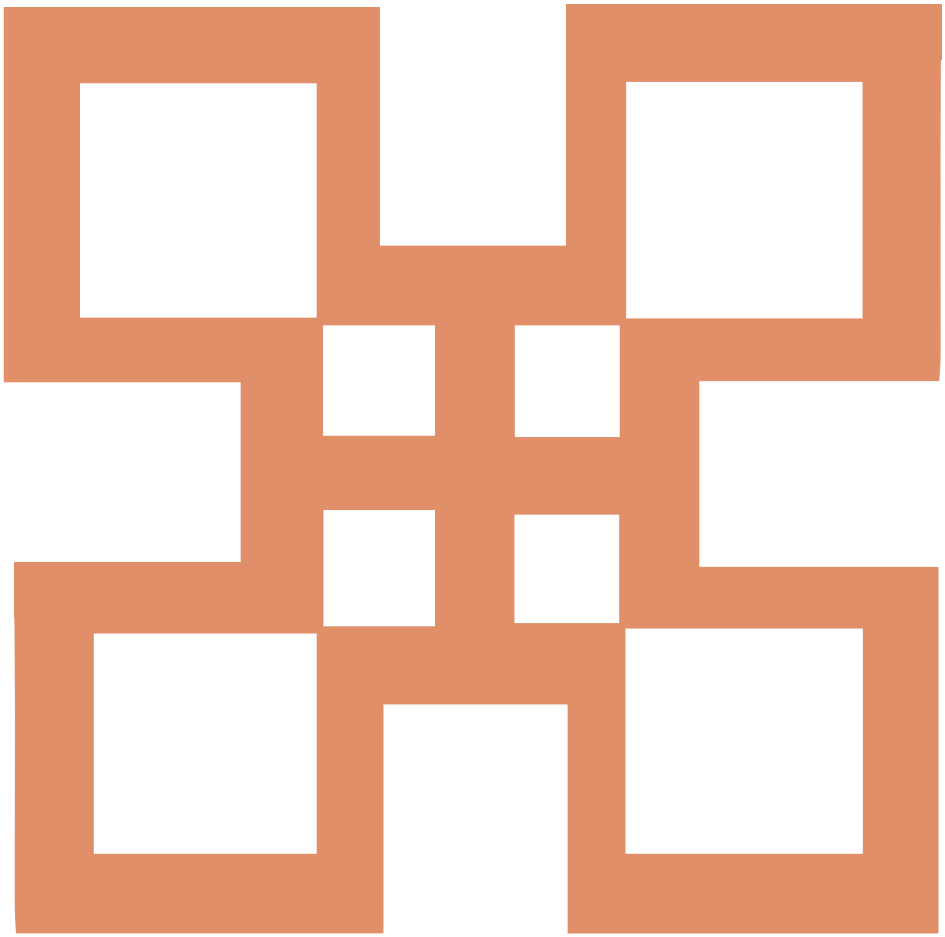
Secondary Education Professional Development Programme

Professional Learning Community (PLC) Handbook

Introduction to the Senior High School (SHS), Senior High Technical School (SHTS) and Science, Technology, Engineering and Mathematics (STEM) Curriculum

HANDBOOK FOR **TEACHERS**



Wisdom, Knowledge and Prudence

Ghana Education Service (GES)

NaCCA
NATIONAL COUNCIL FOR CURRICULUM & ASSESSMENT

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GOVERNMENT OF GHANA

PROFESSIONAL LEARNING COMMUNITY (PLC) HANDBOOK

Introduction to the Senior High School (SHS), Senior High Technical School (SHTS) and Science, Technology, Engineering and Mathematics (STEM) Curriculum

Teacher Version

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Foreword

The aim of teacher professional development activities is to ensure that teachers at all levels of education can improve their work through learning while teaching their classes. The National Council for Curriculum and Assessment (NaCCA) has, in collaboration with teachers from Senior High Schools, Senior High Technical Schools and Science Technical Engineering and Mathematics Schools, Colleges of Education and Universities developed this Professional Learning Community (PLC) Handbook. The Handbook is intended to assist heads and teachers of Secondary Schools to run weekly PLC sessions in schools. These PLC sessions are dedicated periods in the school's weekly schedule where all teachers come together and work collaboratively to improve teaching and learning.

The sessions are designed to support professionalising teaching by providing opportunities for teachers to develop communities of practice where they interact to share ideas with the view to improving their teaching and enhancing learning outcomes in their schools. The sessions provide examples that promote teachers' understanding of gender equality and social inclusion and social emotional learning responsiveness and how this understanding can support learning. They also integrate differentiation and 21st century skills in lesson planning and delivery.

This PLC handbook focuses on the introduction of the Senior High School (SHS)/Senior High Technical School (SHTS)/Science, Technology, Engineering and Mathematics (STEM) curriculum and covers the following topics:

- Overview of the curriculum (Front Matter)
- Contextual issues
- Essential features of the curriculum
- Structure and content of the curriculum of the standards-based curriculum
- How the curriculum was developed and validated
- Transitioning from the current SHS objective-based curriculum to the standards-based curriculum
- Pedagogy 1: Talk for learning and enquiry-based approaches
- Pedagogy 2: Collaborative and experiential learning approaches
- Assessment 1: Assessment process
- Assessment 2: Assessment strategies
- Teaching and learning resources
- Learning planner

The PLC sessions are about introducing teachers to the SHS, SHTS and STEM curriculum before they begin to teach the curriculum in the 2024/2025 academic year. It is our hope and expectation that this PLC Handbook will help improve teacher performance as well as the learning outcomes and life chances for all secondary school students.

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Professional Learning Community (PLC) Handbook on the Introduction to the Senior High School (SHS), Senior High Technical School (SHTS) and Science, Technology, Engineering and Mathematics (STEM) Curriculum

Teacher Version

Background to the PLC Sessions in this Handbook.

This PLC handbook focuses on the introduction of the Senior High School (SHS)/Senior High Technical School (SHTS)/Science, Technology, Engineering and Mathematics (STEM) curriculum. The vision for the curriculum is to ensure the nation has a secondary education system which enables all Ghanaian children to acquire the 21st Century skills, competencies, knowledge, values and attitudes required to be responsible citizens, ready for the world of work, further studies and adult life.

There are twelve weekly PLC Sessions designed to introduce teachers to the curriculum and prepare them to teach subjects in the secondary school curriculum to the National Teachers' Standards and the content standards in the curriculum. The Sessions are not subject specific and can be adapted by teachers of all subjects to suit their professional needs.

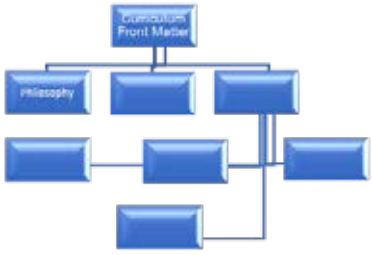
Features of the PLC Sessions.

- The main resources for the weekly teacher PLC Sessions are the Teacher PLC Handbook and the PLC Coordinator Handbook.
- Both versions are written to provide information to guide the twelve weekly PLC Sessions that are linked directly to the Senior High School/Senior High Technical School/Science, Technology, Engineering and Mathematics curriculum.
- The PLC Coordinator Handbook have prompts for leading the PLC Sessions.
- The teacher PLC Handbook contains activities for teachers and guidance for what they will do during the PLC Sessions.
- The weekly PD Sessions are of an hour and a half duration. However, some of the Sessions may take longer than an hour and a half and may be completed in two PLC meetings.
- It is expected that schools will take up to **eighteen (18)** weeks to complete the twelve (12) PLC Sessions so that participants will not be tempted to rush through the Sessions with the view to completing them in twelve (12) weeks.

PLC Session 1: Overview of the Curriculum (*Front Matter*)

The sections below provide the frame for what is to be done in the session.	**Guidance Notes on Teacher Activity during the PLC Session.** *What teachers will do during each stage of the session.*	**Time in session**
1. Introduction to the PLC Handbook and the SHS/SHTS/STEM curriculum	1.1. Discuss what changes you would like to see in a new curriculum to enhance what you currently work with. *E.g.* *Providing opportunities for teachers to use appropriate pedagogies and assessment methods that promote critical thinking.* 1.2. Read the introduction to the Handbook. **Introduction to the Handbook:** The PLC handbook is designed to improve quality and relevance of teaching and learning through experiential learning strategies which incorporate Gender Equality and Social Inclusion (GESI), Social and Emotional Learning (SEL), Information and Communication Technology (ICT), Differentiation and 21st Century Skills and competencies. This Handbook is to equip teachers with the knowledge, understanding and skills needed for effective implementation of the new Senior High School (SHS)/Senior Technical High School (SHTS)/ Science, Technology, Engineering and Mathematics (STEM) curriculum. The curriculum is supporting Ghana to achieve the Goal 4 of the Sustainable Development Goals for 2030, which is "to ensure inclusive and equitable quality education and promote life-long learning opportunities for all". This document covers several cross-cutting issues in teaching and learning and provides guidelines for teachers to enable them to embed these cross-cutting issues in their work. This Handbook is essential for all secondary teachers as it will enable them to meet some of their professional development needs. **Purpose of the Handbook** The Handbook aims at assisting teachers to know how to use the curriculum in terms of planning, teaching and assessing lessons in ways that will improve the learning outcomes of learners. The strategies introduced in the Handbook will help	20 mins

	teachers to equip learners with 21st-century transferable skills and competencies that will develop in learners a sense of equity, inclusion, collaboration, innovation and accountability to make them responsible citizens who are always guided by integrity. The strategies should also help learners to improve their self-awareness and build self-esteem and leadership skills. **The Handbook covers the following topics:** 1. Overview of the curriculum – front matter 2. Contextual issues 3. Essential features of the curriculum 4. Structure and content of the curriculum 5. How the curriculum was developed and validated 6. Transitioning from the current SHS objective-based curriculum to the Secondary Education standards-based curriculum 7. Pedagogy 1: Talk for learning and enquiry-based approaches 8. Pedagogy 2: Collaborative and experiential learning approaches 9. Assessment 1: Assessment processes 10. Assessment 2: Assessment strategies 11. Teaching and Learning Resources 12. Learning Planner	
2. Introduction to the session and planning for teaching, learning and assessment activities which promote character values, GESI, SEL, ICT and 21st century skills and competencies	2.1 Read the Purpose, Learning Outcomes (LOs) and Learning Indicators (LIs) for the session (NTS 2b, 3a). **Purpose of the session** The purpose of this session is to give a summary of the key aspects of SHS/SHTS/ STEM curriculum. These aspects and related concepts will be dealt with in greater detail in subsequent sessions and are only highlighted in this session to underscore the fact that they guide the entire curriculum. **Note:** *LO: This is the expected knowledge, understanding, skills, competencies etc. to be acquired at the end of the lesson.* *LI: This is the practical evidence that learning has taken place. It may include verbal responses, practical activities.* LO 1: Demonstrate knowledge and understanding of the overview of the SHS/SHTS/STEM curriculum (NTS 2a, 2c). LI 1.1 Explain the various sections of the front matter of the SHS/SHTS/STEM curriculum. LI 1.2 Distinguish between the philosophy and the vision of the	30 mins

	SHS/SHTS/STEM curriculum. LO 2: Demonstrate knowledge and understanding of the assessment strategies in the SHS/SHTS/STEM curriculum and application of the 21st century skills and competencies (NTS 2c, 3k, 3i, 3n and 3p). LI 2.1 Discuss the levels of the Depth of Knowledge (DoK) LI 2.2 Discuss at least four (4) examples of 21st century skills and competencies in the SHS/SHTS/STEM curriculum. 2.2 Identify the various sections of the front matter **(**NTS 2c, 3k). *E.g.* *Philosophy, etc.* 2.3 Design a concept map and use it to explain the sections of the front matter of the SHS/SHTS/STEM curriculum (NTS 2b, 2c and 3k) *Note:* ***A concept map is a*** *diagram that shows suggested relationships between concepts. A concept map provides an opportunity for teachers to draw links between concepts and the connections they want learners to know. The act of constructing the map is meant to help both to increase the teacher's understanding of the content under consideration and help to draw their attention to any gaps or misunderstandings in the connections.* *E.g.*  *Philosophy: Developing every learner to their fullest potential through skilled teachers creating the right environment and effectively supporting learners to benefit from the subjects offered at the secondary education level. Every learner needs to be equipped with skills and competencies of interest to further their education and proceed to the world of work and adult life.*	

