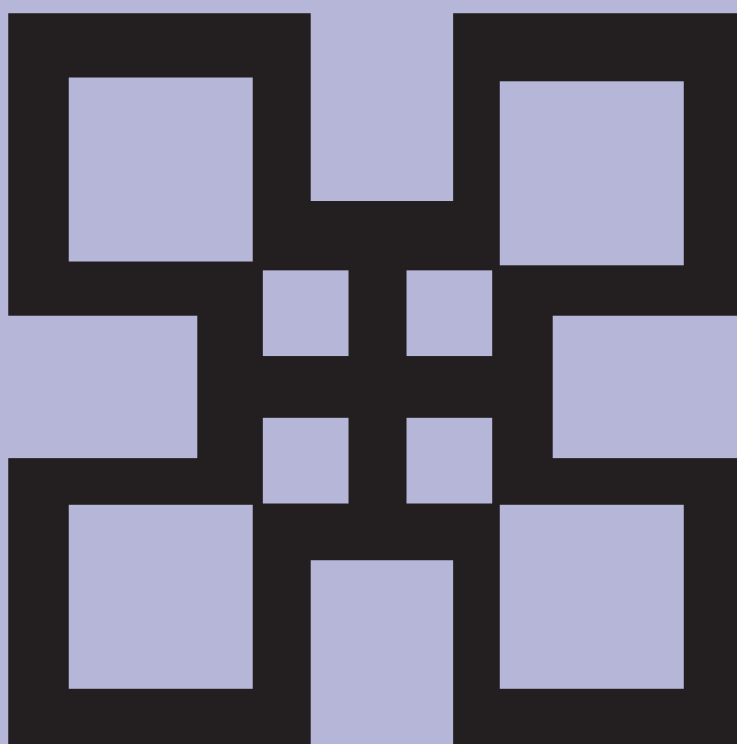


Professional Learning Community Handbook

Computing

Year One



Ghana Education
Service (GES)



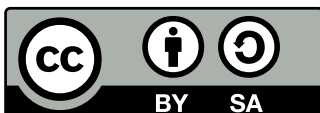
Professional Learning Community Handbook

Computing

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 Computing 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 21st 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 to give the focal areas of week 6 as group project in week 2 to be submitted by learners in week 5. Marked, recorded and feedback discussed in the first (class) of week 6 before the mid-semester examination.
- b) **Mid-semester examination:** To evaluate knowledge and understanding among learners on the learning outcome covering weeks 1-5 and weeks 13-17 in the first and second semester respectively. It is recommended that multiple choice, essays and practical questions are used to assess the learning outcome.
- c) **Homework:** Prompt: To reinforce learning, it is recommended that teachers give a research homework to learners in week 7 covering the focal areas of weeks 11 and

12, to be submitted and discussed as a seminar in week 11 and continued in week 12. The recorded scores for the homework can be submitted in week 12.

- d) **End of semester examination:** To evaluate knowledge and understanding of learners on the learning outcomes covering weeks 1-12 and weeks 13-24 17 in the first and second semester respectively. It is recommended that multiple choice, essays and practical questions are used to assess the learning outcomes. Teachers should ensure that the recorded marks are submitted through the system by the designated due date.
- e) **Class Exercise:** To allow for immediate feedback and clarification of concepts, it is recommended that teachers use weeks 13-15 focal areas as class exercise in the last period of week 15. Ensuring 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 week 3 about creating their own portfolio to submitted via email (keeping their parent in copy) in week 22. Teachers are to ensure recorded scores are submitted via the system on time
- g) **Individual Project:** To assess learners complex problem-solving skills, involving multiple tasks, research, analysis, and creative solutions. Teachers assign learners individual project in week 11, to be submitted in week 20. Teachers are to ensure recorded scores are submitted via the system on time

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: Data as Bit Patterns

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 2a – 2e).
- 1.2 Share your observation on what a colleague did by way of application of lessons learned from previous PLC sessions attended (NTS 1b, 1b and 2a – 2e).

2. Review of learning plans (60 minutes)

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

Purpose

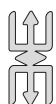
The purpose of the session is to review the learning plan for week 1 by aligning the plan with the Learner Material and appropriate assessment strategies.

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

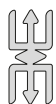
The selected activities should be included in the teacher/learner activity section of the learning plan

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

E.g.

Discuss at least three types of data

Refer to Learner Material and Teacher Manual week 1 for more examples on the assessment task

**Note**

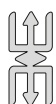
- i. *The assessment tasks may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.*
- ii. *The selected activities should be included in the 'Assessment DoK aligned to Curriculum and Teacher Manual' section below teacher/learner activities in the learning plan*

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 3k, 3p).

E.g.

Scoring Criteria

- a) *Bits are binary digits, 0 and 1, used to represent data in computers. Bit patterns are sequences of bits – 5 marks*
- b) *A bit is a binary digit, either 0 or 1. A bit pattern is a sequence of bits, like 1010 – 3 marks*
- c) *A bit is the smallest unit of data in a computer. It can be 0 or 1 – 2 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.

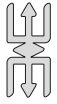
Design a colouring activity where each colour is assigned a binary number (Scan the QR code in the teacher manual for an example), etc.

Refer to Teacher Assessment Manual and Toolkit pages 66–69 for more information on how to administer the assessment mode.

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.

Hold a follow-up discussion or reflection session to discuss common challenges and insights gained from the task in conversion of decimal to binary and vice versa, 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 3j, 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).

PLC SESSION 2: Application of Knowledge of Browser Cache to Solve Runtime Issues.

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 (1a, 1b and 2a – 2e).

1.2 Share your experience in conducting and/or recording the assessment for 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 and 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 plan with the Learner Material and appropriate assessment strategies.

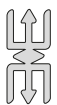
Learning Outcome

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 those in the Learner Material. Indicate the activity(ies) in your learning plan (NTS 2a – 2f and 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) for the week. This week's recommended mode of assessment is **essay** (NTS 3k, 3p).

E.g.

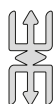
A user gets a run-time error message when trying to access a particular webpage. Write an essay to explain a possible reason for this and how it can be rectified.

Refer to Teacher Manual pages week 2 and Learner Material for more examples on the assessment task.

Hint



- i. *Teacher gives learners a group research project work application of knowledge of browser cache to solve Runtime issues. This is to be submitted in week 5.*
- ii. *Refer to **Appendix A** for more information on the group project work.*



Note

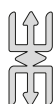
- i. *The assessment tasks may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.*
- ii. *The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities in the learning plan*

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 3k, 3p).

E.g.

Scoring criteria

- a) *The webpage might not be loading due to a slow internet connection, check the internet connection or try reloading the page – **3 marks***
- b) *The browser cache might be causing issues, clear the browser cache and cookies, then try accessing the webpage again – **5 marks***
- c) *The run-time error might be due to a server-side issue, such as a misconfiguration or the server being down, check the server status, ensure the server configuration is correct, and verify that the server is running properly – **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.

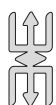
Provide support and accommodation for students with special needs, such as extra time or a quiet testing environment, etc.

Refer to Teacher Assessment Manual and Toolkit pages 94–96 for more information on how to administer the assessment mode.

- 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 oral and written comments to the learner in the provision of feedback, 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 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 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 A: Group Project Work

1. Task:

Investigate how browser cache can be used to solve runtime issues in web applications. Create a presentation that explains the concept of browser cache, common runtime issues that can be resolved by clearing the cache, and demonstrate the process of clearing the cache in different web browsers

2. Marking Scheme/Rubrics

E.g.

1. a) **Explanation of Browser Cache:**
 - i. *Browser cache is where the browser stores copies of visited web pages and files to load them faster next time*
 - ii. *It reduces load times and bandwidth usage but can sometimes cause issues with outdated content – 10 marks*
 - b) **Identification of Issues:**
 - i. *Common issues include old versions of web pages being displayed, slow performance, and web applications not working properly*
 - ii. *Clearing the cache helps by removing outdated files, ensuring the browser fetches the latest versions – 10 marks*
 - c) **Demonstration:**
 - i. *In Chrome, go to settings > privacy and security > clear browsing data, and select cached images and files*
 - ii. *In Firefox, go to options > privacy & security > cookies and site data > clear data, and select cached web content – 10 marks*
2. a) **Explanation of Browser Cache:**
 - i. *Browser cache saves copies of web pages, so they load faster next time*
 - ii. *It helps speed up browsing but can sometimes cause problems if old data is used – 6 marks*
 - b) **Identification of Issues:**
 - i. *Problems can happen like old pages showing up or websites not working right*
 - ii. *Clearing the cache can fix these problems by getting new data – 6 marks*
 - c) **Demonstration:**
 - i. *In Chrome, go to settings, then clear browsing data, and choose to clear the cache*
 - ii. *In Firefox, go to options, then privacy and security, and clear cache – 6 marks*

PLC SESSION 3: Functions of the Parts of the CPU

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 and 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 3 by aligning the learning plan with Learner Material and appropriate assessment strategies.

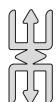
Learning Outcome

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 and 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 **portfolio** (NTS 3k, 3p).

E.g.

Create a portfolio to demonstrate your understanding of the three main components of the CPU (Arithmetic and Logic Unit – ALU, Control Unit – CU, and Registers) and their roles in the operation of a computer, etc.

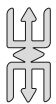
Refer to Teacher Manual week 3 and Learner Material for more examples on the assessment task.

Hint



- i. Teachers assign learners the task of creating an individual portfolio to be submitted in the 22nd week for assessment. Refer to **Appendix B** for guidelines.
- ii. Remind learners about the submission of their group project work in week 5. Provide support to groups facing challenges in their project.

Note

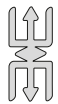


- i. The assessment tasks/items may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.
- ii. The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities of the learning plan.

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 3k, 3p).

E.g.

