by sharing and taking the learner's information.
- ix. Create opportunities for learners to reflect on their own assessment results and learning.
- x. Give written comments to learners in formative assessment to help the learner track their errors and make the necessary corrections.



## 6. Interpreting and Using the Assessment Results

- i. Provide clear and detailed criteria including criterion/pass mark for interpreting the assessment results.
- ii. Avoid biases in interpreting the assessment results. Ensure result interpretation is not influenced by gender, religion, ethnicity, personal liking among others.
- iii. Use simple and clear language in the interpretation of the assessment results.
- iv. Interpret assessment results based on evidence and sound assessment practices.
- v. Ensure that the interpretation of the results accurately reflects the learner's ability, skills, competencies and knowledge.
- vi. Ensure the learner is aware of the assessment process and the consequence of the results.
- vii. Ensure assessment results are used for their INTENDED PURPOSE, aligning with the learning outcomes.
- viii. Seek the consent of the learner and parents/guardians before using the assessment results for any purpose.
- ix. Ensure that assessment informs the teaching and learning process in a fair and unbiased manner and provide remediation where necessary.
- x. Ensure that assessment results are confidentially kept and only shared with relevant stakeholders, such as the learner, parents/guardians, and school administrators.
- xi. Avoid using assessment results to label (name-calling), stereotype and discriminate among learners.
- xii. Ensure that results are stored and used in a secured manner.
- xiii. Avoid discussing the learner's results and performance unofficially with others (e.g., with other teachers, staff, learners and among others).

## C. Differentiated Assessment

Differentiated assessment adapts strategies to diverse learning needs, strengths, and interests of all learners. Teachers tailor assessments to accommodate varying levels of readiness, learning styles, and preferences that ensure that all learners have equitable opportunities to demonstrate their understanding and skills.

**To implement differentiated assessment, teachers should consider the following:**

- i. *Varied assessment formats*: provide a range of assessment options, such as written assignments, oral presentations, projects, or multimedia presentations. This allows learners to exhibit their knowledge and skills using formats that align with their abilities and strengths.
- ii. *Flexible deadlines*: give learners the opportunity to complete assessments within a flexible timeframe. This considers different learning paces and allows learners to manage their time appropriately.

- iii. *Varying tasks*: Vary levels of difficulty for assessment tasks, allowing learners to choose the one that best suits their needs and challenges them appropriately.
- iv. *Accommodations*: Provide necessary accommodations for learners with unique learning needs, such as extended time, modified formats, or additional resources to support their assessment process.
- v. *Individualised feedback*: Provide individualised and constructive feedback that addresses the learner-specific needs and areas for improvement. Tailoring feedback to specific standards and learning outcomes can help learners understand their strengths and areas for improvement.
- vi. *Learner involvement*: Involve learners in the assessment process by encouraging self-reflection, self-assessment, and goal setting. Engaging learners in dialogue about their learning and assessment promotes

## D. Guidelines on how to Construct Multiple Choice Questions (attachment)

1. Clearly define the purpose of the test/assessment
2. Define the learning outcome (i.e. knowledge, comprehension, skills, or competencies) you want learners to demonstrate through MCQs.
3. Prepare a table of test specifications or blueprints.
  - i. List topics and subtopics covered during the instructional period
  - ii. Distribute the number of test items among course content and instructional objectives or behaviours.
4. Write the test items (note: it should match the content and DoK levels stated in the table of test specification).
  - i. The central issue of the items should be in the question statement (stem).
  - ii. The options should be plausible and homogeneous in content.
  - iii. All options must follow syntax and punctuation rules.
  - iv. Repetition of words in the options should be avoided.
  - v. Vary the placement of the correct option (appropriately, arrange options in alphabetical order, ascending or descending or in order of magnitude if using numbers or dates).
  - vi. Stems and options should be stated positively. However, a negative stem could be used sparingly, and the word should be emphasized either by underlining it or writing it in capital form (e.g. **not**, **NOT**, not; **except**, **EXCEPT**, except).
5. Write clear directions/instructions. (e.g. Answer All Questions. All questions carry equal marks, Select/Choose from the alternative lettered A-D the correct answer).
6. Review the test items (go through items again after construction i.e. after a few days to week).

7. Prepare scoring key (scoring keys should be prepared concurrently with item construction).

## E. Common Assessment Used in the Classroom

### Class Exercise As An Assessment Strategy

**Description:** Class exercise as an assessment strategy are tasks designed to evaluate learner's understanding, knowledge, and skills related to a particular subject to gauge how well learners are grasping a content being taught.

Teachers should mainly use class exercises for formative purposes to assess learners across all subject areas, which can take various forms, such as quizzes, problem-solving tasks, group discussions, reflective questions, case studies, question and answer and practical activities, performance, observation, checklist/rubrics and demonstration providing valuable insights into the learning process.

**Purpose:** Class exercises can be used to:

- i. Help identify learning gaps in comprehension, retention, application of knowledge, values and attitudes.
- ii. Allow for immediate feedback and clarification of concepts.
- iii. Encourage active participation of learners for deeper understanding.
- iv. Modify teaching and learning techniques, strategies, and resources based on learning outcomes.
- v. Gradually build learners performance in a lesson over time to reduce summative test anxiety.
- vi. Help identify learners who may require special educational support.
- vii. Accommodate different learning styles and abilities, including group work and multiple representations for learners with special educational needs.

### Settings

- i. Classroom
- ii. Laboratory/Workshops/Resource Centres/Libraries
- iii. Studios
- iv. Field (school park/garden or community spaces)
- v. Online learning platforms/Virtual classrooms e.g. Zoom, Class WhatsApp pages, Google classrooms.

**Time frame:** Class exercises often take place in a lesson and may be conducted before, during and after a lesson depending on the learning outcome and the duration of the lesson.

**Class size:** Class exercises may be conducted for learners either individually, as a group or whole class.

**Steps*****Before***

The teacher should:

- i. Define the learning outcomes.
- ii. Design exercises using simple and clear language.
- iii. Select relevant exercises based on nature of the class exercise and desired skills/knowledge to be attained. E.g. quizzes, case studies etc.
- iv. Develop and discuss assessment criteria with learners.
- v. Set a reasonable time frame for completion of exercises to maintain focus and efficiency.
- vi. Clearly communicate instructions, including format, length, and resources.

The learner should:

- i. Read and understand instructions to ensure a thorough understanding of the exercise provided.
- ii. Collect all available required resources and tools for the task/exercise.

***During***

The teacher should:

- i. Assign task/exercise based on the learning outcome as well as learners with special needs.
- ii. Walk around the classroom and observe learners as they work on the exercise.

The learner should:

- i. Organise and set up their work area to facilitate a smooth workflow.
- ii. Plan how to approach the exercise, considering instructions and steps or techniques to employ.
- iii. Commence class exercise timely and promptly to work within the given time for completion of the task.

***After***

The teacher should:

- i. Evaluate the assessment outcome based on the assessment criteria with the learners.
- ii. Provide constructive feedback for learners' performance for discussions.

**NB:** Teachers should pay attention to learners with special educational needs.

Reflect and modify teaching and learning strategies and resources based on feedback received.

The learner should:

- i. Reflect, self and peer assess their exercises and provide constructive feedback.
- ii. Use the feedback to improve on their work/exercises.