	2.4 In your groups, identify relationships between at least two (2) of the concepts and skills introduced in the front matter of the SHS/SHTS/STEM curriculum (NTS 2b, 2c). *E.g.* *Philosophy and vision: Philosophy is a means by which the vision can be achieved. In both philosophy and vision, learners are equipped with skills, etc.* 2.5 Using thought shower, identify levels 2, 3, and 4 of the DoK (NTS 2b, 2c and 3k). *E.g.* *Level 1- Recall, etc.* 2.6 Research and discuss in groups, levels 1, 2, 3 and 4 of the DoK which you will use in Activity 2.7 (NTS 2b, 2c, 3k). *E.g.* ***Level 1:** This is the first level of the depth of knowledge. It includes recall of facts, concepts, information, and procedures. This entails rote memorization and basic knowledge acquisition that makes higher-level tasks possible. It is a component of learning that does not require learners to go beyond stating information. Mastering Level 1 tasks builds a strong foundation for the other levels. Asking specific questions can launch activities, exercises and assessments that require recollection and reproduction, etc.* 2.7 Based on a given learning indicator from any subject (e.g., social studies) construct in your groups a sample task for each of the levels of DoK (NTS 2b, 2c and 3k). *E.g.* *A given indicator from social studies syllabus: identify factors that make the individual unique in the Ghanaian context and shape their development.* ***Level 1:** List at least three (3) factors that make the individual unique in the Ghanaian context, etc.* 2.8. Role-play an activity to portray at least two (2) of the 21st century skills (NTS 1a, 2c, 3e and 3k). *E.g.* Communication and collaboration, etc.	
3. Planning for teaching, learning and assessment	*Refer to the outline of a sample lesson plan (SHS Social Studies) for teaching concepts in the overview of the secondary education curriculum.*	30 mins

activities, making links with the Pre-Tertiary (standards-based) Curriculum and using Contextual issues and promoting character values, GESI, SEL, ICT and 21st century skills and differentiation	3.1 In groups, read and discuss the outline and use your findings to respond to Activities 3.2 – 3.6 (NTS 1a, 1b) *a)* ***Topic:*** *Individual identity and development* *b)* ***Sub-topic:*** *Self-Identity* *c)* ***Objectives:*** *By the end of the lesson, the learners will be able to:* *i). D*efine the following concepts • *Self* • *Self-Identity* • *Self-Concept* • *Capabilities* • *Personality* ii) Explain self and the individual in relation to their capacity. *iii) Discuss how one can develop their capabilities to achieve their ambition.* *d)* ***Teaching and Learning Resources (TLRs):*** *Videos on cultural practices, pictures on aspects of cultural practices, cultural regalia, phones/computer and projector.* *e)* ***Relevant Previous Knowledge (RPK):*** *Learners know about themselves in terms of their cultures, physical appearance, behaviours and abilities.* f) ***Introduction:*** *Using talk-for-learning learners to hold discussions about themselves after showing pictures and videos on cultural practices. Through discussion learners will know how each of them is different from others in terms of their physical nature as well as psychological nature and abilities.* *g)* ***Activities:*** *1. Learners in pairs use their phones to define the following concepts:* *i. Self* *ii. Self-identity* *iii. Self-concept* *iv. Self-esteem* *v. Self-confidence* *vi. Capabilities* *vii. Personality traits* *2. In mixed groupings (gender, experience, background, etc.) learners discuss how they can develop their capabilities.* *3. In onion groups circles, identify factors that challenge the development of their capabilities.*	

	g) Core points: **i)** ***Self*** *is the whole being of an individual taking into consideration the physical and psychological nature as well as abilities.* ***ii)*** ***Self-identity*** *implies the way an individual sees, knows, feels and understands himself or herself in relation to others.* ***iii)*** ***Self-concept*** *implies an individual's mental picture about himself or herself.* ***iv)*** ***Self-esteem*** *is a concept which has to do with the evaluation of one's own feeling about oneself.* ***v)*** ***Self-confidence*** *is the trust that the individual has in himself or herself which makes him or her confident of doing something very well.* ***vi)*** ***Personality traits*** *reflect people's characteristic patterns of thoughts, feelings and behaviours.* ***vii)*** ***Capabilities*** *refer to the skills, ability, aptitude and knowledge one has in relation to do a job given.* **h) Core competencies:** *i. Critical thinking and problem-solving skills* *ii. Communication and collaborative skills* *iii. ICT* ***i) Conclusion:*** *Ask learners to role-play the need to know themselves and how each of them is different from others in terms of their physical features as well as psychological attributes and abilities.* ***j) Evaluation:*** ***1.*** *How would you explain the following concepts* *a) Self-concept* *b) Self-identity* *2. Give 4 examples of personality traits.* *3. In what four (4) ways can an individual enhance their capabilities* ***4.*** *Discuss four (4) factors that hinder the development of capabilities of individuals.* ***k) Remarks:*** 3.2 Ask teachers to tease out the LOs and the LIs from the sample lesson plan (NTS 2b, 2c). *E.g.* *LO: Demonstrate knowledge and understanding of individual identity and development.*	

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LI 1.1 explain self and individual identity.
L1 1.2 discuss how one can develop their capabilities to achieve their ambition.

3.3 Identify in the sample lesson plan, activities that could promote ICT, GESI, 21st century skills, differentiation and SEL responsiveness (NTS 2e, 2f, 3c, 3d, 3f and 3g)
E.g.
ICT: The use of computers, projectors, videos, etc.

3.4. Use think-pair-share to compare and contrast the objective-based curriculum with the standards-based curriculum (NTS 2b, 2c).
E.g.
<table>
<tr><td></td><td>Objective-based curriculum</td><td>Standards-based curriculum</td></tr>
<tr><td></td><td>It is teacher-centered</td><td>It is learner-centered</td></tr>
</table>
3.5 State what you will do differently when developing a lesson plan to deliver the SHS/SHTS/STEM curriculum (NTS 3b, 3c).
E.g.
By integrating the 21st Century skills and competencies, etc.

3.6 Ask teachers how they feel about working with their colleagues to integrate 21st century skills and competencies into their lessons (NTS 2b, 2c and 3k).
E.g.
It makes me excited
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<td>4. Evaluation and review of session: Noting that teachers need to identify critical friends to observe lessons and report at next PLC meeting</td>
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4.1 In your group, reflect, write and share what you have learned with the larger group regarding the relevant pedagogies that can support the delivery of the secondary education curriculum (NTS 1a and 1b).

4.2 Where possible, identify a critical friend to observe your lesson in relation to PLC Session 1 and provide feedback to you (NTS 3n and 3o).

4.3 Read PLC Session 2 in preparation for the next session.
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PLC Session 2: Contextual Issues		
The sections below provide the frame for what is to be done in the session	**Guidance Notes on Teacher Activity during the PLC Session.** *What teachers will do during each stage of the session.*	**Time in session**
1. Introduction: Review of previous learning using ideas from the last PLC session	1.1 Share what you did differently based on PLC Session 1 on *the overview of the curriculum* that impacted students' learning. 1.2 Discuss and summarise in a single sentence why you think what a colleague did by way of application of what you learned in Session 1, on *the overview of the curriculum* supported students' learning or otherwise.	20 mins
2. Planning for teaching, learning and assessment activities, making links with the Pre-Tertiary (standards-based) Curriculum and using contextual issues in the SHS/SHTS/STEM curriculum	2.1 Ask a teacher to read the Purpose, Learning Outcomes (LOs) and Learning Indicators (LIs) for the session. **Purpose:** The purpose of the session is to help teachers to understand the contextual issues in the curriculum with a view to helping learners develop holistically and overcome the barriers to local and global participation in life-long learning and the world of work. LO 1: Analyse how the standards-based secondary education curriculum deals with barriers to learning (NTS 1g, 2c, 2f, 3c-3f, 3j and 3m). LI 1.1. Discuss barriers to learning in Ghanaian secondary education. LI 1.2. Discuss how the barriers in (LI 1.1) have been addressed in the standards-based curriculum. LI 1.3. Explain how differentiation can be used to address learning barriers. LO 2: Demonstrate understanding of how the integration of GESI and SEL principles and 21st-century skills and competencies serve as effective strategies in addressing contextual issues (NTS 2f, 3e, 3f, 3g and3j). LI 2.1. Discuss how GESI and SEL principles can be incorporated into learning. LI 2.2 Explain how 21st century skills and competencies can influence effective learning.	30 mins

	2.2 Ask teachers to discuss in mixed groupings (gender, background, ability, experience, etc.) barriers associated with learning (NTS 1g, 3c, 3f, and 3m). *E.g*. *Lack of opportunity to use critical thinking, etc.* 2.3 Read the contextual issues from the front matter of the SHS/SHTS/STEM curriculum and think-ink-pair-share within their groups, the various ways of addressing barriers to learning (NTS 1g, 2e). *E.g.* *Using appropriate pedagogies and authentic assessment that focuses on critical thinking, etc.* 2.4 Brainstorm various differentiated learning strategies and how these can be modelled in subjects to support learning (NTS 2a, 2b,2c, 2e, 2f and 3a). *E.g.* *Planning lessons based on learning styles and learning abilities, etc.* 2.5 Using the onion ring strategy, discuss how GESI and SEL principles can be incorporated into learning through teaching (NTS 2c, 2e, 2f, 3c and 3f). *E.g.* *Respect individuals' different beliefs, religion, cultures, etc.* 2.6 Work in groups and develop poster presentations on how 21st century skills and competencies can help learners achieve high learning outcomes and prepare them for the world of work (NTS 3e and 3j). *E.g.* *Being able to think outside the box (critical thinking) enables learners to solve complex problems, etc.* 2.7 Study the sample lesson plan below which provides opportunities for exploring aspects of the SHS/SHTS/STEM curriculum, and discuss the activities that follow (NTS 3a, 3f-3l).	
	Refer to the sample lesson plan below. *A sample lesson plan for teaching the concept of Reading comprehension from the MoE (2010) SHS Core English syllabus is provided below:* *a)* ***Topic:*** *Reading Comprehension*	

	*b) **Sub-topic:** Reading for understanding* *c) **Objectives:** By the end of the lesson, the learner will be able to:* *i. Read the three-paragraph passage.* *ii. State the general idea in each paragraph.* *d) **Teaching and Learning Resources (TLRs):** Picture and/or videos of Ghanaians dressed in traditional clothing in a durbar.* *e) **Relevant Previous Knowledge (RPK):** Learners see Ghanaians dressed for festivals such as Ghana's Independence Day celebration every 6th of March.* *f) **Introduction:** Ask learners to brainstorm and share common festivals and the appropriate dress codes for them. Ask learners to reflect on the just ended 66th independence celebration and the various outfits worn on that day.* *g) **Tasks/Activities:*** *i. Drill new words such as Batakari, Fugu, Kente, Durbar, 'Ahenema', etc., and demonstrate reading the passage for learners. Ask learners to read through the passage in small groups (taking into consideration mixed ability, gender, background, etc.) and individually, aloud and silently.* *ii. With the aid of the videos/pictures, initiate group discussions on why certain clothes are worn by people during festivals and national celebrations.* *iii. Group learners in pairs and ask them to read and explain the idea in each paragraph to their partners.* *iv. Provide positive feedback and support learners who still have difficulty reading.* ***h) Core points:*** *i. Ghanaians are recognised by their dressings, language, and food.* *ii. Ideas in paragraphs are:* • *Ghanaians are recognised in their traditional clothing for the occasions they attend.* • *Traditional clothing/ dressings are the ornaments, garments and jewellery we wear for activities or occasions.* • *On all Ghanaian big occasions, all Ghanaians show their rich culture through dressing.* ***i) Core competencies:*** *i. Communication and collaboration skills are enhanced when learners read and share ideas in groups.*	

	ii. Critical thinking and problem-solving skills are developed when learners analyse occasions/festivals with matching dressing. *iii. Digital literacy is enhanced through video use.* ***j) Conclusion:*** *Ask learners to mention what they have learned from the lesson and how they intend to apply it at home.* ***k) Evaluation:*** *i. Write down three ideas from the passage you have read (level 1 assessment).* ***ii.*** *Explain any two (2) activities that requires unique Ghanaian clothing (level 3 assessment).* ***l) Remarks:*** **READING COMPREHENSION PASSAGE** One way in which Ghanaians or Africans can be easily identified in any part of the world is the way and the type of traditional clothing or dresses they put on. Gone are the days when a typical Nigerian, for example, was easily recognised on any occasion such as a naming ceremony, a festival or a funeral by the type of dresses they wore. Today, the situation is completely different. Traditional clothing in Ghana refers to garments, jewellery and accessories that are rooted in the past. There are traditional clothing styles for both females and males in Ghana. Among the most popular Ghanaian traditional dresses and clothing styles are kente, the smock, batakari or fugu and kaba. In the past, in places like Ghana, a man could wear a full piece of cloth with a matching pair of local sandals called "Ahenema". For a woman, it was "slit" and "kaba" made by such textile factories as Ghana Textile Printing (GTP), Akosombo Textile Limited (ATL) or even our own traditional "Kente" or "Adinkra" cloth. There are others such as "Batakali" and "Fugu". These showcased the rich Ghanaian culture as we just witnessed during the 6th of March durbar.	
3. Modelling a teaching activity, making links with the Pre-Tertiary (standards-based) Curriculum and using contextual	3.1 Discuss in the sample lesson plan, activities that cover contextual issues in the SHS/SHTS/STEM curriculum and suggest other ways of covering same. (NTS 3a - 3c, 3e - 3g). *E.g.* *Using small groups in reading and discussing the context of the paragraphs.*	

issues of the SHS/SHTS/STEM curriculum	3.2 Model a teaching activity based on the sample lesson plan that can support all learners including those students who have not reached proficiency in English literacy taking into consideration contextual issues in the curriculum (NTS 1a, 1b, 2c and 3c). 3.3 Give feedback on the lesson modelled (NTS 1a, 2c).	
4. Evaluation and review of session: Noting that teachers need to identify critical friends to observe lessons and report at next session	4.1 Reflect, write and share what you have learned with the larger group regarding the use of the contextual issues in the curriculum in teaching and learning (NTS 1a, 1b). 4.2 Where possible, identify a critical friend to observe your lesson in relation to PLC Session 2 and provide feedback to them (NTS 3l, 3n and 3o). 4.3 Read PLC Session 3 in preparation for the next session. (NTS 1a)	10 mins

PLC Session 3: Essential Features of the Curriculum		
The sections below provide the frame for what is to be done in the session.	**Guidance Notes on Teacher Activity during the PLC Session.** *What teachers will do during each stage of the session*	**Time in session**
1.Introduction: Review of previous learning using ideas from the last PLC session	1.1 Share two things you did differently based on PLC Session 2 on *contextual issues,* which you think impacted learning. 1.2 Discuss and summarise in a single sentence why you think what your colleague did by way of application of lessons learned in PLC Session 2 on contextual issues*,* supported learning.	20 mins
2. Introduce the PLC Session and planning for teaching, learning and assessment activities, promoting character values, GESI, SEL, ICT and 21st century skills	2.1 Read the Purpose, Learning Outcomes (LOs) and Learning Indicators (LIs) for the session. **Purpose:** The purpose of this session is to introduce teachers to the essential features of the SHS/SHTS/STEM curriculum, which is built around the acquisition of the 21st century skills and competencies, GESI and SEL. It is flexible in its learning pathways at all levels. It also specifies the core learning areas such as science and technology, language and arts, humanities, technical and vocational, emphasising on STEM and agriculture. It also focuses on interactive pedagogies and valid assessments. LO 1: Demonstrate knowledge and understanding of the essential features including pathways and core learning areas in the SHS/SHTS/STEM curriculum (NTS 2a, 2b and 3o). LI. 1.1 Explain the linkage between the Junior High School and the Senior High School curricula. LI. 1.2 Discuss how the core learning areas in the SHS/SHTS/STEM curriculum will adequately prepare learners for further studies, world of work and adult life. LO 2: Demonstrate the knowledge and understanding of the uniqueness of the SHS/SHTS/STEM curriculum in terms of pedagogical approaches, assessment strategies and cross-cutting issues (GESI, SEL etc.) (NTS 2a - 2c, 3j and 3o). LI 2.1 Identify the unique pedagogical and assessment strategies	30 mins

	in SHS/SHTS/STEM curriculum. LI 2.2 Explain two (2) ways of integrating the cross-cutting issues (GESI, SEL, digital literacy, etc.) in the SHS/SHTS/STEM curriculum to support learning. 2.2 In pairs, identify at least two (2) essential features of the SHS/SHTS/STEM curriculum (NTS 2b, 2c). *E.g.* *The curriculum is built around the acquisition of 21st century skills and competencies by learners, etc.* 2.3 In pairs, state at least four (4) relationships between the JHS and the SHS/SHTS/STEM curricula (NTS 2b, 2c and 2d). ***Note:*** *Refer to NaCCA website for the JHS curriculum* (nacca.gov.gh) *E.g.* *Both are standards-based.* 2.4 In groups identify the core learning areas of the SHS/SHTS/STEM curriculum (NTS 2b, 2c). *E.g.* *Science and technology, etc.* 2.5 In mixed groupings explain how the learning areas will prepare learners for further studies, world of work and for adult life (NTS 1b, 1g and 3j). *E.g.* *Learners will become critical thinkers, etc.* 2.6 Using thought shower, identify the unique pedagogies and assessment modes in the SHS/SHTS/STEM curriculum (NTS 2c, 3k and 3p). *E.g.* ***Pedagogies:*** *Experiential learning, etc.* ***Assessment modes:*** *Assessment as learning (AaL), etc.* 2.7 In groups discuss at least four (4) pedagogies and two (2) assessment modes in the SHS/SHTS/STEM curriculum (NTS 2c, 3k and 3p).	