- a) **Accuracy and Completeness:** The descriptions of each CPU component should be accurate and complete, covering their functions and interactions comprehensively – **12 marks**
- b) **Clarity and Organisation:** The portfolio should be well-organised, with clear headings and a logical flow of information. Diagrams should be labelled and clearly explained – **6 marks**
- c) **Relevance and Application:** The real-world example should be relevant and illustrate a clear understanding of how each component contributes to a computer task – **6 marks**
- d) **Reflection:** The reflection should provide meaningful insights into the importance of understanding CPU components and its relevance to software and hardware development – **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 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.

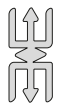
- a) *Identify the learning outcomes the portfolio will address*
- b) *Identify or develop the scoring criteria (e.g., a rubric) to judge the quality of the portfolio, etc.*

Refer to Teacher Assessment Manual and Toolkit Pages 27–31 for more information on how to administer the assessment mode.

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.

- a) *Clearly establish the criteria for evaluating/scoring in a consistent manner*
- b) *Mark and record learners' performances, 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:

- 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 4 and related Learner Material (NTS 3a).*
- c) *bring along your Teacher Manual, PLC Handbook and learning plan on week 4 in preparation for the next session (NTS 3a).*



Appendix B: Individual Portfolio

Task:

Create a portfolio containing of your academic work for the academic year. This will enable the tracking of your academic progression.

Artefacts/pieces

1. MS word
2. PowerPoint
3. A weekly summary of what you have learned from week 1 to week 17 (30–40 words per week).
4. At most 20 pictures to support your weekly summary content.
5. Copies of class exercises/homework
6. Copies of project reports
7. Copies of mid –semester examinations and of first semester examination.

Organisation/ Structure

1. MS word document containing cover page (with learner's name, class and form) and paragraph of weekly summary in MS word
2. PowerPoint slides containing title page (with learner's name, class and form) and key highlights from the MS word on different slides

Rubrics

Criteria	Excellent (4 marks)	Good (3 marks)	Satisfactory (2 marks)	Needs Improvement (1 mark)
Personal Introduction	Description: Introduction (20–30 words) reflect personal background and free of misspelling. To include name, interest, age, class, etc. All in 30 words	Description: Clear introduction within word limit with minor misspelling. To include name, age, class and interest, etc. All in 25 words or less.	Description: Introduction present but may slightly exceed or fall short of word limit with some misspelling. To include name, age, class and interest, etc. All in 13 words or less.	Description: Missing or incomplete introduction with a lot of misspellings. To include just name

Criteria	Excellent (4 marks)	Good (3 marks)	Satisfactory (2 marks)	Needs Improvement (1 mark)
Course Motivation	Description: Insightful explanation (20–30 words) of reasons for choosing Computing. Example: “I chose Computing as a course to explore innovative technologies and develop skills essential for a career in software engineering.” (20 words)	Description: explanation within word limit with little misspelling. Example: “Computing fascinates me because of its role in solving real-world problems and its dynamic nature in a lot of industries.” (18 words)	Description: Explanation present but may slightly exceed or fall short of word limit; lacks depth. Example: “I selected Computing because I like computers and technology.” (9 words)	Description: Short of words with misspelling. Example: “I chose Computing because it’s interesting.” (6 words)
Weekly Summaries	Description: Comprehensive summaries (30–40 words each) for all 17 weeks, accurately reflecting learning. Example (Week 1): “Learned the basics of programming in Python, including variables, data types, and simple input/output operations.” (15 words)	Description: Clear summaries for all weeks with minor inaccuracies or slight deviations in word count. Example (Week 1): “Covered Python basics such as variables and data types.” (8 words)	Description: Summaries present for most weeks but may lack detail or consistency; some may deviate from word count. Example (Week 1): “Learned Python.” (3 words)	Description: Incomplete summaries; several weeks missing or summaries are unclear and do not reflect learning. Example (Week 1): “Did some stuff in Python.” (5 words) Lacks detail and does not meet the word count requirement.

Criteria	Excellent (4 marks)	Good (3 marks)	Satisfactory (2 marks)	Needs Improvement (1 mark)
Use of MS Word and PowerPoint	Description: Uses MS Word and PowerPoint to highlight key points; visually appealing and well-organised. Example: “Used MS Word to create a well-structured document with headings and bullet points. PowerPoint slides included clear visuals and concise text.”	Description: Good use of MS Word and PowerPoint with clear highlights; generally well-organised. Example: “Formatted the document in MS Word with proper headings. PowerPoint slides were organised and included relevant images.”	Description: Adequate use of tools but may lack clarity or visual appeal; organisation is basic. Example: “Used Word and PowerPoint to make the portfolio.” (7 words)	Description: Minimal or ineffective use of MS Word and PowerPoint; poorly organised and difficult to follow. Example: “Made some slides and a document.” (6 words) Minimal use of tools with poor organisation and lack of clarity.
Submission Guidelines	Description: Submitted on time via email with parents copied; follows all instructions precisely. Example: “Submitted portfolio on time via email to teacher@example.com, with parents copied at parent@example.com.”	Description: Submitted on time with parents copied; minor deviations from instructions. Example: “Sent the portfolio by the deadline to teacher@example.com and cc'd parents@example.com.”	Description: Submitted but may be slightly late or have minor issues with copying parents. Example: “Emailed the portfolio late with parents copied.”	Description: Not submitted on time; parents not copied; fails to follow submission instructions. Example: “Did not email the portfolio or forgot to copy parents.” Failed to follow submission instructions properly.

How to administer

1. Explain the purpose and importance of the portfolio and how it will help learners track their progress throughout the course.
2. Craft the assessment tasks and rubric
3. organise after school workshops on using MS Word and PowerPoint

4. Each week, allocate time to check the on the progress of the portfolio creation and clarify areas where learners need improvement
5. Provide a template for the email like “**Subject:** *Submission of year 1 Computing portfolio*”.
6. Confirm receipt for learners to know their portfolio has been successfully submitted.

Feedback

Provide individual feedback highlighting strengths (such as clarity of content, organisation of document) and areas for improvement (such as portion of pictures, omissions of key content in the summary).

PLC SESSION 4: Control bus, Address bus, Data bus and the Internal Clock.

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 and 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 4 by aligning the learning plan with Learner Material and appropriate assessment strategies.

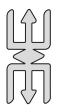
Learning Outcome

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/marketing 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 and 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 **research** (NTS 3k, 3p).

E.g.

Research and present your findings on the following:

Control bus, address bus, and data bus, etc.

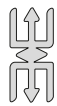
Refer to Teacher Manual section 4 and Learner Material section 4 for more examples on the assessment task, etc.

Hint



Remind learners about the submission of their Group project work in week 5.

Note



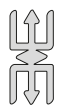
- i. *The assessment tasks/items may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.*
- ii. *The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities of the learning plan.*

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) *The control bus carries control signals from the CPU to other components in the computer. These signals manage and coordinate various operations – **3 marks***
- b) *The address bus carries the addresses of data (not the data itself) between the CPU and memory. It specifies the location where data is stored – **3 marks***
- c) *The data bus transfers actual data between the CPU, memory, and other peripherals – **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 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.

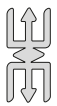
Provide necessary resources, materials, and support to help learners succeed in their research work, etc.

Refer to Teacher Assessment Manual and Toolkit pages 77–80 for more information on how to administer the assessment mode.

- 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.

Conduct review sessions to go over common mistakes and difficult 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 4 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 5 and related Learner Material (NTS 3a).
 - bring along your Teacher Manual, PLC Handbook and learning plan on week 5 in preparation for the next session (NTS 3a).

PLC SESSION 5: Hardware Components of a Computer

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 and 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.

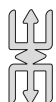
Learning Outcome

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 and 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 **checklist** (NTS 3k, 3p).

E.g.

Use checklist to categorise the following devices into software, input device and output device

- Keyboard
- Microsoft Word
- Printer
- Hard Drive
- Antivirus Software
- Monitor
- Mouse
- Operating System (e.g., Windows), etc.

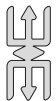
Refer to Teacher Manual week 5 and Learner Material for more examples on the assessment task.

Hint



- i. Submission of group project work, teachers should score the work and upload the marks on the transcript portal
- ii. Teachers meet and discuss as a subject group to prepare questions for the first mid-semester examination.

Note

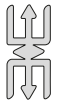


- i. The assessment tasks/items may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.
- ii. The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities of the learning plan.

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.

Categories	Item	Explanation	Tick (✓)	Marks
Input Devices	Keyboard	Commonly used for typing text and commands.		1
	Mouse	Used to point, click, and drag items on a screen.		1
	Scanner	Converts physical documents into digital format.		1
	Microphone	Captures audio input.		1
Output Devices	Monitor	Displays visual output from the computer.		1
	Printer	Produces physical copies of digital documents.		1
	Speakers	Outputs audio from the computer.		1
	Headphones	Provides personal audio output.		1
	Projector	Projects visual output onto a larger screen.		1
Software	Word Processor	Used for creating text documents.		1
	Spreadsheet Software	Used for organising data in tables and performing calculations.		1
	Presentation Software	Used for creating slide shows.		1
	Web Browser	Used for accessing and browsing the internet.		1
	Email Client	Used for sending and receiving emails.		1
	Graphics Editor	Used for creating and editing images.		1
	Antivirus Software	Protects the computer from malware and viruses.		1
	Disk Cleanup Tool	Frees up space on the hard drive by removing unnecessary files.		1
	Backup Software	Creates copies of data to prevent loss.		1
	System Monitor	Monitors system performance and resource usage.		1
	Defragmentation Tool	Reorganises fragmented data on the hard drive.		1
	Firewall	Controls incoming and outgoing network traffic to secure the system.		1

**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.

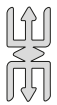
Keep the checklists adaptable and flexible to match the specific learning outcomes, etc.

Refer to teacher assessment manual and toolkit pages 72–74 for more information on how to administer the assessment mode.

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.

Learners reflect and provide constructive feedback to help improve themselves on the hardware components of a computer (self and peer assessment), 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 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 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 and 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.