### Homework As An Assessment Strategy

**Description:** Homework or assignments as an assessment strategy involve the use of structured tasks or projects that learners complete outside of regular class time to evaluate their understanding, knowledge and skills gained in a specific learning outcome. This assessment strategy can take various forms, such as written assignments, projects, research papers, problem sets, essays, or creative tasks.

Some concepts that can be assessed using homework/ assignments include menu planning and recipe development, problem solving exercises in mathematics, hands-on experiments and observations, creative writing assignments and art projects, map development and application of GIS in locating places.

**Purpose:** The key purposes of using homework/assignment as an assessment strategy by the teacher include:

- i. Assessment of Understanding
- ii. Application of Knowledge
- iii. Reinforcement of Learning
- iv. Independent Study
- v. Provision of valuable feedback
- vi. Skill Development
- vii. Assessment of Diverse Abilities

### Settings

- i. Classroom
- ii. Field work
- iii. Online platforms
- iv. Home

**Class Size:** Depending on the intended learning outcomes, assignments/ homework can be structured for either:

- i. Small class sizes
- ii. Large class sizes

**Time Frame:** The time frame for conducting assignments can be adjusted based on the desired learning outcomes and the complexity of the task.

- i. Short-term Assignments (Daily or nightly homework and weekly assignments)
- ii. Medium-term Assignments (Bi-weekly or monthly assignments)

- iii. Long-term Assignments (Semester/ term-long assignments)

### **Steps**

#### *Before*

The teachers should:

- i. Clearly define the learning outcomes intended to be achieved
- ii. Design/ Create a well-structured assignment with clear instructions and expectations.
- iii. Adapt to the needs of diverse learners especially those with special needs
- iv. Provide Resources such as textbooks, online materials, or reference materials, to support learners in completing the assignment successfully.

#### *During*

The teachers should:

- i. Keep track of learners' progress on the assignment.
- ii. Be available to answer questions and provide clarification during the assignment phase.
- iii. Provide formative feedback and guidance to help students improve their work.
- iv. Teach learners how to properly cite sources and use information ethically/ avoid plagiarism.

The learner should:

- i. Seek clarification about the task from teachers or peers where necessary
- ii. Actively work on the homework, focusing on comprehension
- iii. Manage their time effectively
- iv. Learners can reach out to their parents/guardians, peers, or online resources for guidance and clarification in responding to the tasks

#### *After*

The teacher should:

- i. Evaluate the completed assignments using clear and consistent grading criteria
- ii. Analyse student performance to identify common strengths and areas for improvement.
- iii. Discuss feedback with learners
- iv. Reflect on the outcomes of the assignment.
- v. Share the results of the assignment with learners
- vi. Acknowledge and celebrate learners' achievements to boost motivation and self-esteem.

The learner should:

- i. Review their work to identify errors or areas for improvement.
- ii. Reflect on what they have learned
- iii. Bring up questions that were confusing for class discussion.
- iv. Use feedback to learn from their mistakes and improve performance.

### **Discussion As An Assessment Strategy**

**Description:** Discussion is a formative assessment strategy that involves using verbal communication and group interaction to assess learners' understanding, knowledge, and skills. The teacher is to observe and assess learners' contributions, ability to analyse and synthesise information, and provide feedback based on their performance. It can be used for both formative and summative assessments.

Discussion can be used in all subject areas of the secondary education curriculum depending on the purpose of the assessment and learning outcomes under consideration.

**Purpose:** The following are the purposes of discussion as an assessment strategy:

- i. Build knowledge and develop a learner's critical and creative thinking.
- ii. Develop learners' communication skills.
- iii. Increase the depth of the learner's understanding and eliminate misconceptions.
- iv. Engage learners in active participation in the lesson.

### **Setting**

- i. A classroom
- ii. Small groups
- iii. Seminars
- iv. Online learning platforms (virtual classroom and discussion forum)
- v. Fieldwork

**Time frame:** Appropriately, discussion as an assessment strategy can last for a lesson depending on the learning outcomes and learning indicator.

**Class size:** The class sizes appropriate for discussion as an assessment strategy can vary from small class to large/whole class.

### **Steps**

#### ***Before***

The teacher should:

- i. Determine the learning outcomes to be assessed.
- ii. Specify the content to be learnt that aligns with the learning outcome.
- iii. Give prepared questions to guide the discussion (i.e., make use of open-ended questions, adaptive to the diverse/abilities of learners)

- iv. Establish discussion guidelines or rules (let learners know what is expected of them, the content of the discussion and the format of the discussion i.e., individual, small or whole class)

The learner should:

- i. Read any assigned readings, watch videos, or engage with other course materials related to the discussion topic.
- ii. Take notes while reviewing the materials on important concepts, arguments, or evidence.
- iii. Reflect on their own experiences, prior knowledge, or relevant examples that relate to the discussion topic.
- iv. Seek clarification if needed.

### *During*

The teacher should:

- i. Start and facilitate the discussion (ensure that all learners could participate and encourage learners to engage in critical thinking and reflective thinking).
- ii. Monitor and assess learner's participation (encourage self and peer assessment).
- iii. Provide constructive feedback on learners' responses and contributions. NB. Teachers are advised to manage all learners' responses and accommodate them but must be fair and ethical.

The learner should:

- i. Pay attention, maintain eye contact, and be open to different viewpoints and contributions from mates.
- ii. Share their own unique perspectives, insights, and experiences related to the discussion topic.
- iii. Take notes during the discussion to capture key points, new understanding, or questions that arise.
- iv. Ask follow-up questions, seek clarification, or offer alternatives or suggestions respectfully.

### *After*

The teacher and the learners reflect on the discussion in relationship to the expected learning outcomes to check whether the learning outcomes have been achieved.

## **Case Study As An Assessment Strategy**

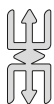
**Description:** A case study can be used as an assessment and or pedagogical strategy. Usually, it is used as an assessment strategy to examine a learner's ability to apply acquired knowledge, skills and experiences by carefully investigating a particular circumstance or scenario to provide solutions to real-life situations. Usually, it will have the following components:



1. Theme
2. Case description
3. Study of the case
4. Class Discussions
5. Conclusion and reflection

### Types of case studies

- i. Descriptive case studies: The teacher should ask learners to analyse and explain the key features and characteristics of the case.
- ii. Explanatory case studies: The teacher should ask learners to give detailed information on the case by identifying and explaining the factors that contributed to the situation.
- iii. Exploratory case reports: The teacher should ask learners to gather information, analyse data, and draw conclusions about a topic where limited information is available
- iv. Cumulative case studies: The teacher should encourage learners to synthesise and integrate their learning across different subjects



#### Note

Any of these can be done individually or as a group depending on the class size. For large class sizes, a group of 3 to 5 members should be used.

**Purpose:** The purpose of a case study is for learners to apply acquired knowledge, concepts and theories to solve real-life situations. What should the teacher consider before using a case study as an assessment strategy?

- i. The complexity of the content standard
- ii. The availability of resources
- iii. Ability level of learners
- iv. Time
- v. Class size

**Steps:** To ensure a well-structured and quality case study, it is important for the teacher to consider the following:

#### *Before*

The teacher should:

- i. Clearly define the learning outcomes to be assessed.
- ii. Identify appropriate issues or cases to be investigated.
- iii. Determine the format of the case study (e.g., written document, a multimedia presentation, a video, or a combination of these), depending on the resources available.