	E.g. ***Pedagogies:*** *Experiential learning: It is the process of learning through experience and reflection on hands-on activities, etc.* **Assessment modes:** *Assessment as learning (AaL): It actively involves students' reflection on learning, monitoring of their own progress occurs through the learning process, etc.* 2.8 Using think-pair-share, identify the cross-cutting issues in the SHS/SHTS/STEM curriculum (NTS 1a, 2c, 3g, 3j, 3k and 3p). *E.g.* *21st century skills and competencies, etc.* 2.9 In groups explain how the cross-cutting issues have been integrated in the SHS/SHTS/STEM curriculum (NTS 2c, 3j, 3k and 3p). *E.g.* *Content: Integrated in the activities, learning indicators, pedagogical exemplars and assessment, etc.* 2.10 Ask teacher to study the sample lesson plan below, which provides opportunities for exploring the essential features of the SHS/SHTS/STEM curriculum, and perform the activities that follows (NTS 1a, 1b).	
	A sample lesson plan for teaching chemical compounds taking into consideration cross-cutting issues: ***a) Topic:*** *Chemical Compounds* ***b) Sub-topic:*** *Elements, Atomic Numbers and Chemical Symbols* ***c) Objectives:*** *By the end of the lesson, the learner will be able to:* *i. Write the names of elements with atomic number ten to twenty (10-20) correctly.* *ii. Match at least five (5) out of the ten (10) elements listed with their corresponding chemical symbols and atomic numbers correctly.* ***d) RPK:*** *Learners can match the first ten (10) chemical elements with their corresponding atomic numbers and chemical symbols.* ***e) Teaching Learning Resources:*** *personal computers, projectors, whiteboard, 3 sets of flash cards containing i) names of the elements (1-20), ii) the first 20 chemical symbols, iii) atomic numbers, print out of elements with*	

atomic numbers 11-20.

f) References:

i. Integrated Science curriculum for secondary education.

g) Introduction:

Put learners in groups of three (3) taking into consideration gender, experience and background to match the first ten (10) elements provided on the flash cards with their corresponding atomic numbers and chemical symbols correctly.

h) Presentation:

i. Put learners in onion rings of six (6) each taking into consideration gender, experience and background and provide a printout containing the names, chemical symbols and atomic numbers of elements for their discussions.

ii. Ask each group to bring out anything they did not understand for a whole class discussion respecting each other's views.

iii. Using presentation software, projector and board (white), present the names, chemical symbols and their corresponding atomic numbers of the elements (11-20) to support learners who had difficulty in understanding the concept.

iv. Ask learners in small groups of three (3) to do peer assessments to consolidate the concept learnt.

i) Core points:

Atomic no.	***Name***	***Chemical symbol***
1	*Hydrogen*	*H*
2	*Helium*	*He*
3	*Lithium)*	*Li*
4	*Beryllium*	*Be*
5	*Boron*	*B*
6	*Carbon*	*C*
7	*Nitrogen*	*N*
8	*Oxygen*	*O*
9	*Fluorine*	*F*
10	*Neon*	*Ne*
11	*Sodium*	*Na*
12	*Magnesium*	*Mg*
13	*Aluminium*	*Al*
14	*Silicon*	*Si*
15	*Phosphorus*	*P*
16	*Sulphur*	*S*
17	*Chlorine*	*Cl*

18	*Argon*	*Ar*
19	*Potassium*	*K*
20	*Calcium*	*Ca*

j) Conclusion:

*Put learners into three (3) groups (A, B and C). Provide group A with the names of the elements (11-20), B with the corresponding atomic numbers and C, the corresponding chemical symbols. Using **'look for someone who has…'** technique to look for their corresponding partners (e.g., a learner who has a card bearing **'sodium'** will look for two other learners who have the corresponding chemical symbol **'Na'** and atomic number **'11'** to match and vice versa.*

***NB:** Motivate the first three and ask learners to support those who are struggling in locating their partners.*

k) Evaluation:

Copy and complete the table below:

Elements	***Symbol***	***Atomic Number***
Sodium	*Na*	*11*
	S	
Calcium		
	Cl	
potassium		
		12

l) *Remarks:*

3. Modelling a teaching activity, promoting character values, GESI, SEL, ICT and 21st century skills and differentiation	3.1 Ask teachers to tease out the LOs and LIs from the sample lesson plan (NTS 2b). *E.g.* *LO: Demonstrate knowledge and understanding of chemical compounds* *LI 1.1 Identify at least ten (10) names of chemical elements between atomic number 1-20, etc* 3.2 Ask teachers to identify in a sample lesson plan, activities that could promote ICT, GESI, 21st century skills, differentiation and SEL (NTS 2e, 2f, 3c, 3d, 3f and 3g). *E.g.* *21st century skills: Put learners in groups of three (3) taking into consideration* gen*der, experience and background to match the first ten (10) elements provided on the flash cards with their corresponding atomic numbers and chemical symbols correctly.* 3.6 Model a teaching activity based on the sample lesson plan that could support learners who may be struggling with understanding chemical compounds taking into consideration GESI, SEL and 21st century skills (NTS 1d, 2b, 2c, 2e, 2f, 3a and 3c- 3l). 3.7 Give feedback on the lesson modelled (NTS 1a, 2c).	30 mins
4. Evaluation and review of session: Noting that teachers need to identify critical friends to observe lessons and report at next session	4.1 In your group, reflect, write and share what you have learned with the larger group with regard to the relevant pedagogies that can support the delivery of the secondary education curriculum (NTS 1a, 1b). 4.2 Where possible, identify a critical friend to observe your lesson in relation to PLC Session 3 and provide feedback to you (NTS 3n, 3o). 4.3 Read PLC Session 4 in preparation for the next session.	

PLC Session 4: Structure and Content of the Standards-based curriculum

The sections below provide the frame for what is to be done in the session.	**Guidance Notes on Teacher Activity during the PLC Session.** *What teachers will do during each stage of the session*	**Time in Session**
1.Introduction: Review of previous learning using ideas from the last PLC session	1.1 Start the PLC session by asking teachers to share two things they did based on PLC Session 3 on *essential features of the curriculum,* which they think impacted learning. 1.2 Discuss and summarise in a single sentence why you think what your colleague did by way of application of lessons learned in PLC Session 2 on essential features of the curriculum*,* supported learning.	20 mins
2. Introduce the PLC Session and planning for teaching, learning and assessment activities, promoting character values, GESI, SEL, ICT and 21st century skills	2.1 Read the purpose, the Learning Outcomes (LOs) and Learning Indicators (LIs) (NTS 2a, 2b). **Purpose:** The purpose of PLC Session 4 is to introduce the teacher to the structure and content of the SHS/SHTS/STEM curriculum. The session will among other things: a) Provide a broad overview of the structure and content of the SHS/SHTS/STEM curriculum. b) Help teachers familiarize themselves with the terminologies of the SHS/SHTS/STEM curriculum. c) Help teachers to know how to plan their teaching, learning and assessment in lessons in line with the structure and content of the SHS/SHTS/STEM curriculum. d) Identify how cross-cutting issues have been integrated into the teaching, learning and assessment in the SHS/SHTS/STEM curriculum. LO 1: Demonstrate knowledge and understanding of the structure of the SHS/SHTS/STEM curriculum (NTS 2a, 2b). LI 1.1 Explain the structure of the SHS/SHTS/STEM curriculum. LI 1.2 Discuss the alignment between the content standards, learning outcomes, learning indicators,	30 mins

	pedagogical exemplars and assessment within the SHS/SHTS/STEM curriculum. LO 2: Demonstrate knowledge of application of content, pedagogy and assessment to address cross-cutting issues (NTS 2c, 2f and 3k). LI 2.1 Identify the cross-cutting issues integrated into the SHS/SHTS/STEM curriculum. LI 2.2 Discuss how cross-cutting issues have been integrated into content, teaching, learning and assessment. 2.1 In pairs, study the structure of the SHS/SHTS/STEM curriculum and explain the key headings on sticky notes (NTS 2a, 2b). *E.g.* *Strands: Strands are the broad areas of a subject or sections of learning in the subject or learning area. The term 'strand' is used to indicate the major learning area. For example, Intervention Mathematics has the following strands: numbers for everyday life, algebraic reasoning and geometry around us, etc.* 2.2 In your groups, study and discuss the alignment of the key headings in terms of how they are related to the SHS/SHTS/STEM curriculum (NTS 2a - 2c). (Note: refer to Appendix A for the sample structure of the standards-based curriculum) *E.g.* *The pedagogical strategies assist the learner to attain the demands of the learning outcome, etc.* 2.3 Study and discuss the pedagogies and their corresponding assessment levels provided under the given indicator in Appendix B (NTS 2b, 2c, 2f and 3k). (Note: refer teachers to Appendix B for the sample structure of the SHS/SH/STEM curriculum) *E.g.* *Indicator:* *Package food products and suggest various strategies to market them, etc.* 2.4 In your groups study and explain the cross-cutting issues integrated into the curriculum. (NTS 2c, 2f)	

E.g.
GESI: Gender Equality and Social inclusion requires ensuring that all learners are given equal opportunity to realise their potential, irrespective of their gender or social background, etc.

2.5. Study the sample lesson plan below, which provides an opportunity to explore some aspects of the SHS/SHTS/STEM curriculum, and perform the activities presented after the lesson plan (NTS 3a, 3d, 3e, 3g, 3k, 3i, 3o and 3p).

Sample Lesson Plan – Integrated Science

a) Topic: *Movement of substances in biotic and abiotic media*

b) Sub-Topic*: Diffusion*

c) Objectives: *By the end of the lesson, the learner will be able to:*

i. Explain the term diffusion.
ii. Give examples of real-life applications of diffusion.
iii. Demonstrate diffusion in liquids and gases.

d) Relevant Previous Knowledge (RPK):

i. Learners have observed the dissolution of dyes in water.
ii. They have also smelt the fragrance of perfume as it spreads.

e) Introduction:

i. In a whole class discussion, ask learners to share their ideas on how the dissolution of dyes in water spreads.
ii. Learners also share how the smell of a fragrance spreads from one part of a room and is detected at another part.

f) Teaching and Learning Resources (TLRs): *Flash/word cards, Computers, Projectors, Dyes, Perfumes, Bowls, Water.*

g) Core-Competencies

i. Communication and collaboration
ii. Critical thinking
iii. Problem-solving skills
iv. Digital literacy

h) Tasks/Activities*:*

i. Show a video on diffusion in liquids or gases and ask

	learners to note the key observations. *ii. In mixed-gender or mixed-ability groups, ask learners to spray the perfumes brought to class and detect the smell at different locations within the room.* ***Note: take into consideration allergies and other health issues of learners.*** *iii. In a whole class discussion, ask learners to share their ideas on the smell of perfume sprayed in one part of a room and detected in another part.* *iv. Use a dye in a vessel containing water and ask learners to observe its spread to other parts of the vessel to illustrate diffusion in liquids and gases.* *v. Let learners:* • *Discuss in small groups the observations made in both scenarios and give possible explanations behind the observations.* • *Brain-write a definition for diffusion.* • *Give other examples of diffusion. (Ensure all learners including SEN take part in the session)* ***i) Core Points*** i. ***Definition****: Diffusion is the process of movement of molecules under a concentration gradient. It is caused in all living things. It helps the movement of substances in and out of the cell.* ii. ***Process of Diffusion****: Molecules move from a region of higher concentration to a region of lower concentration.* iii. ***Applications of diffusion****: The smell of perfumes/Incense Sticks, dipping tea bags in hot water will diffuse the tea in the hot water, small dust particles or smoke diffuse into the air and cause air pollution.* ***j) Evaluation*** *- Use a variety of authentic assessment methods to evaluate the lesson, e.g.* *i. Explain the term diffusion in your own words.* *ii. Compare and contrast diffusion and Osmosis in a tabular form.* *iii. Give one application of diffusion in each of the following fields:* • *Catering* • *Medicine*	

	• *Pharmacy* *iv. Make a graphical representation of how air molecules will move from one place to the other.* ***k) Remarks***	
3.Modelling a teaching activity, promoting character values, GESI, SEL, ICT, 21st century skills and differentiation	3.1 Tease out the LOs and the LIs in the sample lesson plan. (NTS 2a, 2b). *E.g.* *LO: Demonstrate understanding of the process of diffusion and its application in real-life situations, etc.* *LI:* *Explain the term diffusion, etc.* 3.2 Tease out any cross-cutting activities (GESI, SEL, 21st century skills and competencies, ICT skills and differentiation) in the sample lesson with your elbow partners (NTS 2c, 2f, 3g and 3j). *E.g.* *GESI- there was both mixed gender and ability group as well as individual work. All learners including SEN were allowed to participate without intimidation, etc.* 3.3 In your subject groups, evaluate the assessment practices illustrated in the sample lesson and share ideas with the whole group using sticky notes. (NTS 3k, 3l) *E.g.* *Assessment formed part of the learning processes (assessment i.e., learners were asked to brain-write a definition for diffusion, etc.)* 3.4 In your various groups discuss what you would do differently having been introduced to the structure and content of the SHS/SHTS/STEM curriculum (NTS 3a, 3d, 3e, 3g, 3k, 3i, 3o and 3p). *E.g.* *Be deliberate in integrating GESI, SEL and other cross-cutting issues into each lesson.* 3.5 Model one teaching activity from the sample lesson and respond to feedback from their colleagues (NTS 1a,3a).	30 mins

	E.g. *Introduction, etc.*	
4. Evaluation and review of session: Noting that teachers need to identify critical friends to observe lessons and report at next session.	4.1 In your group, reflect, write and share what you have learned with the larger group with regard to the relevant pedagogies that can support the delivery of the secondary education curriculum (NTS 1a, 1b). 4.2 Where possible, identify a critical friend to observe your lesson in relation to PLC Session 4 and provide feedback to you (NTS 3n, 3o). 4.3 Read PLC Session 5 in preparation for the next session.	