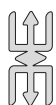
Learning Outcome

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 and 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) *This covers focal areas from weeks 1–5, taking into consideration DOK levels.*
- b) *Resources:*
 - i. *Computer*
 - ii. *Answer booklets*
 - iii. *Learner Material*
 - iv. *Computing Teacher Manual*
 - v. *Teacher Assessment manual and Toolkit*
- c) *The test should include*
 - i. *Section A – Multiple Choice (5 questions answer all)*
 - ii. *Section B – (4 Essay questions, 2 to be selected)*
 - iii. *Section C – Practical (2 questions, 1 to be selected).*
- d) *Time: 1 hours 30minutes.*
- e) *Total Score: **60 marks** to be scaled down to **20 marks** for submission.*
- f) *Table of specification – refer to **Appendix C***

Section A – Multiple Choice

1. Which of the following represents the binary bit pattern for the decimal number 5....
 - A. 1010
 - B. 0101
 - C. 1100
 - D. 0011
2. What is the primary function of the Control Unit (CU) in a CPU.....
 - A. To perform arithmetic and logical operations
 - B. To store data temporarily
 - C. To manage and coordinate the activities of the CPU
 - D. To transfer data between the CPU and memory

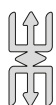
Section B – Essay

1. Describe the functions of the parts of the CPU: Arithmetic and Logic Unit (ALU), Control Unit (CU), and Registers.

2. *Explain the Machine Cycle, particularly focusing on the Fetch–Decode–Execute–Store Cycle.*
3. *Identify and describe the function of the following communication hardware:*
 - i. Router
 - ii. Modem
 - iii. Network Interface Card (NIC)

Test of Practical

1. *Describe the steps to clear the browser cache in Google Chrome*
2. *Explain how bit patterns can be used to represent different types of data, such as numbers, characters, and images. Provide an example for each type.*



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.

Section A

1. B --- 1 mark
2. C --- 1 mark

Section B

- 1.a) *The Central Processing Unit (CPU) is the brain of a computer, responsible for executing instructions and processing data. It consists of three main parts: the Arithmetic and Logic Unit (ALU), the Control Unit (CU), and Registers – 3 marks*
 - i. **Arithmetic and Logic Unit (ALU):** *The ALU is a critical component of the CPU that performs arithmetic and logical operations. It handles all mathematical calculations, such as addition, subtraction, multiplication, and division. Additionally, it performs logical operations like comparing numbers, evaluating conditions, and working with Boolean logic. The ALU is essential for executing instructions that involve mathematical and decision-making processes – 3 marks*
 - ii. **Control Unit (CU):** *The Control Unit acts as the orchestrator of the CPU, directing the operation of the processor. It fetches instructions from the computer's memory, decodes them to understand what actions are required, and then executes those instructions by coordinating with the ALU and other parts of the CPU. The CU ensures that the correct sequence of operations is followed and manages the flow of data*

within the CPU and between the CPU and other components of the computer – 3 marks

b)

- i. **Arithmetic and Logic Unit (ALU):** Performs arithmetic operations (addition, subtraction, multiplication, division) and logic operations (AND, OR, NOT). It is the part of the CPU that performs all calculations and logical decisions – **2 marks**
- ii. **Control Unit (CU):** Directs the operation of the processor. It tells the computer's memory, ALU, and input and output devices how to respond to a program's instructions. The CU fetches instructions from memory, decodes them, and then executes them by coordinating the actions of the ALU, registers, and other components – **2 marks**
- iii. **Registers:** Small, fast storage locations within the CPU used to hold temporary data and instructions. They hold data that is being processed by the CPU, such as the accumulator, instruction register, and program counter – **2 marks**

Section C – Test of Practical

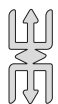
E.g.

a) Open Google Chrome

- Click on the three dots in the upper-right corner to open the menu
- Go to “Settings”
- Scroll down and click on “Privacy and security”
- Click on “Clear browsing data”
- In the dialog box, select the time range (e.g., “All time”)
- Ensure “Cached images and files” is checked – **10marks**
- Click on “Clear data.” etc.

b) Open Chrome, go to Settings, find Clear browsing data, select the time range, and clear the cache – **6 marks**

c) Open Chrome, go to settings, find privacy settings, and clear cache – **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 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).

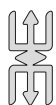
E.g.

Provide clear instructions and resources needed for the tasks and control the environment to prevent cheating, 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.

Encourage learners to reflect on their performance in the mid semester examination, review their work, and identify areas for improvement where applicable, 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 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	Describe data as bit pattern	Multiple Choice	1	-	-	-	1
		Essay	-	1	-	-	1
		Practical	-	1	-	-	1
2	Apply knowledge of browser cache to solve runtime issues, (opening browsers)	Multiple Choice	-	1	-	-	1
		Essay	-	-	1	-	1
		Practical	-	1	-	-	1
3	Describe the functions of the parts of the CPU, Arithmetic and Logic Unit (ALU), Control Unit (CU) and Registers.	Multiple Choice	1	-	-	-	1
		Essay	-	1	-	-	1
4	Understand and explain the control bus, address bus, data bus and the internal clock, Machine cycle, fetch-decode-execute-store cycle, instruction set for a CPU and describe embedded systems	Multiple Choice	-	1	-	-	1
		Essay	-	-	1	-	1
5	Explain the features of the hardware components of a computer(input hardware, processing hardware, output hardware, storage hardware and communication hardware)	Multiple Choice	1	-	-	-	1
		Essay	-	-	1	-	1
	Total		3	6	3	-	12

PLC SESSION 7: Categories of Computer Software

1. Introduction (20 minutes)

- 1.1 Share one thing on the lesson for week 6 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 6 that supported learning ((NTS 2e, 2f and 3d–3j)).

2. Review of Learning Plans (60 minutes)

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

Purpose

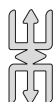
The purpose of the session is to review the learning plan for week 7 by aligning the learning plan with Learner Material and appropriate assessment strategies.

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 and 3a–3j).



Note

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

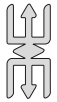
- 2.3** Develop assessment tasks/items based on the learning indicator(s) on assessment for the week. This week's recommended mode of assessment is **questioning** (NTS 3k, 3p).

E.g.

Using questioning, learners in their mixed ability groups:

Explain how a monitor (output hardware) displays information from the computer, etc.

Refer to Teacher Manual week 7 and Learner Material for more examples on the assessment task.



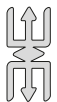
Note

- 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 3k, 3p).

E.g.

- a) A monitor is an output device that shows information from the computer. The graphics card sends images to the monitor. The monitor uses pixels to display the images – **5 marks**
- b) A monitor is a screen that shows what you are doing on the computer. The computer sends pictures and words to the monitor, etc. – **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 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.

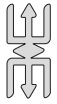
Ask one question at a time and wait for responses from learners to allow time to think through responses critically, etc.

Refer to Teacher Assessment Manual and Toolkit pages 37-41 for more information on how to administer the assessment mode.

- 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.

Reflect and adapt questioning techniques, strategies and resources to check if expected learning outcomes have been achieved, 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 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: Categories of Computer Software.

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 and 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.

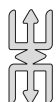
Learning Outcome

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 and 3a–3j).



Note

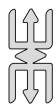
The selected activities should be included in the teacher/learner activity section of the learning plan.

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** (NTS 3k, 3p).

E.g.

Creates a well-organised, visually appealing poster that clearly illustrates what is meant by application software and includes the names of some generic application software, etc.

Refer to Teacher Manual week 8 and Learner Material for more examples on the assessment task.



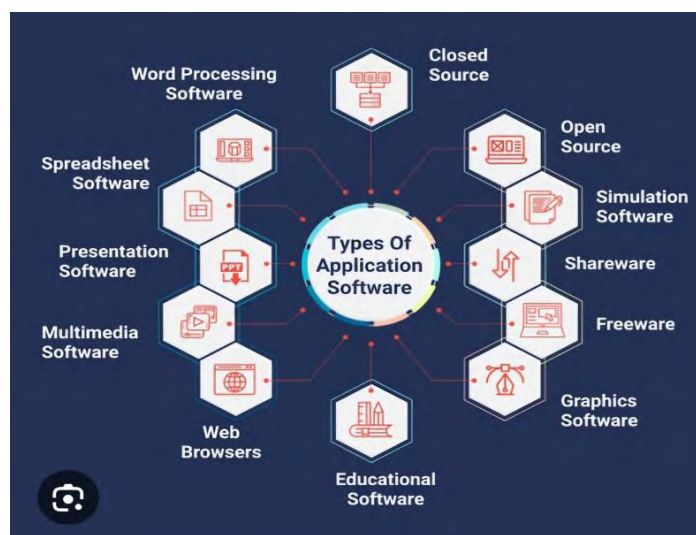
Note

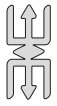
- i. The assessment tasks/items may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.
- ii. The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities of the learning plan.

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 3k, 3p).

E.g.

1.
 - a) Well-organised, visually appealing, clear layout and design – **5 marks**
 - b) Accurate, detailed definition – **5 marks**
 - c) Variety of visual elements enhancing understanding – **5 marks**
 - d) Demonstrates creativity and originality in design and presentation – **5 marks**
2.
 - a) Organised and visually appealing with minor issues – **2 marks**
 - b) Accurate definition with minor lack of depth – **2 marks**
 - c) Uses visual elements, but may lack variety or clarity – **2 marks**
 - d) Some creativity, but may lack originality – **2 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.

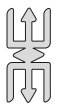
Clearly communicate the learning outcome, requirements, and assessment criteria to the learners and guide them in their research, information organisation, and content for posters assessment, etc.

Refer to Teacher Assessment Manual and Toolkit pages 97 – 99 for more information on how to administer the assessment mode.

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 peer review process to foster collaboration and constructive feedback as the learner progresses where applicable, 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 1b, 1b).

3.2 Identify a critical friend to observe your lesson in relation to PLC Session 8 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 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: Computer Networks And How They Work

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 and 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.