- iv. Inform the learner on what to do, time frame, and expectations.
- v. Provide materials (i.e., text, videos, pictures etc.) for the case study discussion.
- vi. Develop and provide a clear scoring rubric that outlines or defines quality
- vii. work to learners.

### ***During***

The teacher should:

- i. Create and maintain a sound environment for the case study discussion.
- ii. Bring the whole class together and invite each group to share their findings, solutions, or recommendations.
- iii. Ask open-ended questions on the issue of discussion to clarify any misconception.
- iv. Incorporate peer assessment or peer grading as part of the process.

### ***After***

The teacher should:

- i. Provide constructive feedback on learners' responses.
- ii. Ask the learners to reflect on their learning process, such as what they learned, what they found difficult, or what they would do differently.
- iii. Summarise the main points and lessons learned from the case study and link them to the learning outcomes and content.

**Ethical Considerations:** In the use of case study as an assessment strategy, the teacher should:

- i. Discuss ethical considerations with learners, especially in cases that involve sensitive or potentially controversial topics (e.g., gender, cultural, social, emotional, political and religious issues) when selecting and discussing a case.

**Documentation and Record-Keeping:** The teacher should keep records of assessments and learners' submissions to maintain transparency and fairness (e.g., portfolio)

## **Portfolio Assessment- General**

**Description:** A portfolio assessment is an evaluative tool to measure learners' understanding in a comprehensive manner, looking at the overall progress instead of individual marks from tests and quizzes.

**Purpose:** Portfolio assessment is used to establish various cognitive achievements as well as practical competencies. Portfolio assessment could be used for the different levels of Depth of Knowledge (Levels 1 – 4). It helps teachers identify areas where the learner may need additional support or resources to improve learning and provide a wide variety of learners' mastery of a particular standard and growth over a defined time.

**Types of Portfolio Assessments:** A portfolio is a systematic collection of learners' work that represents learner's activities, actions, and achievements over a specific period in one or more areas of the curriculum. There are three main types of portfolios:

1. Assessment Portfolios
2. Teaching and Learning or Working portfolios
3. Showcase portfolios

#### *Assessment Portfolios*

Assessment portfolios, also known as evaluative portfolios, contain work that has been evaluated according to set standards or criteria. These portfolios demonstrate a learner's ability to meet specific learning standards. They often contain rubrics, test results, learner reflections, teacher's notes, and graded assignments. For instance, in a science class, an assessment portfolio may contain lab reports, results from class tests, assessed projects, and the learner's reflection on their learning throughout the term/semester/year.

#### *Teaching and Learning or Working Portfolios*

Teaching and learning or working portfolios are formative in nature. They allow a learner to demonstrate his or her ability to perform a particular skill. For example, a working portfolio may include a collection of lab reports during a semester (term) that highlight a learner's improving ability to create hypotheses.

#### *Showcase Portfolios*

Showcase portfolios are summative in nature. They include samples of a learner's best work to demonstrate mastery at the end of a unit of study, semester or school year. The showcase portfolio allows the learner to select their most outstanding work, hence demonstrating their highest level of learning and achievement. It can contain final drafts of assignments, projects, or any piece of work that the learner is particularly proud of, demonstrating the learner's mastery of the relevant skills.

### **What is in a Portfolio?**

A portfolio contains the following:

1. Completed assignments and evaluations (e.g., Self-Assessment, Peer- Assessment)
2. Journal writings (daily report – Date, Time and Activities)
3. Reflections on discussions
4. Photos, sketches, and other visuals
5. A summary statement made at different points regarding what has been learned/achieved.

**Setting:** The portfolio assessment strategy can be used in the following settings:

1. Project-Based Learning
2. Independent Study and Research Projects
3. Classroom-based assessment
4. Field Work

5. Exhibitions/ Fairs
6. Problem-based Learning
7. Laboratory environment
8. Studio
9. Resource Centres

For all approaches, the portfolio must demonstrate clear and close adherence to specific learning outcomes in the curriculum.

### **Steps**

#### ***Before***

The Teacher should:

- i. Determine the purpose of the portfolio. Decide how the results of a portfolio evaluation will be used to inform the subject.
- ii. Identify the learning outcomes the portfolio will address.
- iii. Decide what learners will include in their portfolio. Portfolios can contain a range of items—plans, reports, essays, resumes, checklists, self-assessments, references from employers or supervisors, and audio and video clips. Limit the portfolio to 3-4 pieces of learner’s work and one reflective essay/memo.
- iv. Identify or develop the scoring criteria (e.g., a rubric) to judge the quality of the portfolio.
- v. Establish standards of performance and examples (e.g., examples of a high, medium, and low-scoring portfolio).
- vi. Create learner instructions that specify how learners collect, select, reflect, format, and submit.
- vii. It is the teacher’s responsibility to help learners by explicitly tying subject assignments to portfolio requirements.

#### ***During***

The learner should:

- i. Collect evidence related to the outcomes being assessed.
- ii. Select the best and appropriate evidence and label each piece of evidence according to the learning outcome being demonstrated.
- iii. Be guided on how to write a one or two-page reflective essay/memo that explains why they selected the particular examples, how the pieces demonstrate their achievement of the program outcomes, and/or how their knowledge/ability/attitude changed.
- iv. Be guided on how to format requirements (e.g., type of binder, font and style guide requirements, online submission requirements).
- v. Be given submission (and pickup) dates and instructions.

### **After**

The teacher should:

- i. Clearly establish the criteria for evaluating/scoring in a consistent manner
- ii. Mark and record learners' performances
- iii. Reflect on the activity and learner performances
- iv. Provide constructive feedback to the learner
- v. Identify learners with SEN who may need extra support

The learner should:

- i. Reflect on the feedback received
- ii. Revise their work for final submission

**Time Frame:** Deciding on a time frame for Portfolio assessment depends on and includes the following:

- i. Nature of project/problem or assignment
- ii. Class size
- iii. Resources

However, based on the learning outcome(s) the appropriate time frame for this portfolio is a week for minor activity and a term for extended projects, especially in Art and Design or Performing Arts.

### **Form**

- i. Individual learner's portfolios when the class size is relatively small.
- ii. Group portfolio when the size is relatively large.
- iii. Whole class/ school

### **Research As An Assessment Strategy**

**Description:** Research as an assessment strategy is a systematic process of inquiry and investigation that aligns with a particular learning outcome to develop knowledge and understand a phenomenon. It involves identifying an issue in need of investigation, collecting and analysing data, conducting experiments, and drawing conclusions based on the findings. Once learners have completed their research work, they will write a report and do a presentation on their findings.

**Purpose:** Research as an assessment strategy is used to assess learner's ability to:

- i. Identify a problem and gather information (data) from a variety of sources.
- ii. Evaluate the credibility and accuracy of information.
- iii. Analyse and synthesise information from multiple sources.
- iv. Communicate their findings clearly and concisely.

## Setting

- i. Classrooms
- ii. Factories/ Industries
- iii. School farms
- iv. School communities
- v. Libraries
- vi. Homes.
- vii. Fieldwork
- viii. Workshops

**Class Size:** As a teacher, depending on the number of learners in your class, individual or group research-based assessment can be used. However, teachers can create large groups for complex research, where different members can focus on specific aspects of the research.