PLC Session 5: How the Curriculum was developed and validated

The sections below provide the frame for what is to be done in the session.	**Guidance Notes on Teacher Activity during the PLC Session.** *What teachers will do during each stage of the session*	**Time in session**
1.Introduction: Review of previous learning using ideas from the last PLC session	1.1 Share what you did differently based on PLC Session 4 on the *structure and content of the curriculum,* which impacted learners' learning. 1.2 Discuss and summarise in a single sentence why you think what a colleague did by way of application of what you learned in Session 4 on the *structure and content of the curriculum,* supported learners' learning or otherwise.	20 mins
2. Planning for teaching, learning and assessment activities, making links with the SHS/SHTS/STEM curriculum and using contextual issues,	2.1 Read the Purpose, Learning Outcomes (LOs) and Learning Indicators (LIs) for the session (NTS 1a, 2b, 2c, 2d, 3a, 3g and 3h). **Purpose:** The purpose of this session is to become familiar with the key policy documents used in the development of the SHS/SHTS/STEM curriculum, highlighting their significance. Additionally, the session aims to deepen your understanding of the processes involved in preparing the curriculum, enabling you to appreciate its holistic nature and build confidence in its implementation. LO 1: Outline the framework used in the development of the SHS/SHTS/STEM curriculum (NTS 1d and 2a,). LI 1.1 Enumerate any three (3) guiding policies used in the development of the SHS/SHTS/STEM curriculum. LI 1.2 Discuss the importance of guiding policies in the development of a curriculum.	30 mins

	LO 2: Develop confidence in the authenticity and validity of the SHS/SHTS/STEM curriculum (NTS 2a and 2b). LI 2.1. Describe five (5) key processes involved in the preparation of the SHS/SHTS/STEM curriculum. LI 2.2. Evaluate the extent to which SHS/SHTS/STEM can be considered holistic, supporting the evaluation with reasoned justifications and specific examples. 2.2 Work in mixed (gender, background, subject, etc.) groups to enumerate some of the key guiding policy documents used in curriculum development (NTS 2a and 2b). Note: *Refer to the excerpts from the front matter of the SHS/SHTS/STEM curriculum (See Appendix C).* *E.g.* *ESP - Education Strategic Plan, etc.* 2.3 Work in your groups to research using your mobile devices, the importance of the key guiding policy documents you enumerated in 2.2 (NTS 1b, 2a and 2b). *E.g.* *ESP - Education Strategic Plan: It sets out the vision and policies for realising the ambition of transforming Ghana into a 'learning nation', etc.* 2.4. In your current groups, engage in a think-ink-share activity to critically analyse the development process diagram in *Appendix C* and discuss the role and significance of five interconnected processes utilised in the development of the standards-based secondary education curriculum (NTS 2a, 2b). *E.g.* *Orientation: Stakeholders (e.g., writers, educators, reviewers, sponsors, interagency groups, etc.) were oriented on the key aspects of the SHS/SHTS/STEM curriculum. Special highlights were made on its advantage over the objective-based curriculum, its relevance, structure and some key terminologies. This orientation was targeted at creating the right paradigm for achieving the targeted outcomes while resolving misconceptions, etc.*	

	2.5. In your current groups, elicit with reasons some key stakeholders you think should have been engaged in the development of the standards-based secondary education SHS/SHTS/STEM curriculum (NTS: 1b, 1e, 2a 2b and 3b). *E.g.* *Stakeholders and their Roles:* *Teachers and Teacher Unions (GNAT, NAGRAT, CCT): Their knowledge, experiences, and competencies were utilised in contributing to the development of the standards-based curriculum, incorporating practical approaches that are feasible for its implementation. It was recognised that their active involvement and support played a crucial role in ensuring the successful development of the standards-based curriculum, etc.* 2.6 Study the sample lesson plan below, which provides opportunity for exploring important aspects of the *SHS/SHTS/STEM curriculum,* and discuss the activities that follow (NTS 3a, 3f-3l).	
	A sample lesson plan for teaching the concept of treatment of water for public consumption is provided below: *a)* ***Topic:*** *Treatment of Water for Public Consumption* *b)* ***Sub-Topic:*** *Steps for Ensuring Water Quality* *c)* ***Objectives:*** *By the end of the lesson, the learner will be able to:* *i. Describe the key steps involved in providing clean water for consumption in a community.* *ii. Explain the importance of stakeholder engagement in meeting this goal* *ii. Explain the essence of standards in ensuring water safety.* *d)* ***Teaching and Learning Resources (TLRs):*** *i. Presentation slides/writing board/ flip chart.* *ii. Handouts with information on water purification methods and accepted water quality standards.* *iii. Charts or posters displaying the steps involved in providing clean water.* *iv. Samples of water from different sources (e.g., dams, pipe borne etc).* *v. Videos showcasing large-scale water treatment processes and quality assessment.*	

	e) Relevant Previous Knowledge (RPK): *i. Learners know sources and uses of water.* *ii. Learners use water daily for various purposes.* ***f) Introduction:*** *i. Begin by engaging learners in mixed groups (gender, background, ability, etc.) using cloudbusting approach to discuss the importance of clean water and its significance for public health and well-being.* *ii. Introduce to learners, the tasks using task worksheets how they will be outlining the key steps to provide a neighbouring rural community with clean water.* *iii. Direct learners to highlight the need for stakeholder engagement through thought shower, including chiefs and opinion leaders, to ensure community involvement and sustainability of the project* ***g) Background Information:*** *i. Provide learners with information about water purification methods, such as filtration, disinfection, and chemical treatment.* *ii. Discuss accepted water quality standards, including pH levels, bacterial contamination limits, and other relevant parameters.* *iii. Distribute handouts with detailed information for reference.* ***h) Tasks/Activities:*** *i. Divide learners into mixed groups (gender, background, ability, etc.)* *ii. Assign each group to outline the key steps involved in providing clean water to a neighbouring rural community.* *iii. Encourage learners to consider stakeholder engagement, including chiefs and opinion leaders, at various stages of the process.* *iv. Remind learners to incorporate the importance of adhering to accepted water quality standards.* *v. Each group presents their outlined steps to the class.* *vi. Encourage questions and discussions after each presentation to promote critical thinking and analysis.*	

	vii. Discuss the importance of stakeholder engagement and the role of accepted standards in ensuring water safety. ***i) Core points:*** ***Water treatment processes*** *i. Coagulation;(how much chemicals?}* *ii. Flocculation (Spontaneous or with chemicals)* *iii. Sedimentation (Time/duration)* *iv. Filtration (Layers of filters/material)* *v. Disinfection (checking Ph levels too)* ***Stakeholder Engagement*** *i. Chiefs and Opinion Leaders (seeking permission, carrying out investigation of safe water sources and support)* *ii. Natives (investigation, sensitization, support and acceptance)* *iii. Local Industries (investment and support)* ***Standardisation Authorities*** *i. Ghana Standards Authority* *ii. Ghana Water Company Limited* ***j) Competencies:*** *i. Communication and collaboration* *ii. cultural identity and glocal citizenship* *iii. creativity and innovation* *iv. critical thinking and problem-solving* *v. leadership and personal development* *vi. Digital literacy* ***k) Conclusion:*** *i. Summarise the key points discussed during the lesson, emphasising stakeholder engagement and adherence to accepted standards.* *ii. Engage in a brief class discussion to reflect on the importance of community involvement and the challenges associated with providing clean water.* *iii. Conclude the lesson by emphasising the role of learners in raising awareness and taking action to address water-related issues.* ***l) Evaluation:*** *i. Describe the key steps involved in providing clean water for consumption to a community.* *ii. Explain the importance of stakeholder engagement in meeting this goal.* *ii. Explain the essence of standards in ensuring water*	

	safety. ***m) Extension Activities (optional):*** *i. Research and explore case studies of successful clean water projects in rural communities.* *ii. Invite a guest speaker, such as a water quality expert or representative from a local water organisation, to share their experiences and insights.* ***n) Remarks:***	
3. Modelling a teaching activity, making links with the Pre-Tertiary (standards-based) Curriculum and how the curriculum was developed.	3.1 with reference to the sample lesson plan, form mixed groups (gender, background, subject, etc.) and engage in a discussion about the importance of stakeholder engagement in implementing activities that have an impact on the general public (NTS 1b, 1e, 2a 2b and 3b). *E.g.* *Addressing Diverse Needs: Stakeholder engagement allows for the inclusion of diverse perspectives and input from various stakeholders, such as educators, learners, parents, community members, and industry professionals. By involving these stakeholders in the curriculum development process, their unique insights and experiences can be considered, ensuring that the curriculum addresses the diverse needs and interests of the general public, etc.* 3.2 Working still in your mixed groups, engage in a discussion on why it is important to incorporate standards and guiding policies in the development of a curriculum that affects the general public (NTS 1c, 1e, 1g, 2a and 2b). *E.g.* *Ensuring Quality: Standards provide a benchmark for excellence and quality in education. By incorporating standards in the curriculum development process, it ensures that the curriculum meets predetermined criteria and addresses important learning outcomes. This helps in maintaining consistent and high-quality education for the general public, etc.* 3.3 Still working in your groups, justify the notion that the SHS/SHTS/STEM curriculum is holistic from your understanding gathered in activities 3.1 and 3.2 (NTS 1b, 2b, 2c, 3a, 3e, 3f, 3g, 3h, 3k and 3n). *E.g.* *The curriculum development process involved a*	30 ins

	comprehensive stakeholder engagement, which included educators, learners, parents, community members, opinion leaders and industry professionals. This ensured that a wide range of perspectives, experiences, and expertise were incorporated into the curriculum, etc. 3.4 Model one teaching activity from the sample lesson and respond to feedback from their colleagues (NTS 1a, 2e and 3a).	
4. Evaluation and review of session: **Noting that teachers need to identify critical friends to observe lessons and report at next session**	4.1 Reflect, write and share what you have learned with the larger group taking into account the developmental process of the SHS/SHTS/STEM secondary education curriculum, the stakeholder engagement and the key policies and standard guidelines that were used in developing the curriculum (NTS 2a). 4.2 Where possible, identify a critical friend to observe your lesson in relation to PLC Session 5 and provide feedback at the next PLC session (NTS 1a, 1b, 1e, 1g, 2b and 2c). 4.3 Read PLC Session 6 in preparation for the next session.	10 mins

PLC Session 6: Transitioning from the objective-based curriculum to the standards-based curriculum.

The sections below provide the frame for what is to be done in the session.	**Guidance Notes on Teacher Activity during the PLC Session.** *What teachers will do during each stage of the session?*	**Time in session**
1. Introduction: Review of previous learning using ideas from the last PLC session	1.1 Share what you did differently in the classroom or elsewhere based on PLC Session 5 on *how the curriculum was developed and validated*, which you think impacted students' learning. 1.2 As critical friends, explain why you think what a colleague did by way of application of lessons learned in PLC Session 5 on *how the curriculum was developed and validated*, supported students' learning or otherwise.	20 mins
2. Planning for teaching, learning and assessment activities, promoting character values, GESI, SEL, ICT 21st century skills and differentiation	2.1 Read the Purpose, Learning Outcomes (LOs) and Learning Indicators (LIs) for the session. **Purpose:** The purpose of the session is to help teachers migrate smoothly from the objective-based curriculum to the SHS/SHTS/STEM standards-based curriculum. LO1: Demonstrate knowledge and understanding of the differences between the objective-based and the SHS/SHTS/STEM standards-based curricula (NTS 1a – 1d, 1g, 2a – 2c, 2e, 2f and 3a – 3o). LI 1.1 Explain the concepts of objective-based curriculum and standards-based curriculum. LI 1.2 Compare and contrast the objective-based and standards-based curricula for secondary education. LO 2: Demonstrate knowledge and understanding of the skills, values and competencies needed to transit from the objective-based curriculum to the SHS/SHTS/STEM standards-based curriculum for secondary education (NTS 1a-1d, 1g, 2a-2c, 2e,	30 mins

	2f and 3a-3o). LI 2.1 Identify the skills, values and competencies needed to implement the SHS/SHTS/STEM standards-based curriculum. LI 2.2 Identify issues envisaged when transiting from the objective-based curriculum to the SHS/SHTS/STEM standards-based curriculum. LI 2.3 Suggest possible ways of addressing the envisaged transition issues raised in LI 2.2 2.2 In your mixed groupings (gender, subject, experience, background, etc.), explain the concepts of objective-based curriculum and standards-based curriculum (NTS 2a, 2b and 2d). *E.g.* *Objective-based curriculum emphasises the attainment of learning goals by learners at the end of a programme, while the* standards-based curriculum focuses on what learners must know, understand and be able to do at a given stage of their learning, etc. 2.3 In your respective groups, contrast the objective-based with SHS/SHTS/STEM standards-based curricula (NTS 2a, 2b, 2d – 2f, 3a, 3c, 3g and 3k). *E.g.* *The objective-based curriculum paid little attention to cross-cutting issues while the* SHS/SHTS/STEM *standards-based curriculum consciously integrates GESI, SEL, ICT, 21st century skills and competencies, national values and differentiation, etc.* 2.4 In your groups, identify skills and values needed to implement the standards-based curriculum (NTS 1a-1f, 2a -2f, 2a-1d, 3a-3p). *E.g.* *a) The skills needed to implement the standard based curriculum include: Digital literacy, etc.* *b) The Values needed to implement the standard based curriculum include: Integrity, etc.* 2.5 In your groups, discuss how the skills and values listed in Activity 2.4 can be applied in teaching, learning and assessment taking into consideration the cross-cutting issues (NTS 1a, 2c, 1f and 3a-3n).	