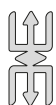
Learning Outcome

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

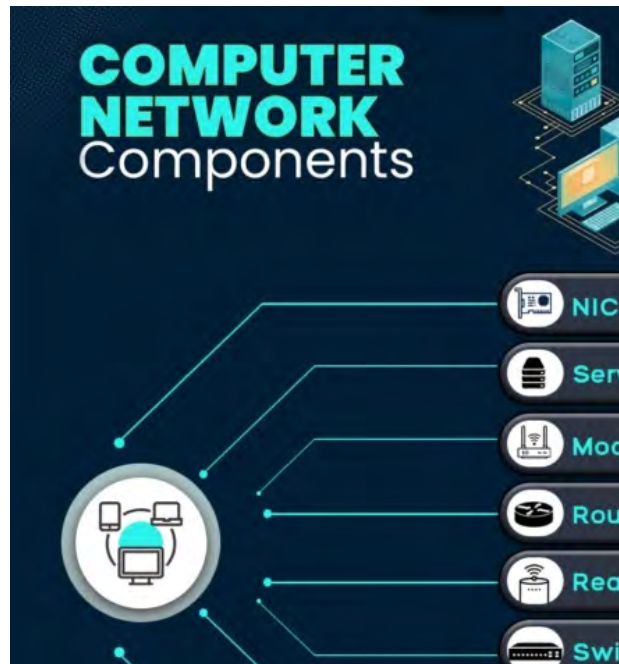
The selected activities should be included in the teacher/learner activity section of the learning plan.

- 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 **demonstration** (NTS 3k, 3p).

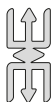
E.g.

In mixed gender/mixed ability group:

Create a glossary of network components on paper and demonstrate how it was created, etc.



Refer to Teacher Manual week 9 and Learner Material for more examples on the assessment task.



Note

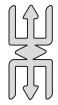
- i. The assessment tasks/items may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.
- ii. The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities of the learning plan.

- 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 3k and 3p).

E.g.

- a) Comprehensive list with accurate, detailed definitions; clear, logical organisation; includes examples or visual aids – **10 marks**
- b) Effective demonstration of the creation process; clear explanation of choices; shows understanding of formatting – **10 marks**
- c) Most components listed with generally accurate definitions; some minor issues in organisation or lack of examples – **5 marks**

- d) *Demonstrates creation process with minor gaps; mostly clear explanations; basic understanding of formatting, etc. – 5 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.

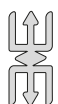
Provide the materials and resources needed to be used for the demonstration, etc.

Refer to Teacher Assessment Manual and Toolkit pages 62–65 for more information on how to administer the assessment mode.

- 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 to the learners based on observations, highlighting areas of improvement, reinforcing correct techniques, and encouraging further practice on demonstration of the glossary of computer networks, 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: Types Network System

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 and 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.

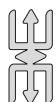
Learning Outcome

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 and 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** (NTS 3k, 3p).

E.g.

Give learners a written assignment to differentiate between MAN and WAN, etc.

Refer to Teacher Manual week 10 and Learner Material for more examples on the assessment task.

Hint

Assign individual project to learners which should be submitted in the 20th 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 3k, 3p).

E.g.

- a) *A MAN covers a city or campus and connects multiple LANs, like a city Wi-Fi network. A WAN covers larger areas like multiple cities or countries, like the internet. MAN is faster with lower latency than WAN. MAN is used for city Wi-Fi and WAN for connecting different cities – **10 marks***
- b) *A MAN connects networks in a city. A WAN connects networks over large distances. An example of a MAN is city Wi-Fi. An example of a WAN is the internet – **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 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.

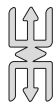
Design/ Create a well-structured assignment with clear instructions and expectations, etc.

Refer to Teacher Assessment Manual and Toolkit pages 62–69 for more information on how to administer the assessment mode.

- 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.

Evaluate the completed assignments using clear and consistent grading criteria, 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 10 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: Computer Networks and How They Work

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 and 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.

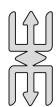
Learning Outcome

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 and 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 **research** (NTS 3k, 3p).

E.g.

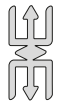
Assign each group a different server to research and create a short summary of the function of each server. Possible servers include file server, print server, email server, web server, database server, proxy server, DNS server, cloud server, and application server, etc.

Refer to Teacher Manual week 11 and Learner Material for more examples on the assessment task.

Hint



*Teachers meet to discuss as a subject group to prepare for the end of first semester examination. A sample of the nature of the assessment has been attached. Refer to **Appendix D** for guidelines on individual research 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 3k, 3p).

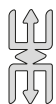
E.g.

a)

- i. **Print Server:** A print server manages printers and print jobs in a network. It allows multiple users to send print jobs to various printers. For example, a school might use a print server to manage all its classroom printers – **3 marks**
- ii. **Email Server:** "An email server sends, receives, and stores emails. It ensures that emails are delivered to the correct recipient. For example, Gmail uses email servers to manage users' emails – **3 marks**
- iii. **Web Server:** A web server hosts websites and serves web pages to users. It handles requests from web browsers and delivers the required content. For example, Apache is a popular web server used to host websites – **3 marks**
- iv. **Database Server:** A database server provides database services to other programs or computers. It stores and retrieves data for various applications. For example, MySQL is a database server used by many web applications – **3 marks**
- v. **Proxy Server:** A proxy server acts as an intermediary between a client and another server. It can provide security, anonymity, and content filtering. For example, a proxy server might be used to block access to certain websites in a company

b)

- i. **File Server:** Stores files – 1 mark
- ii. **Print Server:** “Manages printers – 1 mark
- iii. **Email Server:** “Handles emails – 1 mark
- iv. **Web Server:** “Shows websites – 1 mark
- v. **Database Server:** “Stores data – 1 mark
- vi. **Proxy Server:** “Acts as a middleman, etc. – 1 mark

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

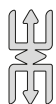
Refer to Teacher Assessment Manual and Toolkit pages 77–80 for more information on how to administer the assessment mode.

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.

Communication skills: The research work should be well-written and well organised.

Learners should be able to communicate their findings clearly and concisely, 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).



Appendix D: Guidelines for Individual Research Project

Assessment Task

Research and present a detailed report covering the identification, description, and discussion of key web page components and their impact on user experience.

Scoring criteria

- **Web Outline Plan:** A clear and organised outline of the web page structure, including all key components – **5 marks**
- **Wireframes:** Visual representations (wireframes) of the web page layout, showing the placement and organisation of components – **5 marks**
- **Rationale Document:** An explanation of the design choices made in the wireframes, with a focus on usability and accessibility – **5 marks**
- **Presentation:** A well-organised presentation summarising the research findings and design process, using visual aids to support the explanations – **5 marks**

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 and 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.

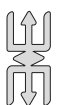
Learning Outcome

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 and 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.

a) Section A – Multiple Choice (1 mark for correct answer)

- i. What is the primary function of the CPU in a computer?
 - A. To connect to the internet
 - B. To display images on the screen
 - C. To execute instructions and process data
 - D. To store data permanently
- ii. Which of the following statements best describes the role of storage hardware in a computer system?
 - A. Storage hardware is used to display information to the user.
 - B. Storage hardware is used to input data into the computer
 - C. Storage hardware is used to perform calculations and logical operations.
 - D. Storage hardware is used to retain data and programs for long-term use.

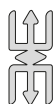
b) Section B – Essay – Answer 3 out of 5 questions

1.
 - a) Define Computer Software
 - b) Explain the difference between system software and application software
 - i. Provide 2 examples of each
2.
 - a) What is a Bit pattern?
 - b) Identify the 3 data types
 - c) Explain how text and images are represented as bit patterns in a computer

c) Section C – Test of Practical (Answer 2 questions out of 3)

The website currently opened on the computer has been frequently visited and is now slow in performance with some display issues. Demonstrate and write down your steps on how to clear the browser cache.

Refer to **Appendix E** for the table of specification.



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.

Multiple Choice

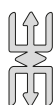
1. C --- Answer (1 mark)
2. D -- Answer (1 mark)

Essay type

- a) Computer software is a set of instructions that tells a computer how to perform specific tasks. There are three main types of software: system software, application software, and programming software. System software includes operating systems like Windows, which manage hardware and software resources. Application software includes programs like Microsoft Word, which help users perform specific tasks. Programming software includes tools like Python, which are used to create other software – **5 marks**
- b) Computer software is a program that runs on a computer. There are different types, like system software, which helps the computer run, application software, which helps you do tasks, and programming software, which helps write programs. Examples are Windows (system), Microsoft Word (application), and Python (programming) – **3 marks**

Test of Practical

- a) The browser cache stores temporary data from websites to speed up loading times. Over time, this cache can cause performance and display issues. To clear the cache in Google Chrome, follow these steps:
 - i. Click on the three dots in the upper-right corner of the browser
 - ii. Select 'Settings'
 - iii. Scroll down and click 'Privacy and security'
 - iv. Click 'Clear browsing data'
 - v. In the time range dropdown, select 'All time'
 - vi. Ensure 'Cached images and files' is checked
 - vii. Click 'Clear data'. Clearing the cache can resolve the issues and improve website performance – **15 marks**
- b) Browser cache stores website data to load pages faster. Clearing it can fix issues. To clear the cache in Chrome, go to settings, choose 'Clear browsing data', select 'Cached images and files', and click 'Clear data'. This should make the website work better – **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.

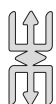
Provide clear instructions and resources needed for the tasks and control the environment to prevent cheating, etc.

Refer to Teacher Assessment Manual and Toolkit pages 94 – 96 for more information on how to administer the assessment mode.

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.

Evaluate the completed examination using clear and consistent grading criteria, 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:

- 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 13 and related Learner Material (NTS 3a).
- c) bring along your Teacher Manual, PLC Handbook and learning plan on week 13 in preparation for the next session (NTS 3a).