**Time Frame:** The time frame for conducting a research-based assessment can vary depending on the complexity of the learning outcomes (skill to be achieved) may be:

- i. Short-term
- ii. Medium-term
- iii. Long term

## Steps

### *Before*

The teacher should:

- i. Define the learning outcomes.
- ii. Develop a theme in line with learning outcomes.
- iii. Design the research work and provide a description that is in line with learning outcomes.
- iv. Define specific tasks to be undertaken in developing the research.
- v. create a timeline.
- vi. Select resources and materials needed.
- vii. Provide guidance and support for learners.
- viii. Develop clear assessment rubrics.
- ix. Provide feedback and revisions.

### *During*

The teacher should:

- i. Provide clear guidelines for developing the research and how to assess it.
- ii. Design and plan the research work to align with the learning outcomes.

- iii. Provide necessary resources, materials, and support to help learners succeed in their research work.
- iv. Guide learners in reflecting on their research-based assessments and help them develop metacognitive skills.

### **After**

The teacher should:

- i. *Alignment with learning outcomes:* The research work should be aligned with the learning outcomes of the content standards. This means that the research work should allow learners to demonstrate their understanding of the course material and to develop the skills that are being taught.
- ii. *Originality:* The research work should be original and not simply a rehash of existing information. Learners should be encouraged to develop their ideas and to come up with their conclusions.
- iii. *Critical thinking:* The research work should demonstrate that learners can conceptualise, apply, analyse, synthesise and evaluate the information they have gathered and come out with an action plan.
- iv. *Communication skills:* The research work should be well-written and well-organised. Learners should be able to communicate their findings clearly and concisely.

### **Practical Assessments**

**Description:** Practical assessment gauges a student's capacity to use their knowledge and abilities in practical and hands-on settings. It involves evaluating learners' ability to perform specific tasks and demonstrate practical skills. It includes laboratory experiments, simulations, demonstrations or projects.

The exact nature of the assessment will depend on the subject or area a teacher is interested in.

**Purpose:** The purpose of conducting a practical assessment is to:

- i. Evaluate learners' proficiency, problem-solving capacity, and aptitude for carrying out tasks.
- ii. Create and deliver tests that ask learners to complete real-world assignments, experiments, or demonstrations.

**Setting:** Teachers can use practical assessment in the following settings:

- i. Classroom
- ii. Laboratory
- iii. Field
- iv. School farms/gardens/community
- v. Technical workshops
- vi. Science fair

- vii. Virtual/Digital/Remote
- viii. Co-curricular activities and clubs
- ix. Outdoor spaces
- x. Workplace
- xi. Team project

**Time Frame:** Based on the learning outcome and the skills to be acquired, a Practical assessment can be done in a week, at the end of a term or year depending on the project.

**Class size:** Class size suitable for practical assessment can be individual, group or whole class

### Steps

#### *Before*

Learners can understand the content and theory being used by;

- i. Reviewing the theoretical concept
- ii. Familiarising themselves with the concept under assessment

Choosing experimental design, learners are required to;

- i. Design an experiment using the theoretical concept.
- ii. Outline the stages/process for the experiment and formulate hypotheses.

Gathering materials

- i. Make a list of the tools and supplies you will need.
- ii. Ensure that the necessary materials are available

#### *During*

Choosing experimental procedure:

- i. Learners are required describe the step-by-step process in detail including how to control extraneous factors, along with any safety precautions.

Gathering and analysing data

With support from teachers, learners are required to:

- i. Measure the dependent variable appropriately at various factor values to collect data.
- ii. Analyse the data meaningfully.
- iii. Sort, examine, and derive conclusions from the data analysis

#### *After*

Display of findings

- i. Give a concise visual summary of the results.



- ii. Address any restrictions or mistakes.

### *Reflection and improvement*

- i. Consider your advantages and disadvantages.
- ii. Improve the design of upcoming experiments.
- iii. Throughout the process, place a strong emphasis on ethics, integrity, and seeking advice as appropriate.
- iv. Encourage a critical and inquisitive outlook on learning.

## **Debate As An Assessment Strategy**

**Description:** Debate as an assessment strategy involves structured arguments and discussions to evaluate learners' knowledge and understanding of issues/ideas. It encourages research and articulation of views; it can be used for formative or summative assessments. Types of debates include formal debates with rules and roles and informal debates, which are more flexible.

**Purpose:** Using debate as an assessment strategy offers a comprehensive evaluation of learners' ability to generate ideas based on their knowledge and understanding of concepts and confidence in supporting their own ideas.

### **Settings**

- i. Classroom
- ii. Performance spaces (e.g. dining hall, assembly hall, laboratory)
- iii. Electronic platforms
- iv. Music and drama theatre

**Class Size:** Depending on the learning outcomes to be achieved debates can be organised in:

- i. Small classes
- ii. Large classes

**Time frame:** The teacher can conduct a debate within a single class session, it can also span over several class sessions or weeks.

### **Steps**

#### *Before*

The teacher should:

- i. Select appropriate motion/ topic, ensuring it is relevant to the learning outcome
- ii. Offer resources and materials to support learners
- iii. Assign roles /create teams or pairings
- iv. Establish rules and procedures

The learner should:

- i. Undertake research regarding the debate's topic or motion
- ii. Play an active role as a team member (in team-based debates)

### *During*

The teacher should:

- i. Host the debate
- ii. Ensure effective time management
- iii. Monitor and take notes

The learner should:

- i. Participate in the debate
- ii. Listen and take notes
- iii. Counter argue when necessary

### *After*

The teacher should:

- i. Facilitate a debriefing session (Teachers should utilise the debriefing sessions to address any misunderstandings or questions that come up from the debate. They should also highlight the key concepts and important lessons based on the learning outcome)
- ii. Implement peer assessments.
- iii. Organise follow-up activities as necessary.

The learners should:

- i. Reflect on their performance and the debate as a whole.
- ii. Assess their peers' performances based on established criteria.

## **The Test of Practical Knowledge (TPK) Assessment Strategy**

**Description:** This assessment is tailored to evaluate a learner's capacity to apply acquired knowledge in real-life situations by engaging in hands-on tasks or simulations that mirror real-world scenarios, assessing practical skills, problem-solving abilities, and the application of practical knowledge theoretically. It aims to gauge how effectively learners can employ their knowledge to solve problems or accomplish tasks.

**Purposes:** The general purpose of the test of practical knowledge is to assess learners' ability to apply practical knowledge in theory to:

- i. Evaluate their application-based understanding.
- ii. Assess their problem-solving skills.
- iii. Measure the learner's practical knowledge and its use in real-life situations.
- iv. Provide insights into a learner's ability to transfer practical knowledge into theoretical actions.

**Setting:** The Test of Practical Knowledge is conducted in environments that simulate real-life situations relevant to the learning outcome and the context being assessed. This could be a

- i. Classroom
- ii. Laboratory
- iii. Field
- iv. School farms/gardens/community
- v. Technical workshops
- vi. Science fair
- vii. Virtual/Digital/Remote
- viii. Outdoor spaces
- ix. Workplace
- x. Team Project

**Class Size:** The size of the class can vary based on resources and the nature of the practical tasks. It could be individual, smaller groups, or whole class.

**Time Frame:** The timing for assessing the Test of Practical Knowledge can range from a single session to multiple sessions, depending on the complexity of tasks and skills being assessed.