	E.g. *Skills:* *Digital literacy: the ability to use ICT tools and infrastructure in teaching, learning and assessment to improve learning outcomes, etc.* *Values:* *Patience: this includes the ability to remain calm and accommodate a variety of views from learners during teaching and learning.* 2.6 In your groups, identify issues envisaged when transiting from the objective-based curriculum to the SHS/SHTS/STEM standards-based curriculum (NTS 1a, 2a, 2b). *E.g.* *Unfamiliarity with the content and structure of the standards-based curriculum, etc.* 2.7 Think-pair-share possible ways of addressing the issues raised in Activity 2.6 (NTS 1b, 1e, 2a, 2e, 2f, 3c and 3o). *E.g.* *Teachers attending regular PLC sessions to share ideas and experiences on the standards-based curriculum, etc.* 2.8 Discuss the sample lesson plan, which provides an opportunity to explore some aspects of the SHS/SHTS/STEM and draw relevant lessons on how to manage the transition from the objective-based curriculum to the standards-based curriculum taking into consideration the cross-cutting issues such as GESI, SEL, 21st century skills and competencies, ICT, national values as well as differentiation (NTS 2e, 2f, 3a, 3c, 3d, 3f and 3g). *E.g.* ***Sample Lesson Plan – Home Economics*** **a)** ***Topic:*** *Management Principles for Quality Living* **b)** ***Sub-Topic:*** *Career Opportunities in management in living* **c)** ***Objectives:*** *By the end of the lesson, the learner will be able to:* *i. Identify career opportunities in management in living in the community.* *ii. Explain at least three (3) benefits of career opportunities to the individual, family and society.*	

	d) Relevant Previous Knowledge (RPK): *Learners have learned the scope and the importance of management in living.* *They are also aware of some careers in their community.* ***e) Teaching and Learning Resources (TLRs):*** *i. Videos/pictures/chart* *ii. Sticky notepads* *iii. Open Educational Resources on the various careers in management in living in relation to family services, community services, industrial services and professional occupations.* ***f) Introduction**:* *Guide learners in groups to:* *i. review the lesson on the scope of management in living and the importance of management in living.* *ii. identify some careers in their locality.* ***g) Tasks/Activities:*** *i. Show videos/pictures for learners to identify some situations that depict quality living, e.g., clean environment, the opportunity to earn income (job or career opportunity), physical safety, etc.* *ii. Assist learners in mixed groupings (ability, gender, background, etc.,) to identify the different career opportunities in management in living from the videos/pictures.* *iii. Through a pyramid discussion, guide learners to identify the benefits of the various careers to the individual, the family and society.* *iv. Task learners to Think-Pair-Share and write on sticky notes their preferred careers, giving reasons for their choice.* *v. Use a pre-recorded video (OER) or chart of male chefs to dispel gender stereotypes that classify Home Economics related careers as the domain of females.* ***Note:*** *Use gender-friendly and appropriate examples to cater for learners of different socio-economic backgrounds to encourage confidence building, self-identity, sense of belonging and collaboration.* *Promote respect and acceptance of each other's career choice or views.* *Encourage learners to listen to peers and ask questions based*	

	on what they heard/saw. *Learners should learn from and contribute to the learning of others.* ***h) Core Points*** *Definition of career in management in living:* *It is an occupation undertaken for a significant period of a person's life and with opportunities for progress.* ***Career opportunities:*** ***Social services*** i. *Event planner* ii. *Interior and exterior designer* iii. *Laundry services* iv. *Household staff* ***Industrial-based Careers*** *i. trade adviser* *ii. credit adviser or consultant, etc.* ***Professional careers:*** *i. teaching* *ii. financial counselling* *iii. childcare and development* *iv. institutional research* *v. hospitality* ***Benefits of careers in management in living Individual*** *i. self-employment* *ii. increased individual income* *iii. improved individual lifestyle* ***Family:*** *i. family members get employment* *ii. increased household income* *iii. better family budget support* ***Society:*** *i. promote peaceful living for all* *ii. improves the quality of life for all* ***i) Evaluation:*** *i. Identify four (4) career opportunities in management in living.* *ii. Assuming you gain employment as a teacher in a school, write 3 benefits of your employment to:* • *Yourself* • *Your family*	

	• *Your community* *iii. Study and present a report about a career in management in living in your community, its prospects to the family and the community.* ***Remarks:***	
3. Modelling a teaching activity, promoting character values, GESI, SEL, ICT, 21st century skills and differentiation.	3.1 Work in your present groups and tease out the LOs and LIs from the objectives of the sample lesson plan (NTS 1b, 3h and 3o). *E.g.* *LO: Demonstrate knowledge and understanding of the importance of management in living.* *L1 1.1 Identify career opportunities in management in living.* 3.2 In your groups, use triangular discussion to tease out the cross-cutting issues in the sample lesson plan and analyse how you can use the cross-cutting issues in the sample lesson to facilitate the transition of your learners from the objective-based curriculum to the standards-based curriculum (NTS 2a, 2b, 2e, 2f, 3a-3h and 3o). *E.g.* *GESI: video of a male chef at work helps to address learners' gender stereotypes (on home economics-related careers) and creates awareness that all careers are appropriate for both gender types, etc.* 3.3 In your groups think-pair-share how assessment strategies used in the sample lesson demonstrate transition from the objective-based to the SHS/SHTS/STEM standards-based curriculum (NTS 3k,3l, 3m,3o and 3p). *E.g.* *Assessment covers both lower and higher levels of thinking, etc.* 3.4 Share your feelings on the transitioning from the objective-based curriculum to the standards-based curriculum (NTS 1a, 2e and 2f). *E.g.* *Transitioning to the standards-based curriculum will really help to prepare learners for further education, world of work and adult life, etc.*	30 mins

	3.5 Model any of the skills in the SHS/SHTS/STEM standards-based curriculum which are listed in Activity 2.3 and respond to feedback on the lesson from your colleagues (NTS 1a, 2e and 3a). *E.g.* *Digital literacy, etc.*	
4. Evaluation and review of the session: Noting that teachers need to identify critical friends to observe lessons and report at the next session.	4.1 In your group, reflect, write and share what you have learned with the larger group regarding the relevant lessons learned in *transiting from the objective-based curriculum to the standards-based curriculum* (NTS 1a, 1b). 4.2 Identify a critical friend to observe your lesson in relation to PLC Session 6 and provide feedback to you (NTS 3n, 3o). 4.3 Read PLC Session 7 in preparation for the next session.	10 mins

PLC Session 7: Pedagogy 1 - Talk for Learning and Enquiry Based Approaches

The sections below provide the frame for what is to be done in the session.	**Guidance Notes on Teacher Activity during the PLC Session.** *What teachers will do during each stage of the session*	**Time in session**
1. Introduction: Review of previous learning using ideas from the last PLC session	1.1 Share what you did differently in the classroom or elsewhere based on PLC Session 6 on *transitioning from the objective-based to the standards-based curriculum,* which you think impacted students' learning. 1.2 As a critical friend, discuss why you think what a colleague did by way of application of what they learned in Session 6 on *transitioning from the objective-based to the standards-based curriculum,* supported students' learning or otherwise and provide your response in a single sentence.	20 mins
2. Planning for teaching, learning and assessment activities, promoting character values, GESI, SEL, ICT and 21st century skills	2.1 Read the Purpose, Learning Outcomes (LOs) and Learning Indicators (LIs) for the session. **Purpose:** The purpose of the session is to help teachers to use interactive GESI and SEL responsiveness as well as other cross-cutting teaching and learning strategies that will get learners to participate actively in lessons through talk and inquiry-based learning in different learning contexts. LO 1: Demonstrate understanding and application of talk for learning approaches in the classroom (NTS 2a -2f, 3g and 3i). LI 1.1 Describe at least two (2) examples of talk-for-learning approaches and their usefulness in a given subject. LI 1.2 Apply talk-for-learning approaches in a sample lesson taking into consideration cross-cutting issues. LO 2: Demonstrate understanding and application of enquiry-based approaches in teaching and learning (NTS 2a-2f, 3g and 3i). LI 2.1 Describe at least 2 examples of GESI responsive enquiry-based approaches and their usefulness in a given subject.	30 mins

LI 2.2 Apply enquiry-based approaches in a sample lesson taking into consideration cross-cutting issues.
2.2 Think, ink and share with an elbow partner and then share with the larger group what talk-for-learning approaches are (NTS 2a - 2f, 3g and 3i).
E.g.
Talk-for-learning approaches are a host of techniques and strategies for encouraging all learners to talk, manage and structure their contributions in lesson, etc.

2.3 In pairs, state at least 3 strategies you use to get your learners to talk in class (NTS 2a-2f, 3e, 3g, 3h and 3j).
E.g.
Questioning, etc.

2.4 In mixed groupings (gender, experience, background, etc.) discuss the various approaches of talk-for-learning and relate your examples in 2.3 to each of them (NTS 2a-2f, 3e, 3g, 3h and 3j).

Talk for learning approaches	*Examples*
Initiating Talk for Learning	*Involves the use of strategies that encourages learners to talk.* *E.g.* *Questioning, etc.*
Building on What Others say	*Explores how to involve all students in learning from each other and to build on what is said.* *E.g.* *Discussion, etc.*
Managing Talk for Learning	*This looks at how to develop ways of working together and regulating talk to help you manage talk for learning in your classroom.* *E.g.* *Debate, etc.*
Structuring Talk for Learning	*This introduces strategies to structure the many ideas that are being shared by your student teachers when using talk for learning.* *E.g.* *Participatory feedback, etc.*

	2.5 Randomly pick one strategy under any of the approaches, search for information (using ICT tools or other material available) on how it is used and present your response to the larger group (NTS 2a-2f, 3e, 3g, 3h and 3j). *Note:* *a) Questioning - It is a way of eliciting active engagement of learners and to check existing levels of understanding of concepts during a lesson or at the end of it through strategies that involve asking, pausing, calling, taking response and giving feedback.* *b) Activity ball* *c) Concept cartoons* *d) Ordering cards* *e) Pyramid discussion* *f) 5 whys* *g) Think (ink)-pair-share* *h) Concept/mind mapping* *i) Fish bone strategy* *https://t-tel.org* 2.6 Individually use your phones or laptops to search for the meaning of enquiry learning approaches and share with the larger group (NTS 2a-2f, 3e, 3g, 3h and 3j). *E.g.* *A quest for truth information or knowledge seeking information by questioning, etc.* 2.7 Share with the larger group how you felt searching for information using your devices (NTS 1a). *E.g.* *It was exciting, etc.* 2.8 In your mixed gender groups describe at least 2 GESI responsive strategies that foster enquiry in a lesson (NTS 2e, 2f, 3f-3h). *E.g.* *Pattern seeking, etc.* 2.9 In your mixed grouping (gender, experience, background, etc.), randomly pick “talk-for-learning” or “enquiry” approach and discuss their usefulness in teaching a subject (NTS 2b, 2d, 2e and 3e-3h).*Note: Be ready to present your response to the larger group.*	

	E.g. *a) Benefits of talk for learning: It helps students to process their learning, through integration of information, etc.* *b) Benefits of enquiry: It improves problem-solving skills among learners, etc.*	
	Refer to the sample lesson plan below, which provides opportunity for discussing the pedagogical strategies in the SHS/SHTS/STEM curriculum. *A sample lesson plan for teaching the concept "dynamic nature of culture" from the MoE (2010) SHS Social Studies teaching syllabus is provided below:* ***a) Topic:** Our culture and national identity* ***b) Sub-topic:** Dynamic nature of culture* ***c) Objectives:** By the end of the lesson, the learner will be able to:* *i. Identify at least 3 aspects of the Ghanaian culture.* *ii. Examine at least a change each in any 3 aspects of the Ghanaian culture.* ***d) Teaching and Learning Resources (TLRs):** videos on cultural practices, pictures on aspects of cultural practices, computer and projector.* ***e) Relevant Previous Knowledge (RPK):** Learners see and use cultural artefacts in their homes.* ***f) Introduction:** Using activity ball technique, ask learners to mention some items they use in their homes such as clothes and utensils which depict their culture. Encourage learners to appreciate other learners' culture.* ***g) Tasks/Activities:*** *i. With the help of a projector, show a video on Ghanaian cultural activities and ask learners to think, ink, pair and share at least 3 aspects of the Ghanaian culture they observed and present them on a concept cartoon.* *ii. Ask learners to post their concept cartoon on the walls for gallery walk.* *iii. Guide learners to form groups to represent various ethnic groups and use pyramid discussion to examine the changes in different aspects of the Ghanaian culture.* *iv. Call the leader of each group to present their findings using radio reporting and appropriate visuals such as pictures.* ***h) Core points:*** *i. Aspects of the Ghanaian culture include:*	