Appendix E: Table of Specification for End of Semester Examination

Weeks	Focal Area(s)	Type of Questions	DoK Levels				Total
			1	2	3	4	
1	Describe data as bit pattern	Multiple Choice	2	2	1	-	5
		Essay	-	1	-	-	1
2	Apply knowledge of browser cache to solve runtime issues, (opening browsers)	Multiple Choice	2	2	1	-	5
		Practical	-	1	-	-	1
3	Describe the functions of the parts of the CPU, Arithmetic and Logic Unit (ALU), Control Unit (CU) and Registers.	Multiple Choice	2	2	-	-	4
4	Understand and explain the control bus, address bus, data bus and the internal clock, Machine cycle, fetch-decode-execute-store cycle, instruction set for a CPU and describe embedded systems	Multiple Choice	2	2	1	-	5
		Essay	-	1		-	1
		Practical	-	1	-	-	1
5	Explain the features of the hardware components of a computer(input hardware, processing hardware, output hardware, storage hardware and communication hardware)	Multiple Choice	1	1		-	2
		Essay	-	1		-	1
6	Explain the features of the hardware components of a computer(input hardware, processing hardware, output hardware, storage hardware and communication hardware)	Multiple Choice	2	1			3
7	Describe the categories of Computer software	Multiple Choice	2	2			4
8	Describe the categories of Computer software	Multiple Choice	1	1	1		3
		Essay		1			1
9	Computer Networks and how they work	Multiple Choice					
		Practical		1			1
11	Computer Networks and how they work	Multiple Choice					
		Essay			1		1
	Total		14	20	5	-	39

PLC SESSION 13: The Concept and Importance of Data Structures

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 and 3d-3j).

2. Review of Learning Plans (60 minutes)

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

Purpose

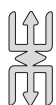
The purpose of the session is to review the learning plan for week 13 by aligning the learning plan with Learner Material and appropriate assessment strategies.

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/marketing 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

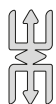
The selected activities should be included in the teacher/learner activity section of the learning plan.

- 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 **homework** (NTS 3k, 3p).

E.g.

What is a data structure in programming.

Refer to Teacher Manual section 13 and Learner Material section 13 for more examples on the assessment task.



Note

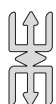
- i. *The assessment tasks/items may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.*
- ii. *The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities of the learning plan.*

- 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 3k, 3p).

E.g.

Scoring criteria

- a) *Data structure organise and store data for efficient operations. They include arrays, linked lists, stacks, queues, trees, and graphs. Arrays are fixed-size, linked lists are dynamic, and stacks and queues manage order. They are important for efficient algorithm performance – **10 marks***
- b) *Data structure are methods for storing and organising data. Common examples are arrays and linked lists. They are important because they help in managing data efficiently, etc. – **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 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.

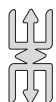
Clearly define the learning outcomes intended to be achieved, etc.

Refer to the Teacher Assessment Manual and Toolkit pages 57 – 60 for information on how to administer the assessment mode.

- 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 to the learners based on observations, highlighting areas of improvement, reinforcing correct techniques, and encouraging further practice for the discussion on data structures in programming, 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:
- provide constructive feedback to learners and record their assessment scores in the required format and document where appropriate (NTS 3l–3n).
 - read PLC Session 14 and related Learner Material (NTS 3a).
 - bring along your Teacher Manual, PLC Handbook and learning plan on week 14 in preparation for the next session (NTS 3a).

PLC SESSION 14: The Concept of Data Structures and Their Importance.

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 and 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.

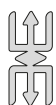
Learning Outcome

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/marketing 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 and 3a–3j).



Note

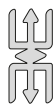
The selected activities should be included in the teacher/learner activity section of the learning plan.

- 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 **class exercise** (NTS 3k, 3p).

E.g.

Search for the meaning of “array” in computing, the types of arrays, and their advantages, etc.

Refer to Teacher Manual week 14 and Learner Material for more examples on the assessment task.



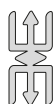
Note

- 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 3k-3p).

E.g.

- a) *An array is a data structure that holds a fixed number of elements of the same type in contiguous memory locations, allowing efficient access and manipulation. One-dimensional arrays store elements in a single row. Two-dimensional arrays store elements in rows and columns, like a grid. Multi-dimensional arrays extend this concept to more dimensions. Arrays provide efficient storage and retrieval, fixed-size structure, and easy iteration. One-dimensional arrays are good for lists; two-dimensional arrays for tables or grids; multi-dimensional arrays for complex data models – **15 marks***
- b) *An array is a collection of items stored at contiguous memory locations. For example, a list of numbers like [1, 2, 3, 4, 5]. One-dimensional array (like a list), Two-dimensional array (like a table), Multi-dimensional array (like a 3D block). Arrays allow for fast access to data using indexes and help in organising multiple values. One-dimensional arrays are simple lists; two-dimensional arrays are like tables, etc. – **9 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.

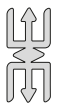
Set a reasonable time frame for completion of exercises to maintain focus and efficiency, etc.

Refer to Teacher Assessment Manual and Toolkit pages 80–83 for more information on how to administer the assessment mode.

- 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 learners' performance for discussion on the meaning of array, types and advantages, 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:
- provide constructive feedback to learners and record their assessment scores in the required format and document where appropriate (NTS 3l–3n).
 - read PLC Session 15 and related Learner Material (NTS 3a).
 - bring along your Teacher Manual, PLC Handbook and learning plan on week 15 in preparation for the next session (NTS 3a).

PLC SESSION 15: The Difference Between the Types of Data Structures

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 and 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.

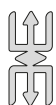
Learning Outcome

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 and 3a–3j).



Note

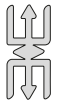
The selected activities should be included in the teacher/learner activity section of the learning plan.

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 assessment** (NTS 3k-3p).

E.g.

Learners in their mixed-ability groups, peer assess the responses: discuss and present on the types of linked list (Singly Linked List, Doubly Linked List and Circular Linked List), etc.

Refer to Teacher Manual week 15 and Learner Material for more examples 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 3k-3p).

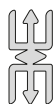
E.g.

a)

- i. **Singly Linked List:** Nodes contain data and a reference to the next node. Traversal starts from the head node to the end. Useful in applications requiring simple traversal, such as a list of students in a class – **4 marks**
- ii. **Doubly Linked List:** Nodes contain data, a reference to the next node, and a reference to the previous node. Traversal can be done in both directions. Useful in applications requiring bidirectional traversal, such as a browser's history list – **4 marks**
- iii. **Circular Linked List:** Nodes contain data and a reference to the next node. The last node points to the first node, forming a loop. Useful in applications requiring continuous looping, such as a round-robin scheduling in operating systems – **4 marks**

b)

- i. **Singly Linked List:** A linked list where each node points to the next node in the sequence – **3 marks**
- ii. **Doubly Linked List:** A linked list where each node points to both the next and the previous nodes – **3 marks**
- iii. **Circular Linked List:** A linked list where the last node points back to the first node, forming a circle, etc. – **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 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.

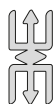
For peer assessment, lead the pairing or grouping for the assessment. In doing this, the teacher should consider mixed groupings and avoid inter pairing and pairing amongst friends (fairness and transparency), etc.

Refer to Teacher Assessment Manual and Toolkit pages 91–94 for more information on how to administer the assessment mode.

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.

Offer help or intervention in areas learners need help, 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: The Difference Between the Types of Data Structures

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 and 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.

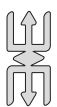
Learning Outcome

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 and 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** (NTS 2a-2f, 3a-3j).

E.g.

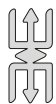
Learners in their small groups demonstrate the concept of “queuing, enqueueing and dequeuing” etc.

Refer to Teacher Manual Pages week 16 and Learner Material for more examples on the assessment task.

Hint



Remind learners about the submission of their individual project work. Support should be given to learners with special needs.



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).

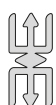
E.g.

a)

- i. *A queue works like waiting in line at a theme park ride where the first person in line gets on the ride first – **3 marks***
- ii. *When you enqueue, like adding a new task to a to-do list, it goes to the end and waits for its turn – **3 marks***
- iii. *Dequeuing is like checking off the first task on a to-do list because it was added first and needs to be done first, etc. – **3 marks***

b)

- i. *Queuing is the process of waiting in line for service or processing – **2 marks***
- ii. *Dequeuing means taking an item from the front of a line – **2 marks***
- iii. *Enqueueing means adding an item to the end of a line – **2 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.

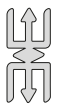
Provide instructions for the demonstration to include safety precautions, criteria for assessment and time, etc.

Refer to Teacher Assessment Manual and Toolkit pages 62–65 for more information on how to administer the assessment mode.

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 to the learners based on observations, highlighting areas of improvement, reinforcing correct techniques, and encouraging further practice for the demonstration of the concept of queuing, dequeuing and enqueueing, 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: Using Algorithms to Solve Real Life Problems

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, 2b 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 and 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.

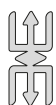
Learning Outcome

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 and 3a–3j).



Note

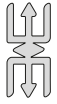
The selected activities should be included in the teacher/learner activity section of the learning plan.

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 **feedback** (NTS 3k, 3p).

E.g.

Provide feedback on the task of creating a study schedule using algorithms.

Refer to Teacher Manual week 17 and Learner Material for examples on the assessment task.



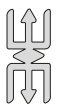
Note

- 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 3k, 3p).

E.g.

- a) *I need to create a study schedule for five subjects: Math, Science, History, English, and Computing. I have 10 hours a week to study. I will study Math and Science for 3 hours each because they are harder, and the other subjects for 2 hours each. My schedule is: Monday – Math, Tuesday – Science, Wednesday – History, Thursday – English, Friday – Computing*
- b) *I need to make a study schedule for my subjects. I have 10 hours a week to study. I will study each subject for 2 hours. My schedule is: Monday – Math, Tuesday – Science, Wednesday – History, Thursday – English, Friday – Computing*



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.

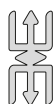
Seek clarification on learner's responses where necessary, etc.

Refer to Teacher and Assessment Manual and Toolkit pages 114 – 116 for more information on how to administer the assessment mode.

- 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.

Reflect on the effectiveness of the feedback and refine their strategies for future assessments, 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 and 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.

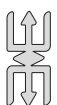
Learning Outcome

Review your learning plan for week 18 and 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/marketing 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.