### **Steps**

#### ***Before***

The teacher should:

Provide clear instructions and resources needed for the tasks.

Clarify any doubts about the assessment task.

*The learner should:*

- i. Seek clarification from the teacher or other relevant persons before starting the assessment.
- ii. Familiarise themselves with theoretical concepts beforehand.

#### ***During***

The teacher should encourage teamwork and effective communication if tasks involve group work.

The learner should

- i. Focus on applying learned concepts to solve problems or complete tasks accurately within the given context.
- ii. Manage time efficiently to complete tasks within allocated timeframes.

#### ***After***

The teacher should encourage learners to reflect on their performance, review their work, and identify areas for improvement.

### **Performance Assessment Strategy**

**Description:** In its simplest terms, a performance assessment is one which requires learners to demonstrate that they have mastered specific skills and competencies by performing or producing something. It is important that the task be meaningful and engaging to learners. When learners perform tasks that are meaningful and engaging to them, they can take ownership of their learning and effectively work, either independently or in collaboration, depending on the requirement of the task. Performance assessment can be used as either formative or summative tool.

**Purpose:** The main purpose of this assessment strategy is to provide learners with the opportunity to demonstrate their knowledge and understanding about a concept and communicate that understanding through a performance task.

**Setting:** Performance assessment can be used in the following settings:

- i. Classroom
- ii. Laboratory/workshops
- iii. Field
- iv. Theatre

**Time Frame:** Teachers should note that the learning outcome and learners' achievement expectations may inform the appropriate time frame for the use of performance assessment. However, the designated time of completion of the assessment task should not be too short or too long.

**Class Size:** Performance assessment works best for all forms of class size. Teachers should, however, be strategic in making learners work individually or in moderate/large groups depending on the unique situation.

**Steps:** To develop and implement performance assessment, teachers should:

#### *Before*

The teacher should:

- i. State the purpose of the assessment.
- ii. Specify the learning outcome to be assessed using the performance assessment strategy.
- iii. Make learners aware whether they will work individually or as groups (e.g., group of 2-5).
- iv. Design a performance task which requires the learners to demonstrate the intended skills and knowledge required of them.
- v. Discuss with learners the rules of engagement which includes the performance criteria that specifies the extent to which learners have mastered the skills and knowledge.

- vi. Discuss with learners the available resources to be used.

The learner should:

- i. Make ready the available resources that will help them perform the assessment task.
- ii. Seek for clarification on the performance task to be performed when necessary.

***During:***

The teacher should:

- i. Monitor and ensure serenity of the environment for learners to work effectively as individuals or groups as in the case of a laboratory/field/workshop exercise.
- ii. Guide learners to complete the assigned task(s) within the stipulated time.

The learner should:

- i. Design the artifact or the idea using the available resources.
- ii. Should submit the performance product to class at the stimulated time for evaluation.

***After:***

The teacher should:

- i. Collaborate with learners to evaluate the performance task(s) outcome.
- ii. Communicate constructive feedback of the assessment to the learners.
- iii. Provide information on how the assessment feedback would be used.

The learner(s) should:

- i. Offer constructive feedback on their colleague's work.
- ii. Self-reflect and make use of constructive feedback to shape his/her work.

## **Demonstration As An Assessment Strategy**

**Description:** Demonstration as an assessment strategy offers a practical and effective way to evaluate learners' knowledge, skills, and abilities by observing their performance in a real or simulated context. This may include a presentation, a practical experiment, a role-play, a performance, or a project.

**Purpose:** The main purpose of using demonstration as an assessment strategy is to allow learners to showcase their skills and competencies through practical application. Some of the areas in which learners can demonstrate their proficiencies are:

- i. Problem-solving skills
- ii. Critical thinking abilities
- iii. Communication

## Settings

- i. Classroom
- ii. Laboratory/ Workshop /Studio
- iii. Simulation studio/environment
- iv. Field or real-world settings (e.g., field trips, community projects, or internships)
- v. Performance spaces (e.g., theatre, music room, or sports field/studio/rooms)
- vi. Online/remote/virtual platform

**Time Frame:** The time frame for conducting demonstration as an assessment strategy depends on the following:

- i. Learning outcome(s)
- ii. Complexity of the task to be performed
- iii. Resources

**NB:** The teacher should provide the learner enough time to demonstrate their abilities and ensure the assessment process is managed within the constraints of the learning environment.

**Class size:** Demonstration can be used for individuals or groups (large or small groups) for the reasons of attention, support, and prompt feedback on factors such as assessors, resources and equipment, learning outcome and the assessment environment.

## Steps

### *Before*

The teacher should

- i. Set clear expectations of the learning outcomes, specific skills, knowledge and competencies.
- ii. Provide instructions for the demonstration to include safety precautions, criteria for assessment and time.
- iii. Provide learners the opportunity to rehearse the task or the activity to be demonstrated.
- iv. Provide the needed materials and resources to be used for the demonstration.
- v. Address the concerns of the learners raised after the rehearsals.
- vi. Distribute the task to the learner(s) considering Special Education Needs - SEN)

The learner should:

- i. Understand the learning outcomes, specific skills, knowledge, and competencies expected of them.
- ii. Take the necessary steps to prepare for the demonstration by reviewing the instructions and rehearsing the expected knowledge, skills, and competencies.

- iii. Seek clarification about the instructions and materials to be used for the demonstration.
- iv. Take the opportunity to practice and refine their skills or knowledge before the demonstration.
- v. Reflect on their previous learning and experiences related to the skills or knowledge being assessed.

### ***During***

The teacher should:

- i. Observe the learner's performance of the task demonstrated.
- ii. Provide continuous guidance to learner(s) on the task especially when they are working with or in hazardous situations.
- iii. Monitor the progress of the learner(s) on the task.
- iv. Pace the timing of the demonstration such that differentiation is considered.
- v. Assess the performance of the learners on the task.
- vi. Take notes of critical issues such as learners' strengths and areas for improvement

The learner should:

- i. Focus on the demonstration and actively listen to the instructions and explanations provided.
- ii. Carefully watch the demonstration, noting the steps, techniques, and key details being shown.
- iii. Take notes of important points, steps, or tips during the demonstration to refer to later.
- iv. Request feedback from the demonstrator or peers to ensure they are on the right track and identify areas for improvement.

### ***After***

The teacher should:

- i. Provide constructive feedback to the learners based on observations highlighting areas of improvement, reinforcing correct techniques, and encouraging further practice.
- ii. Review notes to consider where learners have performed well and areas that need improvement
- iii. Provide support to learners who may be struggling with the demonstrated skills. This can involve additional explanations, demonstrations, or one-on-one assistance.

The learner should:

- i. Reflect on their own performance during the demonstration and assess their understanding and execution of the demonstrated skills or techniques.

- ii. Share their performance and ask for feedback to improve their learning.
- iii. Identify specific areas where they need further assistance or practice; they can seek out additional resources such as tutorials, online courses, or books to support their learning and assessment.

## Questioning As An Assessment Strategy

**Description:** Questioning as an assessment strategy is the practice of engaging learners in an interactive dialogue or a series of carefully crafted questions to evaluate their understanding, knowledge, skills, and critical thinking abilities. Teachers can use questioning as an assessment strategy in all learning areas or subjects.