	• *Language* • *Marriage* • *Food* • *Music and dance* • *Dressing* • *Governance, etc.* *ii. Some changes in aspects of the Ghanaian culture include:* • *Some people code mix language.* • *Traditional marriage rites have been mixed with foreign marriage rites.* • *Traditional preparations of some Ghanaian foods have changed.* ***i) Core competencies:*** *iii. Critical thinking and problem-solving.* *iv. Communication and collaborative skills.* ***j) Conclusion:*** *Guide learners to reflect on the lesson using participatory feedback and ask them how it has influenced their thoughts.* ***k) Evaluation:*** *1. Write three aspects of the Ghanaian culture.* *2. Explain at least a change each in any 3 aspects of the Ghanaian culture.* ***Remarks:***	
3. Modelling a teaching activity, promoting character values, GESI, SEL, ICT and 21st century skills	3.1 Identify pedagogies in the sample lesson that help learners to actively talk and get involved in enquiry during learning, and suggest alternatives (NTS 3a - 3c, 3e - 3g). *E.g.* *Using activity ball to introduce a lesson, etc.* 3.2 Identify cross-cutting issues addressed in the lesson plan, pair with a friend to discuss your findings and together share your findings with another pair. (NTS 1a, 2e, 3f, 3k and 3m). *E.g.* *GESI – forming groups to represent ethnic groups, etc.* 3.3 Individually, tease out a likely LO and their corresponding LIs from the sample lesson and share with the larger group (NTS 2b). *E.g.* *LO: Demonstrate understanding of the dynamic nature of Ghanaian culture.* *LI 1 Describe at least 3 aspects of the Ghanaian culture, etc.*	30 mins

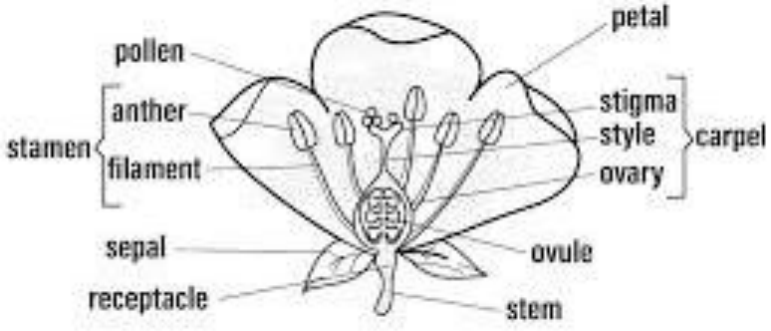
	3.4 Model a teaching activity based on the sample lesson plan that can support all learners taking into consideration GESI, SEL, ICT, 21st century skills and differentiation (NTS 1b, 1f, 1g, 2c 2e, 2f and 3c-3j). 3.5 Give feedback of your observation on the lesson modelled (NTS 1a, 2c).	
4. Evaluation and review of session: Noting that teachers need to identify critical friends to observe lessons and report at next session.	4.1 Reflect, write and share what you have learned with the larger group with regard to the use of talk-for-learning and enquiry-based approach in teaching and learning (NTS 1a, 1b). 4.2 Where possible, identify a critical friend to observe your lesson in relation to PLC Session 7 and provide feedback at the next PLC session (NTS 3l, 3n and 3o). 4.3 Read PLC Session 8 in preparation for the next session and come along with a sample lesson plan.	10 mins

PLC Session 8: Pedagogy 2 - Collaborative and Experiential Learning Approaches

The sections below provide the frame for what is to be done in the session.	**Guidance Notes on Teacher Activity during the PLC Session.** *What teachers will do during each stage of the session*	**Time in session**
1. Introduction: Review of previous learning using ideas from the last PLC session	1.1 Share what you did differently in the classroom or elsewhere based on PLC Session 7 on *talk-for-learning and enquiry-based approaches*, which you think impacted learners' learning. 1.2 As a critical friend, discuss why you think what a colleague did by way of application of what they learned in Session 7 on *talk-for-learning and enquiry-based approaches,* supported learners' learning or otherwise and provide your response in a single sentence.	20 mins
2. Planning for teaching, learning and assessment activities, promoting character values, GESI, SEL, ICT 21st century skills and differentiation	2.1 Read the Purpose, Learning Outcomes (LOs) and Learning Indicators (LIs) for the session. **Purpose:** The purpose of the session is to equip teachers to use interactive GESI responsive teaching and learning strategies that will help develop learners' ability to work together with peers and to construct their learning by doing and reflecting in different learning contexts. LO 1: Demonstrate understanding and application of collaborative approaches in teaching and learning (NTS 2a - 2f, 3g and 3i). LI 1.1 Describe at least 3 examples of GESI responsive collaborative approaches and their usefulness in a subject area. LI 1.2 Apply collaborative approaches in a sample lesson taking into consideration cross-cutting issues. LO 2: Demonstrate understanding and application of experiential approaches in teaching and learning (NTS 2a-2f, 3g and 3i).	30 mins

	LI 2.1 Describe at least 2 examples of GESI responsive experiential approaches and their usefulness in a subject area. LI 2.2 Apply experiential approaches in a sample lesson taking into consideration cross-cutting issues. 2.2 In mixed-gender groups (where applicable), think, ink and share with the larger group what collaborative approaches are (NTS 2a - 2f, 3g and 3i). *E.g.* *Collaborative approaches are techniques of teaching which promotes creation of contexts that foster interaction between and among learners, etc.* 2.3 In your mixed groupings (subjectt, gender, experience, background, etc.), discuss at least three (3) strategies you have ever used to get your learners to work together and how effective they were (NTS 2a-2f, 3e, 3g, 3h and 3j). *E.g*. *Sage in a circle: This is where a learner who is knowledgeable or skillful in a concept is selected as a "sage", groups are formed, and each group surrounds a sage. The sage then shares their knowledge and experiences on the task with their group, etc.* 2.4 In your group, discuss how you will teach a known concept using the strategy which your leader picked and use activity ball to present your findings (NTS 2b, 2d, 2e and 3e-3h). *E.g.* *Sage in a circle:* *Customs and traditions (Ghanaian Language) – Learners who are knowledgeable in an aspect of Ghanaian culture (such as festivals) are selected as sages to narrate a known culture or tradition to members in a group (ensuring equal gender representation of sages where applicable), etc.* 2.5 Use your computers and other devices to search for the meaning of experiential learning approaches, share in your mixed groupings (subject, gender, experience, background, etc.) then share with the whole group (NTS 2a-2f, 3e, 3g, 3h and 3j). *E.g.* *Experiential learning is the process of learning through*	

	experience and is both an active and reflective process, etc. 2.6 Share with the larger group how you felt searching for information using your devices (NTS 1a). *E.g.* *It was exciting, etc.* 2.7 In your mixed groupings (subject, gender, experience, background, etc.) describe at least 2 GESI responsive strategies that allow first-hand experience of concepts in a lesson (NTS 2e, 2f and 3f-3h). *E.g.* *Problem-based: Learners learn about a concept by cooperating in groups to find a solution to an unrestricted challenge, etc.* *Note: Post findings for gallery walk and appreciate constructive critiquing.* 2.8 In your subject groupings, randomly pick one strategy under experiential approaches and discuss the selected strategy that can be used to teach a particular concept (NTS 2b, 2d, 2e and 3e-3h). *E.g.* *Problem-based: (Geography-Erosion) Learners on field trip, identify erosion prone areas of the school compound and the community, device strategies and carry out the plan to solve them, etc.* 2.9 Ask teachers, in their subject groupings, to read the lesson plan below, which provides an opportunity to discuss relevant pedagogies in the SHS/SHTS/STEM curriculum, and complete the activities presented after the lesson. *A sample lesson plan for teaching the concept 'structure of flowers' from the MOE (2010) SHS Teaching Syllabus for Integrated Science is provided below:* ***a) Topic:*** *Reproduction and growth in plants* ***b) Sub-topic:*** *Structure of flowers* ***c) Objectives:*** *By the end of the lesson, the learner will be able to:* *i. Identify at least three (3) parts of a flower.* *ii. Examine the difference between the structure of a bisexual flower and a unisexual flower.*	

	d) Teaching and Learning Resources (TLRs): *Computer and projector, pictures of flowers, variety of flowers* ***e) Relevant Previous Knowledge (RPK):*** *Learners see and use flowers in their everyday lives.* ***f) Introduction:*** *Ask learners to form mixed groups (where applicable), appoint a leader to pick a flower name as the name of their group. With the help of a projector, show slides of variety of flowers and ask learners to name the flower that is shown (a correct name attracts a token for the group).* ***g) Tasks/Activities:*** *i. Ask learners in groups to go outside the classroom in the school's environment to collect different flower specimen and bring to the classroom (teacher may support learners with additional variety of flowers for learners to pick from).* *ii. Guide learners in their groups to cut open fully flowers to identify the main parts (encourage learners to be conscious of safety and provide support when necessary).* *iii. Ask learners in their groups to mount each flower on a separate sheet of paper and the parts separated out and labelled (groups could also make labelled diagrams of flowers to add.* *iv. Ask groups to display their works on the wall for a gallery walk and allow peer assessment.* *v. Guide learners using the fishbowl techniques (one member from each group) to discuss the concept of bisexual and unisexual flowers bringing out the difference between their structure.* ***h) Core points:*** *i. Parts of a flower:*  	

	ii. The difference between bisexual flower and unisexual flower: *Bisexual flowers possess both male and female reproductive parts i.e., both stamens and carpels (pistil) are present in the same flower (E.g., Rose, Hibiscus, etc.), whereas unisexual flowers containing either male reproductive parts (stamen) or female reproductive parts (carpels) E.g., Pawpaw, Coconuts, maize, etc.* ***i) 21st Century Skills and Core competencies:*** *i. Critical thinking and problem-solving skills* *ii. Communication and collaboration* *iii. Creativity and innovation* ***j) Conclusion:*** *Review lesson using "redeem your token game". Each group formulates two questions relating to the lesson and ask one other group. If the group gets the answer, they take a token from the group that asked the question and if they fail to get the answer, the group that asked the question takes a token from them.* ***k) Evaluation:*** *i. Use a strategy of your choice (e.g., Written, graphics, etc.) to present at least three (3) parts of a flower you know.* *ii. Use a strategy of your choice to show the difference between a bisexual flower and a unisexual flower.* ***l) Remarks:***	
3. Modelling a teaching activity, making links with the Pre-Tertiary (standards-based) Curriculum and using GESI, SEL, ICT, 21st century skills and differentiation	3.1 Identify pedagogies in the sample lesson that helped learners to work co-operatively and/or had first-hand experience in learning and suggest alternatives (NTS 3a - 3c, 3e - 3g). *E.g.* *Using the trip outside the classroom, learners are encouraged to agree on a particular flower to pick, etc.* 3.2 In concentric circles (onion ring), identify cross-cutting issues addressed in the lesson plan and share your findings with the larger group (NTS 1a, 2e, 3f, 3k and 3m). *E.g.* *Differentiation: Learners select different presentation approaches, e.g., mounting real flowers or making diagrams, using strategies of choice to show difference between bisexual and unisexual flowers, etc.*	30 mins

	3.3 Individually, tease out a likely LO and their corresponding LIs from the sample lesson and share with the larger group (NTS 2b). *E.g.* *LO: Demonstrate understanding of the structure of flowers* *LI 1: Identify at least 3 parts of a flower* *LI 2: Examine the difference between the structure of a bisexual flower and a unisexual flower, etc.* 3.4 Model a teaching activity based on the sample lesson plan making use of collaborative and experiential learning approaches that can support all learners taking into consideration GESI, SEL, ICT, 21st century skills and differentiation (NTS 1b, 1f, 1g, 2c 2e, 2f and 3c-3j). 3.5 Give feedback of your observation on the lesson modelled (NTS 1a, 2c).	
4. Evaluation and review of session: Noting that teachers need to identify critical friends to observe lessons and report at next session.	4.1 Reflect, write and share your impression (i.e., how you felt) on what you have learned with the larger group with regard to the participation and use of talk for learning and enquiry-based approach in teaching and learning (NTS 1a, 1b). 4.2 Where possible, identify a critical friend to observe your lesson in relation to PLC Session 8 and provide feedback at the next PLC session (NTS 3l, 3n and 3o). 4.3 Read PLC Session 9 in preparation for the next session and come along with a sample lesson plan.	10 mins

PLC Session 9: Assessment 1 – Assessment Process		
The sections below provide the frame for what is to be done in the session.	**Guidance Notes on Teacher Activity during the PLC Session.** *What teachers will do during each stage of the session*	**Time in session**
1. Introduction: Review of previous learning using ideas from the last PLC session	1.1 Share two things you did differently based on PLC Session 8 *on collaborative and experiential learning,* which you think impacted learning. 1.2 Discuss in groups and provide your responses in a single sentence why you think your colleague (a critical friend) did by way of application of lessons learned in PLC Session 8 *on collaborative and experiential learning* which supported students learning or otherwise.	20 mins
2. Planning for teaching, learning and assessment activities, promoting character values, GESI, SEL, ICT 21st century skills and differentiation	2.1 Read the Purpose, Learning Outcomes (LOs) and Learning Indicators (LIs) for the session. **Purpose**: The purpose of this session is to help teachers to understand and use the assessment processes (e.g., linking learning outcomes, pedagogy, and assessment strategies) in the classroom consciously integrating the cross-cutting issues (GESI, SEL, ICT, core values, differentiation, attitudes, and 21st-century skills) in the curriculum. *Note:* *See Appendix D for excerpts from the Secondary Education Assessment Guide (SEAG)* LO 1: Demonstrate knowledge and understanding of the relationships between, and the alignment of learning outcomes, pedagogy, and assessment in the SHS/SHTS/STEM curriculum (SEAG p.3, NTS 2a – 2f, 3g and 3i). LI 1.1 Explain how pedagogy relates to assessment. LI 1.2 Explain how learning outcomes relate to assessment. LO2: Demonstrate knowledge and understanding of the role of stakeholders (e.g., school, teacher, learner, parent, external assessors, MoE and regulatory bodies) in	30 mins

	assessment (SEAG p.3, 4, NTS 3n). LI.2.1 Identify the various stakeholders in the assessment process. LI.2.2 Examine the role of the various stakeholders in the assessment process. 2.2 In mixed groups, discuss and present the relationship between pedagogy and assessment (SEAG p.3, NTS 3g). *E.g.* *An assessment provides feedback on the effectiveness or otherwise of pedagogy, etc.* 2.3 In mixed groups (gender, experience, background, etc.) discover and share the relationships among learning outcomes, pedagogy, and assessment (SEAG p.3, NTS 3g, 3e). *E.g.* *The curriculum outlines the learning outcomes that students should achieve, and assessment is used to provide feedback that monitors the improvement in learning or otherwise, etc.* 2.4 Think-pair-ink and share the various stakeholders associated with school assessment (NTS 3n). *E.g.* *Teachers, etc.* 2.5 Discuss, ink, and share the role of your assigned stakeholder and their roles in assessment (NTS 3e, 3n). *E.g.* *Teachers* *Identify the strengths and learning needs of learners, etc.* 2.6 Identify in the sample lesson plan (below) the connections among learning outcomes, pedagogy, and assessment (SEAG, p3, NTS 2e, 2f, 3c, 3d, 3f and 3g). *E.g.* *Linking objectives to the activities, etc.* 2.7 Read the lesson plan below, which provides an opportunity to discuss relevant pedagogies in the SHS/SHTS/STEM curriculum, and complete the activities presented after the lesson.	