Section A – Multiple Choice Questions

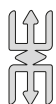
Answer all questions

1. Which data structure follows the Last In, First Out (LIFO) principle?
 - A. Binary Tree
 - B. Linked List
 - C. Queue
 - D. Stack
2. A _____ is a data structure that stores elements in a linear order and allows access to elements by their position

Section B – Essay Type Question

1.
 - a) What is a data structure
 - b) Differentiate between Arrays and Linked Lists
 - c) Mention one advantage and disadvantage each for Arrays and Lists, etc.

Refer to **Appendix F** for the Table of Specification.



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.

Q1 ---Answer is D (1 mark)

Q2 ---Answer is List (2 marks)

Essay type

A data structure is a way of organising and storing data so that it can be accessed and modified efficiently

Scoring criteria

1. a)

- i. A data structure is a method of organising data to make it easy to access and modify. Common types include arrays, linked lists, stacks, queues, and trees. Arrays store items in a fixed order, linked lists connect items with pointers, stacks follow last in first out, queues follow first in first out, and trees organise data hierarchically – **5 marks**
- ii. A data structure is a way to organise data. There are different types like arrays, stacks, and queues. Arrays hold items in order, stacks use last in first out, and queues use first in first out. They help us find and use data quickly – **3 marks**

b)

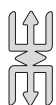
- i. **Differences between Arrays and Linked lists**

Arrays: Contiguous block of memory – **2 marks**

Linked Lists: Elements can be stored anywhere in memory, with each element pointing to the next – **2 marks**

Arrays: Inserting or deleting an element requires shifting other elements, which can be slow – **2 marks**

Linked Lists: Inserting or deleting elements is more efficient as it involves changing pointers – **2 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.

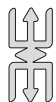
- a) Provide clear instructions and resources needed for the tasks
- b) Provide time allocation for the completion of the essay and assign marks to each of the questions (Give additional time for learners with SEN), etc.

Refer to Teacher Assessment Manual and Toolkit pages 94–97 for more information on how to administer the assessment mode.

- 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.

- a) *Evaluate the completed examination using clear and consistent grading criteria*
- b) *Analyse student performance to identify common strengths and areas for improvement in the end of semester mid-examination, 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 F: Table of Specification for Mid-Semester Examination

Weeks	Focal Area(s)	Type of Questions	DoK Levels				Total
			1	2	3	4	
13	Explain in detail the concepts of data structures and their importance in organising and manipulating data efficiently	Multiple Choice	1	1	-	-	2
		Essay	-	1	-	-	1
14	Explain in detail the concepts of data structures and their importance in organising and manipulating data efficiently	Multiple Choice	1	1	-	-	2
		Fill in	-	1	-	-	1
15	Differentiate between the types of data structures	Multiple Choice	1	1	-	-	2
		Essay	-	1	-	-	1
16	Differentiate between the types of data structures	Multiple Choice	-	1	1	-	2
		Fill in	-	-	1	-	1
17	Explain and use Algorithms to solve a real life problem, Identify the stages in the program development cycle.	Multiple Choice	1	1	1	-	3
		Essay	-	1		-	1
		Fill in	1	1			2
	Total		5	10	3	-	18

PLC SESSION 19: Algorithms into Programs

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 and 3d–3j).

2. Review of Learning Plans (60 minutes)

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

Purpose

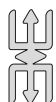
The purpose of the session is to review the learning plan for week 19 by aligning the learning plan with Learner Material and appropriate assessment strategies.

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 and 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.

The Impact of Problem Analysis on Algorithm Development in Software Development Life Cycle

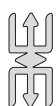
Scenario

You are part of a software development team tasked with creating a new mobile application that helps users manage their daily tasks and reminders. During the initial stages of the SDLC, your team engages in a thorough Problem Analysis phase to understand the user's needs, the application's required functionalities, and potential constraints such as limited processing power and storage on mobile devices

Refer to Teacher Manual week 19 and Learner Material for more examples on the assessment task.

Hint

Remind learners about the submission of their individual project work in the 20th 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 3k, 3p).

E.g.

Scoring criteria

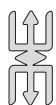
- a) *Understanding of Problem Analysis*
 - i. *The learner provides a thorough explanation of the Problem Analysis phase, clearly identifying key user needs, functionalities, and constraints. They mention specific details such as mobile device limitations and user preferences – 10 marks*
 - ii. *The learner explains the Problem Analysis phase but may miss some key aspects or provide a less detailed analysis – 5 marks*
- b) *Linking Problem Analysis to Algorithm Development*
 - i. *The learner clearly explains how the findings from Problem Analysis directly influence the decisions made in Algorithm Development, such as simplifying*

algorithms to accommodate limited processing power or prioritising essential features – 10 marks

- ii. *The learner provides an explanation but may miss some key links between Problem Analysis and Algorithm Development or give a less detailed account – 5 marks*

c) *Application of Knowledge*

- i. *The learner proposes specific strategies or decisions in the Algorithm Development stage that directly address the constraints identified in the Problem Analysis, such as optimising algorithms for performance on low-power devices – 10 marks*
- ii. *The learner proposes strategies but may not fully address all constraints or provide a less detailed application – 5 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.

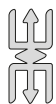
Ask open-ended questions on the issue of discussion to clarify any Misconception, etc.

Refer to Teacher Assessment Manual and Toolkit pages 31–34 for more information on how to administer the assessment mode.

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.

Summarise the main points and lessons learned from the case study and link them to the learning outcomes and content, 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:
 - d) provide constructive feedback to learners and record their assessment scores in the required format and document where appropriate (NTS 3l–3n).
 - e) read PLC Session 20 and related Learner Material (NTS 3a).
 - f) bring along your Teacher Manual, PLC Handbook and learning plan on week 20 in preparation for the next session (NTS 3a).

PLC SESSION 20 : Implementing Algorithms into Programs.

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 and 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.

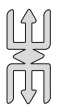
Learning Outcome

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 and 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 **class exercise** (NTS 3k, 3p).

E.g.

Explain what happens when the `swap` function is called with two arguments, etc.

Refer to Teacher Manual week 20 and Learner Material for more examples on the assessment task.

Hint

Submission of Individual project work. Teachers are reminded to score and upload the marks.



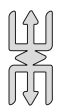
Note

- 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 and 3p).

E.g.

- a) *When the **swap** function is called, it takes two arguments and exchanges their values. This is done by storing the value of the first argument in a temporary variable, assigning the value of the second argument to the first, and then assigning the value of the temporary variable to the second argument – 10 marks*
- b) *The **swap** function exchanges the values of the two arguments, etc. – 5 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.

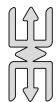
Walk around the classroom and observe learners as they work on the exercise, etc.

Refer to Teacher Assessment Manual and Toolkit pages 80 – 83 for more information on how to administer the assessment mode.

- 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 learners' performance for discussion on the assessment, 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: Describe the Key Components of a Web Page

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 and 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.

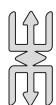
Learning Outcome

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 and 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).

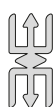
E.g.

Learners in their mixed ability groups debate on the topic: In the development of modern web applications, the roles of front-end and back-end development are equally crucial. Do you agree or disagree with this statement? Justify your position by discussing the distinct responsibilities and impacts of front-end and back-end development, etc.

Refer to Teacher Manual week 21 and Learner Material for more examples on the assessment task.

Hint

Remind learners about the submission of their individual portfolio in the 22nd Week.



Note

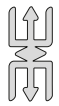
- i. *The assessment tasks/items may cover levels 1 to 4 where appropriate to ensure that assessment is differentiated for all.*
- ii. *The selected activities should be included in the 'Assessment DoK aligned to Curriculum and TM' section below teacher/learner activities of the learning plan.*

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 3k, 3p).

E.g.

Criteria	Excellent (5)	Good (3)	Satisfactory (2)	Needs Improvement (1)
Understanding of Roles	<i>Demonstrates a thorough understanding of both front-end and back-end roles with detailed explanations and examples.</i>	<i>Shows a good understanding of front-end and back-end roles with clear explanations.</i>	<i>Provides a basic understanding of front-end and back-end roles with some explanations</i>	<i>Shows limited understanding of front-end and back-end roles with minimal explanation.</i>
Justification of Arguments	<i>Provides strong, well-reasoned arguments with specific examples supporting the equality of both roles.</i>	<i>Presents clear arguments with relevant examples but may lack depth in justification.</i>	<i>Provides basic arguments with some examples, but lacks thorough reasoning</i>	<i>Arguments are weak or poorly justified with few or no examples.</i>

Criteria	Excellent (5)	Good (3)	Satisfactory (2)	Needs Improvement (1)
Clarity and Organisation	Presents arguments in a well-organised and clear manner, making it easy to follow.	Arguments are organised and clear, though some points may be less detailed.	Arguments are somewhat organised, but clarity and detail are inconsistent	Arguments are poorly organised or unclear, making it difficult to follow.
Engagement and Interaction	Engage effectively with opposing views, providing insightful responses and counterarguments.	Engages with opposing views and provides relevant responses but may lack depth.	Engages minimally with opposing views and provides basic responses	Little to no engagement with opposing views, and responses are minimal or irrelevant.

**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.

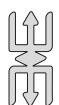
- a) Select appropriate motion/ topic, ensuring it is relevant to the learning outcome
- b) Hosting the debate, etc.

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

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 (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), 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:
 - 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 22 and related Learner Material (NTS 3a).
 - c) bring along your Teacher Manual, PLC Handbook and learning plan on week 22 in preparation for the next session (NTS 3a).

PLC SESSION 22: Key Components of a Web Page

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 and 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.

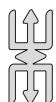
Learning Outcome

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 and 3a–3j).



Note

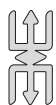
The selected activities should be included in the teacher/learner activity section of the learning plan.

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 **multiple choice questions** (NTS 3k, 3p).

E.g.

Learners in mixed-ability groups answer the following multiple-choice questions:

1. Which component is typically found at the top of a web page and often includes the website's logo and main navigation.....
 - A. Content Section
 - B. Footer
 - C. Header
 - D. Sidebar
2. What is the main purpose of the footer on a web page.....
 - A. To display contact information, privacy policies, and copyright information
 - B. To display the main content of the page
 - C. To provide a navigation menu
 - D. To show images and videos



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.