**Purpose:** Questioning as an assessment strategy can be used by the teacher to:

1. Identify learning gaps through the assessment of the level of comprehension, retention and application of knowledge, and skills gained by learners in achieving a learning outcome of a given content.
2. Actively engage learners in the teaching and learning process.
3. Assess if a concept taught has been well grasped as learners' feedback provides valuable feedback to them and the teacher.
4. Clarify concepts leading to deeper understanding or seek additional information in solving real-world or imaginary issues.
5. Promote the acquisition of critical thinking and problem-solving skills.
6. Encourage immediate or real-time feedback from learners leading to deeper thinking.
7. Investigate misconceptions for clarification.
8. Accommodate diverse learning styles to achieve a specific learning outcome.

**Types:** The following are various types of questioning techniques based on the Depth of Knowledge (DoK) levels that the teacher can use in assessment:

- i. Closed-ended questions – DoK 1: have a limited number of predetermined answers and are designed to gather specific information requiring “yes” or “no”, “True or False”
- ii. Open-ended Questions - DoK 2 and 3: allow for a more detailed and
- iii. Comprehensive response, which begins with words like “what,” “why,” or “how.”
- iv. Funnel Questions- DoK 2 and 3: used to gradually narrow down a topic, starting with broader questions and proceeding to more specific ones. This technique helps gather information in a logical and structured manner.
- v. Probing Questions - DoK 2 and 3: used to explore a topic in more detail or to gain deeper insights. They are often used to dig deeper into a previous response or to uncover hidden information,
- vi. Leading Questions - DoK 2 and 3: used to steer learners towards a particular answer or viewpoint. They may imply an expected or desired response.



- vii. Hypothetical Questions- DoK 3 and 4: These questions often involve speculative or creative thinking. They require learners to make connections, apply knowledge, and think beyond the immediate context.

### Settings

- i. Classroom
- ii. Co-curricular activities, e.g. School Clubs and Games
- iii. Field trips/work, e.g., Factories/industries, school farms/gardens/ pantries(kitchen)
- iv. Laboratory/Resource Centre
- v. Workshops/studios/theatres

**Time Frame:** Teachers can use questioning in their daily teaching and learning activities. However, it should be used based on the learning outcome of the subject matter under consideration. It can specifically be used:

- i. Throughout the teaching and learning process (Formative Assessment): before, during and after the teaching of a lesson.
- ii. In summative assessment, questioning can be used together with other forms of assessment such as oral/aural(listening) assessment at the end of a unit or content and programme.

**Class size:** Individual, small group or whole class

**Steps:** In using questioning as an assessment strategy, the teacher and learner can employ the following steps:

### *Before*

The teacher should:

- i. Define the Learning Outcomes to be achieved and develop key questions before class based on the outcomes.
- ii. Select appropriate question type(s) that align with the content standard/ indicators to be taught and the DoK levels to be achieved. The questions to be asked should be clear, relevant, concise, and free from ambiguity and biases.
- iii. Design valid questions that will suit the type of questioning strategy to be used to achieve the learning outcomes.

**NB:** Avoid or minimise the use of questions that will yield Yes/No or True/False responses but make more use of questions that allow for explanatory responses.

Plan question sequence and adapt questioning techniques to meet the diverse learning needs and abilities of their learners to promote active participation.

### *During*

The Teacher should:

- i. Select the context and provide relevant information to give learners the basis for the questions.

- ii. Vary the form of questions: those that gauge knowledge, require diagnosis, or challenge conclusions considering the learner's background characteristics to promote inclusivity.
- iii. Ask one question at a time and wait for responses from learners to allow time to think through responses critically.
- iv. Encourage active engagement of all learners.
- v. Monitor learners' performance and learning process to identify areas where learners may need additional support or clarification or to plan appropriate remediation where appropriate.
- vi. Acknowledge all responses/answers- repeat so the class can hear and/or write them on the board.
- vii. Provide constructive and timely feedback; teachers are advised to accommodate learners' varied responses as well as be fair and ethical.
- viii. Use assessment data to modify their teaching techniques, strategies and resources.
- ix. Move around the classroom or learning centre

The learner should:

- i. Ensure they gain an understanding of the learning outcomes and work towards achieving them through self and peer assessment.
- ii. Actively participate in the questioning process by listening carefully to the questions, thinking critically about their responses, and providing thoughtful answers.
- iii. Self and peer assess themselves using a questioning assessment strategy when learning to enable them to reflect on their learning.
- iv. Own their learning by adapting strategies to improve their learning outcomes, skills and competencies.

*After*

The teacher should:

- i. Analyse responses
- ii. Provide constructive feedback
- iii. Modify teaching and learning processes
- iv. Document assessment data
- v. Reflect and adapt questioning techniques, strategies and resources to check if expected learning outcomes have been achieved.
- vi. Teachers and learners reflect on responses to check if expected learning outcomes have been achieved.

## Peer/Self Assessment Strategy

**Description:** Peer/self-assessment is a type of performance monitoring and evaluation related to a learning outcome done by or among learners under the supervision of a teacher to track their learning progress. It can be used as both formative and summative assessment. However, it is predominately used for formative assessment purposes.

**Purpose:** Peer/self-assessment provides an opportunity for learners to reflect and provides insight, leading to meaningful feedback on their or other learners' work (behaviours, competencies and experiences). Peer/self-assessment enhances deep learning and understanding among learners and trains learners to track their progress and areas for improvement.

### Setting

- i. Classroom-based environment
- ii. Fieldwork
- iii. Laboratory i.e., Science Resources Centres
- iv. Studio
- v. Workshop

**Class size:** Peer assessment strategy can be done in small groups or whole class.

**Time Frame:** The time frame depends on the complexity of the assignment, the estimated period of the lesson stated in the curriculum and how learners have been adequately prepared. However, the time should neither be too short nor too long.

### Steps

#### *Before*

The teacher should:

- i. Set clear expectations of the learning outcome, skills and competencies
- ii. Decide the structure and format of the assessment e.g.: written or oral
- iii. Introduce the learners to the assignment to be assessed
- iv. Develop the assessment criteria and scoring rubrics with learners.

#### *During*

The teacher should

- i. Model peer/self-assessment by letting learners assess or review what he has taught to open them up to the assessment to be conducted.
- ii. For peer assessment, lead the pairing or grouping for the assessment. in doing this, the teacher should consider mixed groupings, and avoid inter- pairing and pairing amongst friends. (fairness and transparency)
- iii. In self-assessment, the teacher should guide learners with special educational needs in their assessment through questioning
- iv. Provide constructive feedback to learners after the assessment

The learner should:

- i. Work and submit assignments
- ii. Assess their assignments or that of other learners and give constructive feedback
- iii. Reflect on the feedback received and revise the work for final submission

*After*

The teacher should:

- i. Grade the assignments (summative)
- ii. Reflect on the activity with learners
- iii. Offer help or intervention in areas learners need help
- iv. Work on areas that need improvement

**NB:** The teacher should be a mediator between arguing learners and should also consider and guide learners in their approach to providing feedback. (Be conscious of gender, cultural, social and religious sensitive comments and issues)

Teacher should also provide multiple opportunities or formats for learners to assess to accommodate all learn.

### Appendix 3: Teacher Lesson Observation Form

Name of School: .....

Subject being observed: .....