	A sample lesson plan for teaching the concept of reproduction from the MoE (2010) SHS Science syllabus is provided below: *Sample Lesson Topic in Core Science:* ***a) Topic:*** *Reproduction* ***b) Sub-topic:*** *Reproduction in mammals.* ***c) Objectives:*** *By the end of the lesson, learners will be able to:* *i. Define reproduction* *ii. Draw and label the reproductive system of humans* *iii. Discuss the functions of the reproductive system of humans* ***d) Teaching and Learning Resources (TLRs):*** *Pictures of parts of the reproductive organs of male and female humans, simulation of functions parts of the reproductive organs of humans, computers, and projectors* ***e) Relevant Previous Knowledge (RPK):*** *Learners are aware of the parts of the human body* ***f) Introduction:*** *Using think-pair-share, ask learners to mention some examples of parts of the reproductive organs of humans* ***g) Tasks/ Activities:*** *i. In mixed groups (gender, ability, etc.), ask learners to research, discuss and present the definition for reproduction.* *ii. Show an annotated diagram or video of the male and female reproductive system of humans using a projector and ask learners to research and draw the reproductive system of humans.* *iii. Using the onion ring technique, ask learners to research and discuss the functions of the reproductive organs in male and female humans.* *NB: Encourage learners to actively participate and respect each other's views during discussion. Also, learners should be encouraged to respect individual differences and beliefs about their reproductive organs and their functions.* ***h) Core Points:*** *i. Definition of reproduction* *Reproduction is the biological process by which individual organisms, called offspring, are produced from their parents.*	

	ii. *Functions of some parts of the human reproductive system* • *Vagina: This muscular tube receives the penis during intercourse and through it, a baby leaves the uterus during childbirth.* • *Uterus: This organ holds and nourishes a developing fetus if an egg was properly fertilized.* • *Ovaries: The female gonads, the ovaries produce ova.* • *Penis: The organ used for urination and sexual intercourse. It has spongy tissue which can fill with blood to cause an erection.* • *Urethra: It carries both urine and semen.* • *Scrotum: This is a loose bag of skin that hangs outside the body, behind the penis.* *i)* ***21st-century skills and Core competencies:*** *i. Critical thinking* *ii. Digital literacy* *iii. Communication and collaboration skills* *iv. problem-solving skills, etc.* *j)* ***Conclusion:*** *Guide learners to reflect on the lesson using group discussion to provide feedback on what they have learned and how they would incorporate those ideas into their own lives.* ***k) Evaluation*** *i. Explain reproduction.* *ii. In mixed groups (gender, ability, etc.), task learners to do a project where they draw the male and female reproductive organs of humans and indicate the functions of the parts.* **Remarks:**	
3. Modeling a teaching activity, making links with the Pre-Tertiary (standard-based) curriculum and using GESI, SEL, ICT and 21st	3.1 Ask teachers to think-pair-ink and share the assessment strategies used in the sample lesson (NTS 1e, 2c,3e and 3g). *E.g.* *Group presentation, etc.* 3.2 Identify and discuss cross-cutting issues addressed in the lesson plan (NTS 1a, 2e, 3f, 3k and 3m).	30 mins

century skills	*E.g.* *a) GESI- forming groups based on gender and ability.* *b) SEL- encouraging self-evaluation and further motivating one's actions through think-pair-share.* *c) ICT- using a computer and projector to show videos.* *d) Differentiation- assessing learners in an equitable manner by tasks.* *e) Core values- learners will respect individual differences and beliefs about their reproductive organs and their functions.* *f) 21st-century skills - creativity and collaboration, etc.* 3.3 Model a teaching activity based on the sample lesson plan that could support learners who may be struggling with developing basic knowledge in science (NTS 1d, 2b, 2c, 2e, 2f, and 3c-3l). 3.4 Give feedback on how assessment was used in the modeled lesson (NTS 1a).	
4. Evaluation and review of the session: **Noting that teachers need to identify critical friends to observe lessons and report at the next session.**	4.1 Reflect, write, and share what you have learned with the larger group regarding the use of assessment processes in teaching and learning (NTS 1a, 1b, 3k). 4.2 Identify a critical friend to observe your lesson in relation to PLC Session 9 and provide feedback at the next PLC session (NTS 3l, 3n, and 3o). 4.3 Read PLC Session 10 in preparation for the next session.	10 mins

PLC Session 10: Assessment 2 – Assessment Strategies		
The sections below provide the frame for what is to be done in the session.	**Guidance Notes on Teacher Activity during the PLC Session.** *What teachers will do during each stage of the session*	**Time in session**
1. Introduction: Review of previous learning using ideas from the last PLC session	1.1 Share two things you did differently based on PLC Session 9 *on the assessment process,* which you think impacted learning. 1.2 Discuss in groups why you think what a colleague did by way of application of lessons learned in PLC Session 9 *on the assessment process,* supported student learning or otherwise, and provide your responses in a single sentence.	20 mins
2. Planning for teaching, learning, and assessment activities, promoting character values, GESI, SEL, ICT, 21st-century skills and differentiation	2.1 Read the purpose, Learning Outcomes (LOs), and Learning Indicators (LIs) for the session. **Purpose**: This session is to engage teachers to apply innovative and differentiated assessment strategies that incorporate various cross-cutting issues (i.e., GESI, SEL, ICT, 21st century skills and competencies, national core values) in their lessons. LO1: Demonstrate knowledge and understanding of the application of formative assessment. (SEAG, p. 2, 13, NTS 3k) LI 1.1 Identify the purposes of formative assessment. LI 1.2 Apply at least four (4) appropriate formative assessment strategies that elicit critical thinking skills among learners in the classroom. LI 1.3 Develop innovative formative assessment tools. LO2: Demonstrate knowledge and understanding of application of summative assessment in different contexts (NTS 3p). LI2.1 Explain at least three (3) ways in which summative assessment results are used in different contexts.	30 mins

	LI.2.2 Apply at least two (2) ways in which summative assessment can be used for formative purposes. 2.2 In mixed groups (gender, experience, background, etc.), discuss the rationale for formative assessment (NTS 3k). *E.g.* *It enables monitoring of learners' progress, etc.* 2.3 In groups, classify the identified rationale of formative assessment in Activity 2.2 into assessment as learning (AaL) and assessment for learning (AfL). *E.g.* *It enables monitoring of learners' progress (AfL), etc.* 2.4 Think-pair-ink and share at least four (4) appropriate formative assessment strategies that can be used in the classroom. *E.g.* *Observations during in-class activities, etc.* 2.5 Discuss and share at least three (3) uses of diagnostic assessment results as a formative assessment strategy in the classroom (SEAG p.9, NTS, 3k, 3l). *E.g.* *To identify the learners' strengths and weaknesses in a subject, etc.* 2.6 Discuss the various guidelines that can be followed in developing a formative assessment tool (SEAG p.8, NTS 3k). *E.g.* *Align internal assessment(s) with the learning outcomes, content standards, with emphasis on skills, attitudes, values, and competencies, etc.* 2.7 Using subject-based groups, apply the guidelines in *2.6* developing a checklist (SEAG p.8, NTS 3k, 3p). *E.g.* *Checklist items are aligned to the learning outcomes, content standards and learning indicators with emphasis on skills, values, and competencies, etc.*	

	2.8 Discuss and present at least three (3) innovative formative assessment strategies that take into consideration the cross-cutting issues (SEAG p.11, NTS 3g, 3k). *E.g.* *Essays: This is a write-up on a particular topic or issue of interest, e.g., long essay, reports, etc. (21st century skills)* 2.9 In mixed groups (gender, subjects-based, experience, etc.), research and discuss three relevant artifacts to be included in a portfolio (SEAG p.11, NTS 3h). *E.g.* *Samples of the learner's work, etc*. 2.10 Use one sentence to express how you feel about using the innovative formative assessment strategies in *2.8* (NTS 3k). *E.g.* *Excited* 2.11 In mixed groups (gender, experience, background, etc.), discuss and present three (3) ways by which summative assessment results can be used in different contexts (i.e., both internal and external) (SEAG p.5, NTS 3p). *E.g*. *Terminal promotion, etc.* 2.12 Use pyramid discussion to come out with how summative assessment results can be used for formative purposes (NTS 3l-3n). *E.g.* *Identify learners' strengths and needs on a task, etc.* 2.13 Discuss a sample lesson plan in social studies, which provided an opportunity for exploring assessment strategies in the SHS/SHTS/STEM and link it to appropriate innovative assessment strategies. *A sample lesson plan for teaching the concept of our culture and national identity from the MoE (2010) SHS Social Studies syllabus is provided below:* *Sample Lesson Topic in Social Studies:*	

	a) Topic: *Our Culture and National Identity* ***b) Sub-Topic:*** *Nature of Culture* ***c) Objectives:*** *By the end of the lesson the learner will be able to:* i. *State at least three (3) elements of the Ghanaian culture that bind us.* ii. *Explain the concept of national identity.* iii. *Analyse at least two (2) of the Ghanaian values and traits* ***d) Teaching and Learning Resources (TLRs)*****:** *Videos on cultural practices, pictures on aspects of cultural practices, cultural regalia, and computers.* ***e) Relevant Previous Knowledge*** **(RPK)**: *Learners live in communities where they are exposed to various cultural practices.* ***f) Introduction:*** *Using a typical folktale (e.g., Ananse and the wisdom pot story) about three Ghanaian communities (Ga, Fantes, Dagomba, Ashanti), ask learners to think-pair, ink and share their responses to questions about cultural activities that they have witnessed.* ***g) Task/Activities:*** i. *Based on the video watched and other resources available, discuss in groups of four (4) (having in mind GESI issues) and present the cultural traits and practices in Ghanaian localities which they think will promote national integration.* *ii. Using gallery walk, observed from the pictures displayed, discuss in pairs and share with the whole group at least three (3) elements of Ghanaian culture that bind us together as one people.* *iii. In mixed groups (gender, ability, etc.), watch a video on cultural practices and examine-ink and share at least two (2) of the Ghanaian cultural values and traits that help to provide a positive image for the country.* *Note: Learners should be encouraged to appreciate cultural dynamics and diversity. Also, learners should be encouraged to respect individual views during discussions.*	

	h) Core points*:** a) *Aspects of the Ghanaian culture that bind us include:* *i. festivals* *ii. funerals* *iii. marriage ceremonies* *iv. outdooring* v. *music and dance, etc.* *b). The concept of national identity: National identity includes the behaviours, traits and ideas that are commonly shared by the people of a nation. It also refers to the phenomenon where an individual sees themselves as part of their nation and relates to the symbols, traits, or psychological feelings connected with the nation and not only to their tribe or ethnic group.* *c) Some Ghanaian values and traits: Shared values include modesty, humility, respect, concern for others, hospitality, tolerance, resilience, etc.* ***i) 21st century skills and core competencies *i. critical thinking and problem-solving* *ii. communicative skills* *iii. collaboration* ***j) Conclusion:*** *Guide learners to reflect on the lesson using group discussion and ask them which real-life moral lessons they have learned.* ***k) Evaluation*** i. *In pairs, learners give a 15-minute PowerPoint presentation on the common cultural traits that bind us together as a nation* ii. *In pairs, learners research and write a project on the concept of national identity and its importance* iii. *Discuss at least four (4) ways by which national integration can be achieved by Ghanaian common values and traits.* ***Remarks:***	

3. Modelling a teaching activity, promoting character values, GESI, SEL, ICT and 21st-century skills	3.1 Think-pair-ink and share the assessment strategies used in the sample lesson (NTS 1e, 2c, 3e and 3g). *E.g.* *Group presentation, etc.* 3.2 Identify in the sample lesson plan, activities that could promote ICT, Gender Equality and Social Inclusion (GESI), 21st century skills and competencies, differentiation and Social and Emotional Learning (SEL) responsiveness (NTS 2e, 2f, 3c, 3d, 3f and 3g). *E.g.* *GESI- Groups formed based on gender and ability encouraged learners to be tolerant of others' views, etc.* 3.3 Model a teaching activity based on the sample lesson plan that could support learners who may be struggling with developing basic skills that can assist in their future learning taking into consideration GESI, SEL, and 21st-century skills and competencies (NTS 1d, 2b, 2c, 2e, 2f, 3a and 3c- 3l).	30 mins
4. Evaluation and review of the session: Noting that teachers need to identify critical friends to observe lessons and report at the next session.	4.1 Reflect, write, and share what they have learned with the larger group regarding the relevant assessment strategies that can support the delivery of the secondary education curriculum (NTS 1a, 1b). 4.2 Identify a critical friend to observe your lesson in relation to PLC Session 11 on *teaching and learning resources*, and provide feedback (NTS3n,3o). 4.3 Read PLC Session 11, *Teaching and Learning Resources*, in preparation for the next session.	10 mins

PLC Session 11: Teaching and Learning Resources (TLRs)		
The sections below provide the frame for what is to be done in the session.	**Guidance Notes on Teacher Activity during the PLC Session.** *What teachers will do during each stage of the session*	**Time in session**
1.Introduction: Review of previous learning using ideas from the last PLC session	1.1 Share two things you did differently in the classroom or elsewhere based on PLC session 10 on *assessment strategies,* which you think impacted students' learning. 1.2 In mixed groupings (gender, experience, background, etc.) discuss and summarise in a single sentence why you think what your colleague (critical friend) did by way of application of lessons learned in PLC session 10 on *assessment strategies,* supported learning or otherwise.	20 mins
2. Planning for teaching, learning and assessment activities to promote character, values, GESI, SEL, ICT and 21st century skills	2.1 Read the Purpose, Learning Outcomes (LOs) and Learning Indicators (LIs) for the session. **Purpose:** The purpose of this session is to discuss how Teaching and Learning Resources (TLRs) can be used to support teaching and learning of concepts in different subject areas taking into consideration cross-cutting issues (GESI, ICT, SEL, etc.). LO 1: Demonstrate knowledge and understanding of teaching and learning resources (TLRs) in the SHS/SHTS/STEM curriculum (NTS 3j, 3k and 3m). LI 1.1 Discuss at least four (4) teaching and learning resources that could be used to support teaching, learning and assessment in a subject area. LI 1.2 Suggest at least two (2) ways of improvising/creating TLRs that could be used to support teaching, learning and assessment in subject area. LO 2: Demonstrate understanding of the use of TLRs in the SHS/SHTS/STEM curriculum (NTS 3c-3g, 3i and 3m). LI 2.1 Describe at least how two (2) TLR(s) could be used to support teaching, learning and assessment in your subject area taking into consideration cross-cutting issues. LI 2.2 Suggest at least two (2) implications of using TLRs to support teaching, learning and assessment in your subject area.	30 mins

2.2 In pairs, mention at least four (4) TLRs in your subject area that are appropriate to all learners and could be used for teaching, learning and assessment (NTS 3j, 3k and 3m).