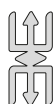
2.4 Discuss (and agree as a subject group) how you will develop the marking scheme/ rubrics for scoring the assessment task(s)/item(s) for the week's recommended assessment (NTS 3k, 3p).

E.g.

Q1 answer is C

Q2 answer is A

1 mark for each correct answer



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.

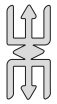
Administer constructed MCQs in a controlled environment to prevent cheating, etc.

Refer to Teacher Assessment Manual and Toolkit pages 83 – 86 for more information on how to administer the assessment mode.

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.

Score test items using the scoring rubrics and provide constructive feedback to learners on each question, 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 22 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 23 and related Learner Material (NTS 3a).
- bring along your Teacher Manual, PLC Handbook and learning plan on week 23 in preparation for the next session (NTS 3a).

PLC SESSION 23: Web Design

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 and 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.

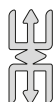
Learning Outcome

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 and 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).

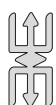
E.g.

Learners in their mixed-ability groupings write an essay on why it's important to define purpose and goal for developing a website, etc.

Refer to Teacher Manual week 23 and Learner Material for more examples on the assessment task.

Hint

Teachers meet as a subject group to prepare for the end of second semester examination.



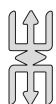
Note

- 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 and 3p).

E.g.

- a) *The purpose of a website is its reason for existence, like providing information or selling products. The goal is what the website wants to achieve, such as increasing sales or educating users. Defining these helps in creating a website that meets user needs, guides the design and functionality, and ensures the website achieves its objectives. For example, an e-commerce site with the goal of increasing sales will focus on user-friendly navigation and clear product information – **10 marks***
- b) *The purpose of a website is its main reason for existence, and the goal is what it aims to achieve. It is important to define them to know what the website is for and what it should do – **5 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.

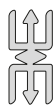
Give guidelines to the learner during the writing task, etc.

Refer to Teacher Assessment Manual and Toolkit pages 94–97 for more information on how to administer the assessment mode.

- 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 your work with peers and seek peer support, 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 23 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 24 and related Learner Material (NTS 3a).
 - 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 and 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 by aligning the learning plan with Learner Material and appropriate assessment strategies.

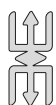
Learning Outcome

Review your learning plan for week 24 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 and 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.

Section A – Multiple Choice Questions

Answer all questions

1. What is the primary function of a queue in computer science.....?
 - A. Storing data permanently in a database
 - B. Storing data temporarily in a FIFO (First In, First Out) order
 - C. Storing data temporarily in a LIFO (Last In, First Out) order
 - D. Storing data temporarily in a stack
2. In the context of a queue, what does the term “enqueue” mean.....?
 - A. Adding an item to the front of the queue
 - B. Adding an item to the rear of the queue
 - C. Removing an item from the front of the queue
 - D. Removing an item from the rear of the queue

Section B – Essay Type Questions

1. a) What is a Web page
- b) Describe the following key components of a web page
 - i. headings
 - ii. menus
 - iii. links
 - iv. text
 - v. Images
- c) Discuss the role of HTML, CSS, and JavaScript in web development

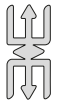
Section C – Test of Practicals

1. Imagine you are organising a small event with 10 friends, and you need to determine how many pizzas to order. Each person can eat about 3 slices, and each pizza has 8 slices. Use an algorithm to find out how many pizzas you need to order

Hint

Refer to **Appendix G** at the end of session 24 for table of specification.



**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.

Section A – Multiple Choice Questions

1. B --- Answer (1 mark)
2. D -- Answer (1 mark)

Section B – Essay

A web page is a document that is accessible on the internet and viewed using a web browser. It is made up of various elements that define its content, appearance, and behaviour

Headings: Structural elements that organise content into sections; typically denoted by `<h1>` to `<h6>` tags in HTML

Menus: Navigational elements that allow users to move between different sections or pages; can be horizontal or vertical

Links: Clickable elements that direct users to other pages or resources; created using `<a>` tags in HTML

Text: Main content of the web page; can include paragraphs, lists, and other textual information

Images: Visual elements embedded in the web page; added using `<img>` tags in HTML

Section C – Test of Practical

Input: Number of friends = 10, Slices per person = 3, Slices per pizza = 8

Calculate Total Slices Needed: Total slices = Number of friends * Slices per person.

Calculate Pizzas Needed: Pizzas needed = Total slices / Slices per pizza

Round Up: Since you can't order a fraction of a pizza, round up to the nearest whole number

1. a)
 - i. *A web page is a document on the internet that people can view using a web browser. It is created with HTML to structure the content, CSS to style it, and JavaScript to add interactivity. For instance, an e-commerce web page has product listings (HTML), styled nicely (CSS), and allows users to add items to their cart (JavaScript) – 5 marks*

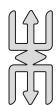
- ii. A web page is what you see on the internet. It is made with HTML, which shows the content. CSS makes it look nice, and JavaScript makes it do things. For example, a web page can be a blog or a shop – **3 marks**

b)

- i. Headings are used to organise content and range from `<h1>` to `<h6>`. Menus are used for navigation and can be horizontal or vertical. Links are clickable elements made with `<a>` tags that take you to other pages. Text is the main written content of the page. Images are added using `<img>` tags and provide visual content – **10 marks**
- ii. Headings are titles. Menus help you navigate. Links take you to other pages. Text is the main content. Images are pictures on the page – **5 marks**

Scoring criteria – test of practical

- i. We need to order pizzas for 10 friends. Each person eats 3 slices, so we need $10 * 3 = 30$ slices in total. Each pizza has 8 slices, so we divide 30 by 8, which is 3.75. We can't order part of a pizza, so we round up and order 4 pizzas – **10 marks**
- ii. To find out how many pizzas we need, first we find out how many slices everyone eats. There are 10 friends and each eats 3 slices, so we need 30 slices. Each pizza has 8 slices, so 30 divided by 8 is about 3.75. We round up to 4 pizzas – **5 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.

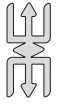
- a) Provide clear instructions and resources needed for the tasks
- b) Provide time allocation for the completion of the essay and assign marks to each of the questions (Give additional time for learners with SEN)
- c) Control the environment to prevent cheating, etc.

Refer to Teacher Assessment Manual and Toolkit pages 94–97 for more information on how to administer the assessment mode.

- 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.

- c) *Evaluate the completed examination using clear and consistent grading criteria*
- d) *Analyse student performance to identify common strengths and areas for improvement in the end of second semester examination, 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	Explain in detail the concepts of data structures and their importance in organising and manipulating data efficiently	Multiple Choice	2	2	1	-	5
		Essay	-	1	-	-	1
14	Explain in detail the concepts of data structures and their importance in organising and manipulating data efficiently	Multiple Choice	2	1	1	-	4
		Practical	-	1	-	-	1
15	Differentiate between the types of data structures	Multiple Choice	2	2	-	-	4
16	Differentiate between the types of data structures	Multiple Choice	1	2	1	-	4
		Practical		1			1
17	Explain and use Algorithms to solve a real life problem, Identify the stages in the program development cycle.	Multiple Choice	2	1	1	-	4
18	Explain and use Algorithms to solve a real life problem, Identify the stages in the program development cycle.	Multiple Choice	2	1			3
		Practical		1			1
19	Implement Algorithms into programs using flowcharts, pseudocode and programming languages like Python etc	Multiple Choice	2	1	1		4
		Practical					
20	Implement Algorithms into programs using flowcharts, pseudocode and programming languages like Python etc	Multiple Choice	1	2	1		4
		Essay		1			1
21	Identify and describe the key components of a web page, including headings, menus, links, text, images and other relevant elements	Multiple Choice	1	1			2
		Essay		1			1
22	Identify and describe the key components of a web page, including headings, menus, links, text, images and other relevant elements	Multiple Choice		1			1
23	Draw and explain 2 web outline plans showing the wireframes	Multiple Choice	1	2	1		4
		Essay			1		1
	Total		16	22	8	-	46



Appendices

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)

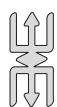
Summative Assessment

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, 21st 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 21st 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 21st 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 st Century Skills & Competencies	GESI & SEL	National Values
• Critical Thinking and Problem Solving • Creativity • Innovation • Collaboration • Communication • Global and Local Citizenship • Learning for life • Leadership • Analytic skills • Digital Literacy	• Gender Equality and Social Inclusion • Self-Awareness • Self-Management • Social Awareness • Relationship Skills • Responsible Decision Making • Tolerance	• Respect • Truth and Integrity • Tolerance • Respect • Equity • Communalism • Appreciation • Stewardship • Time Management

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 st Century Skills & Competencies	Assessment Strategies
Critical Thinking, Problem Solving, Analytical skills	• Debates • Analysis of Case Studies based on learners' environment. • Research & Project work. • Objective and Essay type questions/items
Creativity and Innovation	• Individual and group projects • Analysis of Case Studies based on learners' environment. • Design & product creation to solve societal problems
Communication and Collaboration	• Debates • Group projects. • Presentations • Drama & Role play
Global and Local Citizenship	• Research & Project work. • Analysis of Case Studies based on cultural and global issues
Leadership and learning for life	• Individual and Group projects • Presentations
Digital Literacy	• Research & Project work. • Presentations using ICT tools. • individual and group projects

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.