Class

Year 1

Year 2

Year 3

Sex of the teacher

Male

Female

1. Is the purpose of the lesson clearly stated in the lesson plan and focused on learners achieving the lesson learning outcomes?

Yes

In Part

No

NA

1b. Please provide an explanation to your answer in Q1 above

.....

2. Are the unique needs of female learners, male learners, and learners with special education needs adequately catered for in the lesson plan? For example, the choice of teaching methods and learning activities reflects/does not reflect the learning needs of all learners.

For example, the choice of teaching methods, and learning activities.

Yes

In Part

No

NA

2b. Please provide an explanation to your answer in Q2 above

.....

3. Does the teacher manage behaviour well, maintaining a positive and non-threatening learning environment throughout the lesson?

Yes

In Part

No

NA

3b. Please provide an explanation to your answer in Q3 above

.....

4. Are appropriate teaching and learning materials and other resources (including ICT, books, desks) available, accessible and being used to support learning of all females, males and learners with special education needs?

Yes

In Part

No

NA

4b. Please provide an explanation to your answer in Q4 above

.....

5. Are learners engaged on tasks that challenge them in line with the content standards?  
Does the teacher take into consideration the uniqueness of learners?

Yes  In Part  No  NA

5b. Please provide an explanation to your answer in Q5 above

6. Is there evidence that students are learning?

Yes  In Part  No  NA

6b. Please provide an explanation to your answer in Q6 above

7. Is teaching differentiated to cater for the varied needs of all learners (i.e., male learners, female learners, learners with special education needs) and those with poor literacy and/ or numeracy proficiency?

Yes  In Part  No  NA

7b. Please provide an explanation to your answer in Q7 above

.....

8. Does the teacher use real life examples which are familiar to learners to explain concepts?

Yes  In Part  No  NA

8b. Please provide an explanation to your answer in Q8 above

.....

9. Does the teacher point out or question traditional gender roles when they come up during the lessons as appropriate?

Yes  In Part  No  NA

9b. Please provide an explanation to your answer in Q9 above

.....

10. Does the lesson include appropriate interactive and creative approaches e.g., group work, role play, storytelling to support learners achieving the learning outcomes?

*If yes, give examples of the issues and skills that have been so integrated.*

Yes  In Part  No  NA

10b. Please provide an explanation to your answer in Q10 above

.....

11. Have cross-cutting issues and /or 21st century skills been integrated into the lesson to support learners in achieving the learning outcomes e.g., problem-solving, critical thinking, communication? If yes, give examples of the issues and skills that have been so integrated.

Yes  In Part  No  NA

11b. If yes, give examples of the issues and skills that have been so integrated.

.....

12. Does the teacher incorporate ICT into their practice to support learning?

Yes  In Part  No  NA

12b. Please provide an explanation to your answer in Q12 above

.....

13. Does the teacher encourage all female male and male learners (including those who may be shy or afraid to speak) to ask questions, answer questions, participate in group work, etc. during the lesson?

Yes  In Part  No  NA

13b. Please provide an explanation to your answer in Q13 above

.....

14. Is assessment evident in the lesson? If yes, does it include assessment as, for or of learning and go beyond recall?

*If yes, did it include assessment of, for or as learning and go beyond recall?*

Yes  In Part  No  NA

14b. Please provide an explanation to your answer in Q14 above

.....

15. Do learners make use of feedback from teacher and peers?

Yes  In Part  No  NA

15b. Please provide an explanation to your answer in Q15 above

.....

16. Does the teacher sum up the lesson and evaluate the lesson against the learning outcomes with the learners?

Yes  In Part  No  NA

16b. Please provide an explanation to your answer in Q16 above

.....

17. Does the teachers' planning of lessons taught before the one observed show how they plan for learning over time, considering individual and group needs?

Yes  In Part  No  NA

17b. Please provide an explanation to your answer in Q17 above

.....

18. Does the teacher pay attention to the composition of females and males during group work and assigns females leadership roles.

Yes  In Part  No  NA

18b. Please provide an explanation to your answer in Q18 above

.....

19. Does the teacher provide constructive verbal feedback to both females and males and learners with special education needs?

Yes  In Part  No  NA

19b. Please provide an explanation to your answer in Q19 above

.....

20. Does the teacher provide constructive written feedback to both females and males and learners with special education needs in their exercise book?

Yes  In Part  No  NA

20b. Please provide an explanation to your answer in Q20 above

.....

21. Key strengths in the lesson

.....

22. Areas for development

.....

23. Next steps for teacher

.....

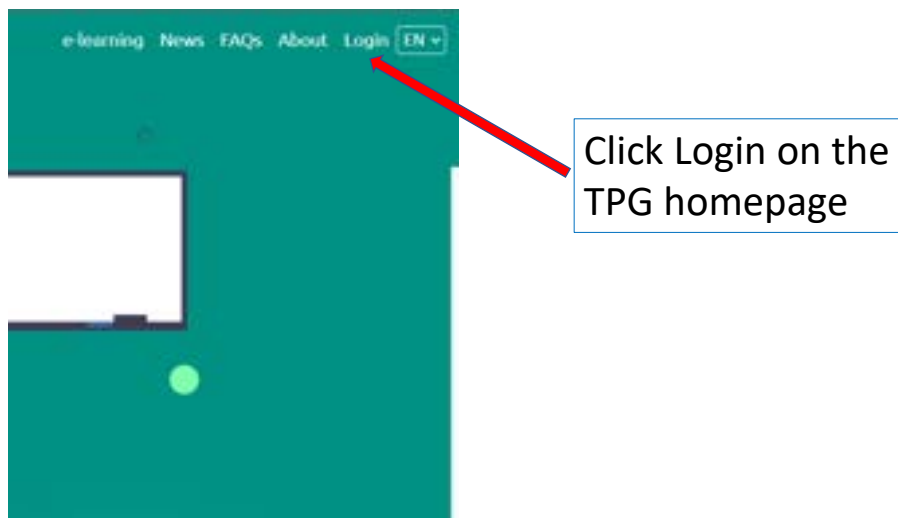
24. Additional Notes (on teacher's actions, the flow of activities, etc.)

.....