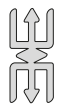
In providing feedback, use the sandwich method (CCC), which starts with a positive aspect of the work (**compliment**), followed by constructive criticism (**correction**), and concludes with another positive note (**compliment**). To set the stage for effective feedback, clearly communicate the learning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

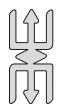
Case Study As An Assessment Strategy

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. In form 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,
- iii. solutions, or recommendations.
- iv. Ask open-ended questions on the issue of discussion to clarify any misconception.
- v. 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

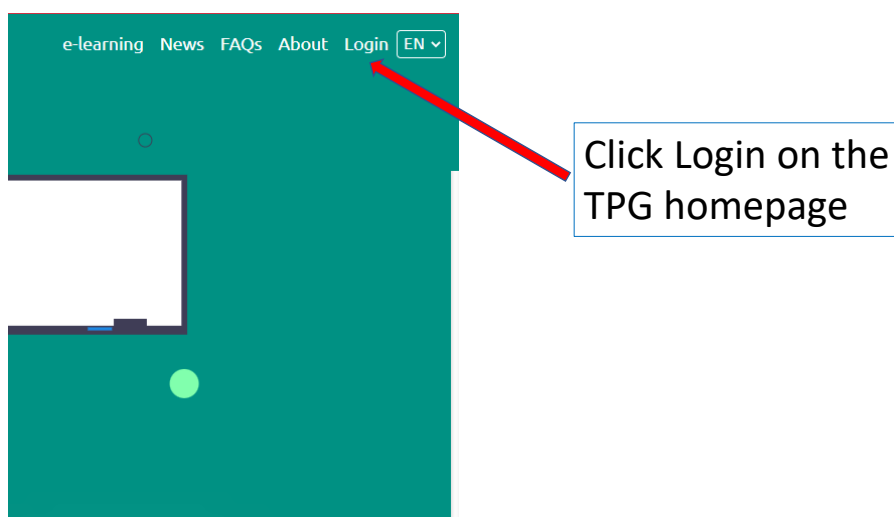
.....

24. Additional Notes (on teacher's actions, the flow of activities, etc.)

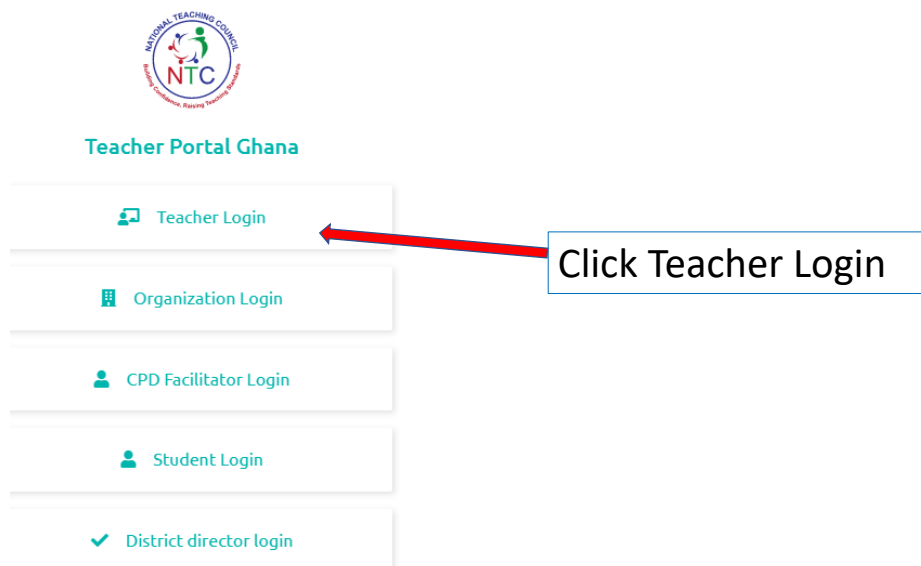
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Appendix 4: How to Check CPD Points and Training Records on Teacher Portal Ghana

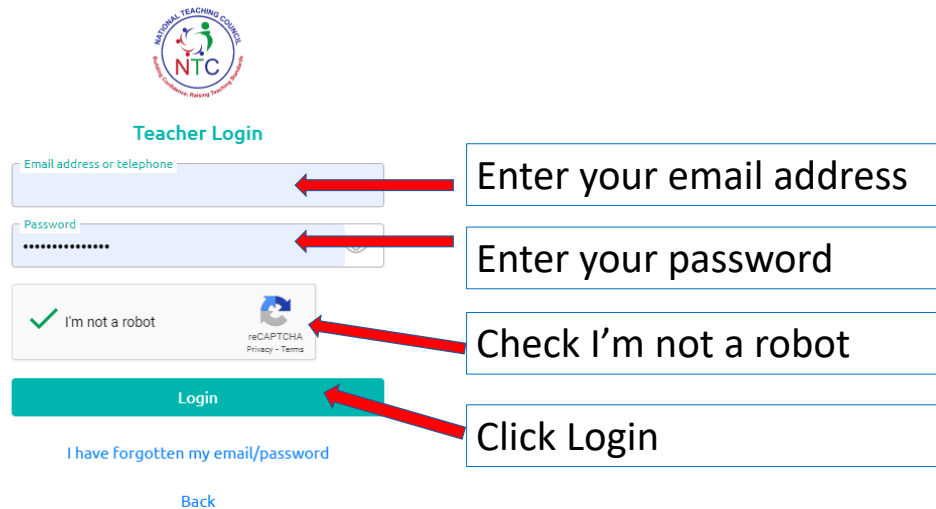
1. Visit tpg.ntc.gov.gh and click Login



2. On the Login page, click Teacher Login



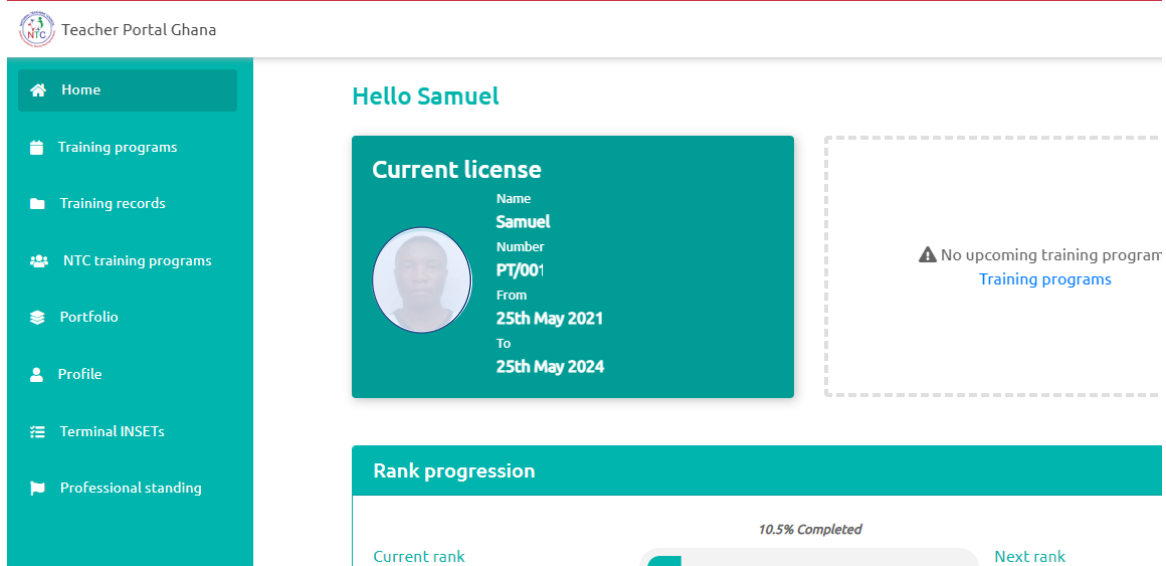
3. On the **Teacher Login** page enter your email address and password and then click **Login**



The image shows the Teacher Login page with the following elements and annotations:

- Teacher Login** (Page Title)
- Email address or telephone** (Input field) → **Enter your email address**
- Password** (Input field) → **Enter your password**
- I'm not a robot** (Captcha) → **Check I'm not a robot**
- Login** (Button) → **Click Login**
- [I have forgotten my email/password](#)
- [Back](#)

4. After a successful login you will get access to your **TPG account** (Check image below)



The image shows the Teacher Portal Ghana dashboard for a user named Samuel. The dashboard includes the following sections:

- Header:** Teacher Portal Ghana
- Left Sidebar:**
 - Home
 - Training programs
 - Training records
 - NTC training programs
 - Portfolio
 - Profile
 - Terminal INSETs
 - Professional standing
- Main Content Area:**
 - Hello Samuel**
 - Current license**
 - Name: Samuel
 - Number: PTJ/001
 - From: 25th May 2021
 - To: 25th May 2024
 - Rank progression**
 - Current rank: [Progress bar showing 10.5% Completed]
 - Next rank
 - No upcoming training program** (with link to [Training programs](#))

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)

The screenshot shows the 'Teacher Portal Ghana' interface. On the left is a teal side menu with options: Home, Training programs, Training records, NTC training programs, Portfolio, Profile, Terminal INSETs, and Professional standing. A red arrow points from the 'Training records' option to the main content area. The main content area is titled 'Training records' and shows 'Records for training programs registered and/or attended' with 'Total points: 1.8988'. It lists three programs: 'Sensitization on Education Policies' (Marked as absent), 'Differentiated Learning' (Processed, Credits: 1.32), and 'Advanced Mobile Learning with Multimedia (AMLM)' (Processed, Credits: 0.5788). A red bracket on the right groups these programs under the label 'List of training programs'. A red arrow points from the 'Click to view training records' label to the 'Training records' option in the side menu.

Teacher Portal Ghana

Home

Training programs

Training records

NTC training programs

Portfolio

Profile

Terminal INSETs

Professional standing

Click to view training records

Training records

Records for training programs registered and/or attended

Total points: 1.8988

Sensitization on Education Policies

Marked as absent

Differentiated Learning

Processed

Credits: 1.32

Advanced Mobile Learning with Multimedia (AMLM)

Processed

Credits: 0.5788

List of training programs

List of Contributors

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4.		Dr Mohammed Almu Mahaman	University for Development Studies
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7.		Eng. Dr. Prosper Mensah	CSIR – Forestry Research Institute of Ghana
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14.	Agricultural Science	Issah Abubakari	Half-Assini SHS
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27.	Mathematics	Collins Kofi Annan	Mando Senior High School
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49.		Edward Mills Dadson	University for Education, Winneba
50.		Eric Abban	Mt. Mary College of Education
51.		Jennifer Fafa Adzraku	Université Libre de Bruxelles