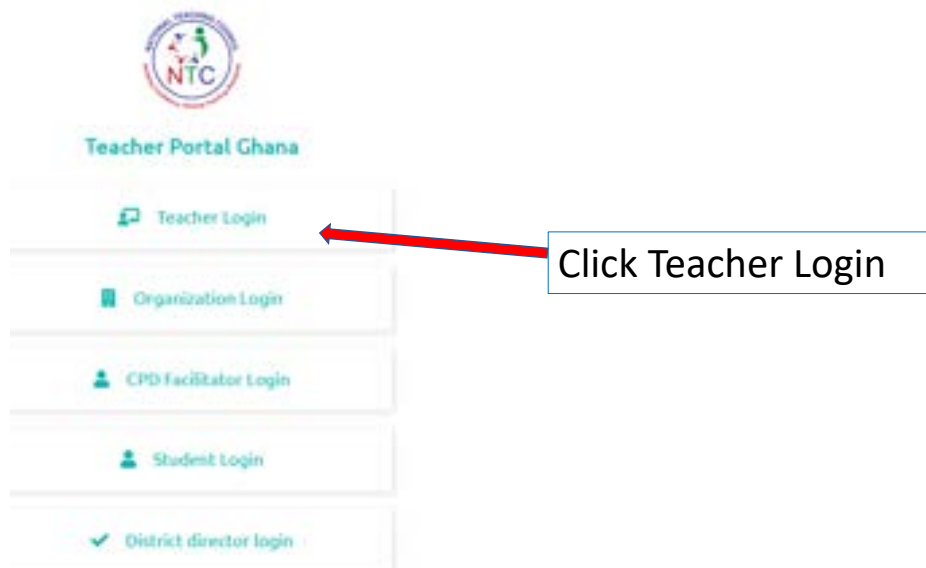


## Appendix 4: How to Check CPD Points and Training Records on Teacher Portal Ghana

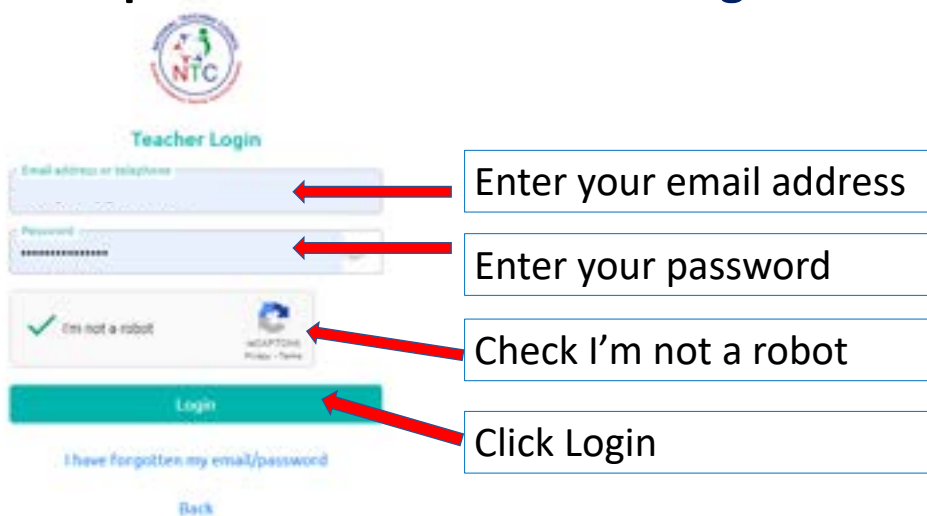
### 1. Visit [tpg.ntc.gov.gh](http://tpg.ntc.gov.gh) and click Login



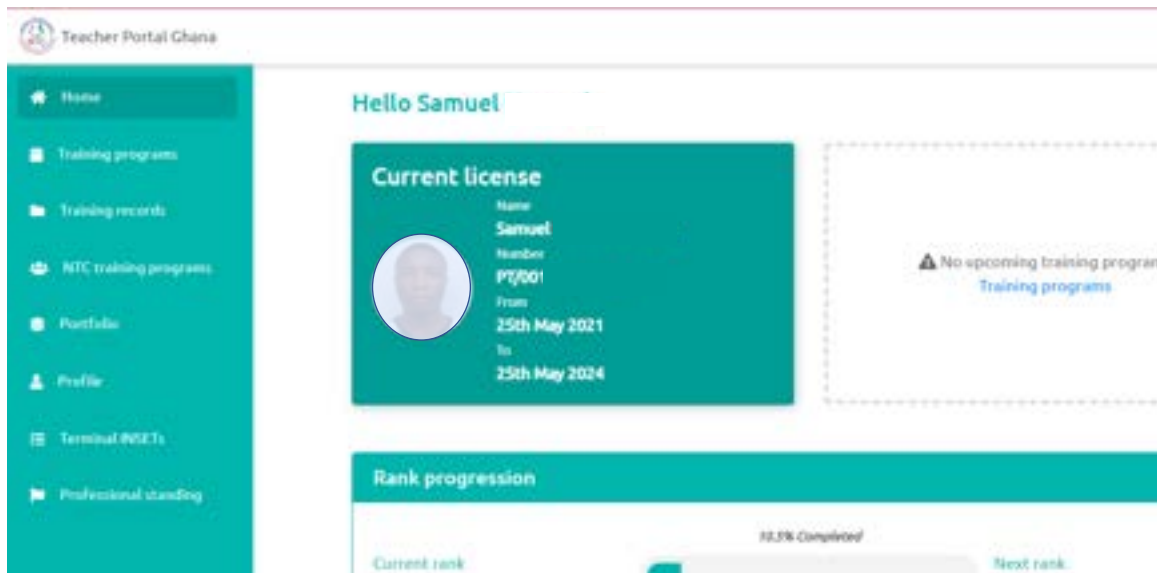
### 2. On the Login page, click Teacher Login



### 3. On the **Teacher Login** page enter your email address and password and then click **Login**



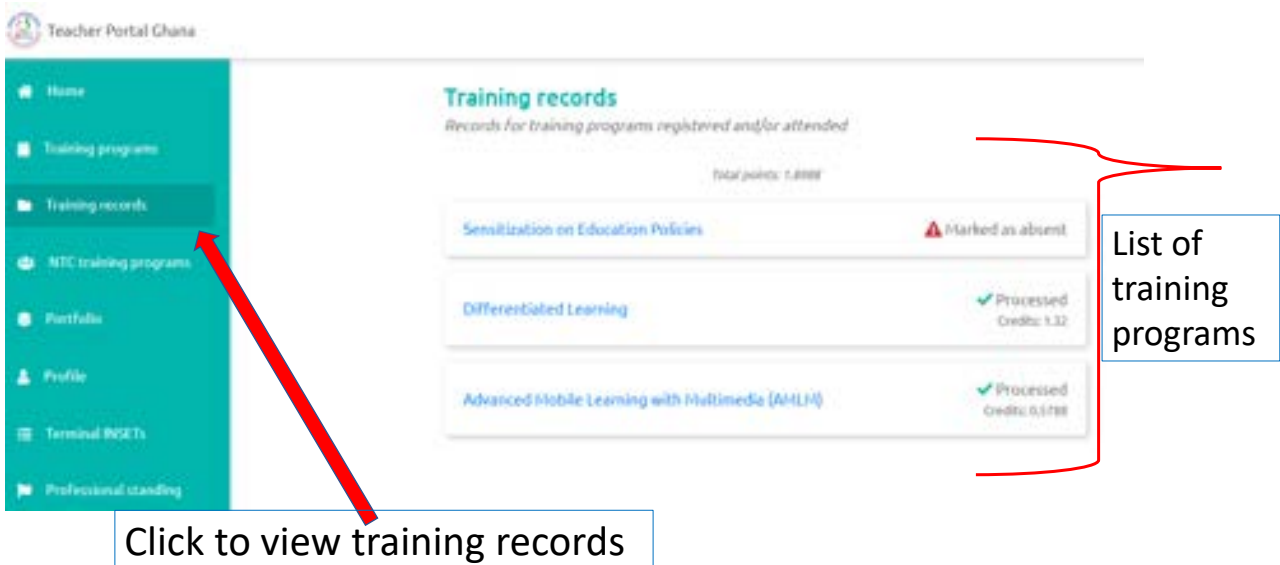
### 4. After a successful login you will get access to your **TPG account** (Check image below)



5. To check CPD points, scroll down to **Rank progression**. You will see the CPD points progress bar and actual points accrued (Check image below)



6. To view training records, from the side menu tap on **Training records** (Check image below)



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