Note:
Use online and offline resources where applicable.

E.g.
Interactive board, etc.

2.3 In mixed groupings (gender, experience, background, etc.), discuss the uses of the TLRs mentioned in 2.2, taking into consideration individual differences and views (NTS 3c-3g, 3i and 3j).
E.g.
Interactive board: For illustrations, drawing, jotting/writing salient points, etc.

2.4 Explain the term 'improvisation' in relation to teaching and learning resources (NTS 3c, 3i).
E.g.
Improvisation is the act of producing and using local resources in the absence of real ones in teaching and learning situations, etc.

2.5 Identify improvised materials that could be used by all learners in place of the suggested resources in the SHS/SHTS/STEM curriculum if they are lacking /inadequate in your school (NTS 3c-3g, 3i and 3m).
E.g.

Original	***Improvised***
Tape measure	*Graduated string/ribbon, etc.*

Note
Create/use TLRs that are suitable for all learners which support teaching, learning and assessment in your subject groups / areas.

2.6 In mixed groupings (gender, experience, background, etc.) associate at least two (2) TLRs with specific concepts in your subject area (NTS 3c-3g, 3i and 3m).

E.g.

Concepts	TLRs
Scientific measurement	*Calculator, measuring cylinder, weighing scale, etc.*

2.7 Still in your mixed groupings, (gender, experience, background, etc.) examine how any two (2) TLRs are used in teaching and learning (NTS 3i, 3j and 3m).
E.g.

TLRs	*Uses/Procedure*
Measuring cylinder	*Measuring liquids/ chemicals. for instance, if a teacher wants to measure 20 millilitres of pesticides, he/ she pours the pesticides into the measuring cylinder to the 20 millilitres mark. Measuring cylinders have calibrations/ lines at the sides to represent the number of millilitres the cylinder contains and therefore the volume of liquid, etc.*

2.8 Individually write and share with the larger group at least two (2) impacts of using TLRs to teach concept(s) in your subject area (NTS 3g, 3j and 3m).
E.g.
It leads to effective engagement and understanding among learners, etc.

2.9 Discuss the sample lesson plan in ICT below and show how it can be taught with the support of TLRs for learners who struggle understanding *ICTs* and their relevance to SHS/SHTS/STEM curriculum (NTS 3e, 3f, 3g, 3h, 3i, 3j, 3k and 3l).

A sample lesson plan for teaching ICT:

a) ***Topic:*** *The promises of ICTs*
b) ***Sub-topic:*** *Benefits of ICTs*
c) ***Objectives:*** *By the end of the lesson, the learner will be able to:*
  i. Explain the concept of ICTs.
  ii. State at least three (3) areas in daily life where ICTs

	are used. *iii. Discuss at least five (5) benefits of ICTs in daily life.* ***d) RPK:*** *Learners are familiar with the following: Phones, ATM machines, traffic lights, laptops, desktop computers and projectors.* ***e) Teaching Learning Resources:*** *Personal computers, digital calculators, projectors, internet, smartboard, phones.* ***f) References:*** *i. ICT curriculum for Secondary Education.* *ii. Sharp, V.F. (2008). Computer Education for Teachers. Integrating Technology into Classroom Teaching. USA: John Wiley & Sons.* *iii. Summerville, J., & Reid-Griffin, A. (2008). Technology integration and instructional design. TechTrends, 52(5), 45-51.* *iv. Food and Agriculture Organization (n.d.). Information and Communication Technologies (ICT). Retrieved from Information and Communication Technologies (ICT) | AIMS (fao.org)* ***g) Introduction:*** *Put learners into five (5) mixed groupings, taking into consideration gender, abilities, background, etc. to discuss the ICT tools they have interacted with in their environment.* ***h) Activities/Tasks:*** *i. Ask learners to explain the term ICTs in their mixed groupings (gender, ability, background, etc.)* *ii. Ask each group to present (on flipcharts for gallery walk, PowerPoint, etc.) their findings to the whole class respecting each other's views.* *iii. Using presentation software, projector and board (white/black), present notes to support learners who have difficulty in coming out with the explanation of ICTs.* *iv. Task learners in pairs to think, ink and share with the whole class five (5) areas in their daily lives where ICTs are used.* *v. Put learners into four (4) mixed groupings, taking into consideration gender, ability, background, etc. (if possible) and ask each group to select a leader. (Teacher should take note of learners with special needs and include them)* *vi. Teacher writes on pieces of paper or projects the*	

	following areas where ICT can be used: Education, health, agriculture, business and engineering. *vii. Invite group leaders to pick one of the areas for discussion and presentation using different modes appropriate to them.* *viii. Invite feedback from the whole class on each groups' presentation.* *ix. Summarise key points to learners as notes.* ***i) Core points:*** *i. The concept ICTs:* *ICTs – Information and Communication Technologies is a broader term for information technology (IT), which refers to all communication technologies, including the internet, Internet of Things (IoTs), wireless networks, cell phones, computers, software, middleware, video-conferencing, social networking and other media applications and services enabling users to access, retrieve, store, transmit and manipulation of information in a digital form.* *ii. Areas for the application of ICTs: Areas where ICTs could be used: Education, health, agriculture, business, engineering, etc.* ● ***Education****: The use of ICTs encourages collaboration, enhances learning, for communication, for research, entertainment, etc.* ● ***Agriculture:*** *ICTs are used in the production of agrochemicals, for modelling improved seedlings and seeds; monitor crops and livestock, drone for collection of plants, soil data and help automation in farming, etc.* ● ***Health:*** *ICTs are used for diagnostic purposes, for prescription of medicines, for production of drugs, for documentation, research into diseases, simulation, etc.* ● ***Engineering****: ICTs are used for modelling, simulations, designing of sophisticated machines and equipment, design of robots, etc.* ● ***Business:*** *ICTs aid in counting/calculating, sales and feedback, e-commerce, communication, etc.* ***j) Conclusion:*** *Teacher concludes the lesson by asking learners to reflect and express how they felt about the use of ICTs in their daily life.*	

	k) Evaluation: *i. Discuss the concept of ICTs.* *ii. Describe one way you can relate ICTs to the following areas: Education, Health, Agriculture, Business and Engineering.* *iii. Argue for or against the fact that ICTs are relevant in this 21st century and beyond.* ***l) Remarks:***	
3. Modelling a teaching activity, promoting character /National values, GESI, SEL, ICT and 21st century skills, differentiation	3.1 Tease out in the sample lesson plan, activities that could promote ICT, Gender Equality and Social Inclusion (GESI), 21st century skills, differentiation and Social and Emotional Learning (SEL) responsiveness (NTS 2b, 2e, 2f, 3c, 3d, 3f and 3g). *E.g.* *In mixed groupings (gender, experience, background, etc.) teachers ask learners to define ICTs (GESI).* 3.2 Model a teaching activity based on the sample lesson plan that could support learners who may struggle with understanding of ICTs and their importance in their daily lives taking into consideration GESI, SEL and 21st century skills (NTS 1d, 2b, 2c, 2e, 2f, 3a and 3c- 3l). *E.g.* *Introduction, etc.* 3.3 Suggest at least three (3) improvised GESI responsive resources that could be used to deliver the same modelled lesson (NTS 3e, 3i and 3j). *E. g.* *Online videos, instead of; downloaded/recorded video with transcriptions and audios, etc.*	30 mins
4.Evaluation and review of session: **Noting that teachers need to identify critical friends to observe lessons and report at next session**	4.1 In mixed groupings (gender, experience, background, etc.) reflect, write and share what you have learned with the larger group with regard to TLRs (NTS 1a, 1b). 4.2 Where possible, identify a critical friend to observe your lesson in relation to PLC Session 11, on *teaching and learning resources*, and provide feedback to you (NTS 3n, 3o). 4.3 Read PLC Session 12, on *learning planner, in preparation for the next session (*NTS 3k, 3l and 3n*).*	10 mins

PLC Session 12: Learning Planner

The sections below provide the frame for what is to be done in the session.	**Guidance Notes on Teacher Activity during the PLC Session.** *What teachers will do during each stage of the session*	**Time in session**
1. Introduction: Review of previous learning using ideas from the last PLC session	1.1 Share what you did differently in the classroom or elsewhere based on PLC Session 11 on *Resources,* which you think impacted students' learning. 1.2 As critical friends, discuss and summarise in a single sentence why you think what your colleague did by way of application of lessons learned in PLC Session 11 on *Resources,* supported students' learning or otherwise.	20mins
2. Planning for teaching, learning and assessment activities, promoting character values, GESI, SEL, ICT, 21st century skills and differentiation	2.1 Read the Purpose, Learning Outcomes (LOs) and Learning Indicators (LIs) for the session. **Purpose:** The purpose of the session is to introduce the structure and organisation of the learning planner to teachers and discuss how to integrate GESI and other cross-cutting issues into the planning of a lesson with the learning planner. LO 1: Demonstrate knowledge and understanding of the structure and organisation of the learning planner (NTS 2b, 2c and 3a-3o). LI 1.1 Study the learning planner and identify its features. LI 1.2 Explain the various features of the learning planner. LI 1.3 Compare and contrast the learning planner to the existing lesson plan. LO 2: Demonstrate understanding of the use of the learning planner in planning a lesson (NTS 2b, 2c and 3a-3o). LI 2.1 Discuss the resources required to plan a lesson using the learning planner. LI 2.2 Discuss the sections of the secondary education curriculum required for planning a lesson. 2.2 Refer to Appendix 12, and in your mixed groupings (gender, subject, background, experience, etc.), study the learning planner and identify its features (NTS 2a, 2b). *E.g.* *Content standard, etc.*	30mins

	2.3 In groups, discuss and make a presentation on the features identified in the learning planner (NTS 2a - 2c). *E.g.* *Strands:* *Strands are the broad areas or sections of learning in the subject. For instance, English Language has the following strands – Oral Language, Reading, Grammar, Writing and Literature, etc.* 2.4 In groups, discuss and come out with the differences and similarities between the existing lesson plan and the learning planner (NTS 2a-2c). *E.g.* *There is a conscious integration of GESI and other cross-cutting issues. in the learning planner unlike the existing lesson plan, etc.* 2.5 In groups, discuss and come out with relevant resources required for planning a lesson with the learning planner (NTS 1a, 2a-2c, 3a - 3g and 3j). *E.g.* *Curriculum, etc.* 2.6 In groups, study the SHS/SHTS/STEM curriculum and discuss the sections that are required for the preparation of a lesson using the learning planner (NTS 1a, 1b, 2a-2f and 3a-3m). *E.g.* *Content standard, etc.* *Refer to Appendix 12 for a sample learning planner*	
3. Modelling a teaching activity, promoting character values, GESI, SEL, ICT, 21st century skills and differentiation	3.1 In groups, extract the strand, sub-strand, content standard(s), learning outcome(s), and learning indicator(s) in the sample learning planner in Appendix 12 (NTS 1a, 2b and 3a). *E.g.* *Strand:* *Making sense of and using data, etc.* 3.2 In groups, tease out the activities that could promote GESI, SEL, ICT, 21st century skills and competencies and differentiation in the sample learning planner (NTS 2c, 2e, 2f and 3a – 3h). *E.g.* *GESI:*	30mins

	Encouraging learners to be tolerant and circumspect with their criticisms and commentary on other presentations and the use of mixed-ability groups during class activities, etc. 3.3 In groups, share your views on how to integrate ICT into their learning planners (NTS 1a, 3e, 3g and 3j). *E.g.* *Creating teaching and learning resources using ICT tools, etc.* 3.4 Suggest ways of planning differentiated lessons that meet the varied needs of learners. (NTS 1a, 2c, 2e, 2f and 3a-3o). *E.g.* *Adopting different pedagogical approaches such as experiential learning, talk-for-learning, case study and peer editing that meet the varied needs of learners, etc.* 3.5 Model a teaching activity in your subject area (taking a cue from the sample learning planner) integrating GESI, SEL, ICT, 21st century skills and competencies and differentiation and respond to feedback from your colleagues (NTS 1a, 2b, 2c, 2e, 2f and 3a-3o).	
4. Evaluation and review of the session: **Noting that teachers need to identify critical friends to observe lessons and report at the next session**	4.1 In groups, reflect, write and share what you have learned from all the PLC sessions and how you feel, with the larger group (NTS 1a, 1b). 4.2 Where possible, identify a critical friend to observe your lesson in relation to PLC Session 12 and provide feedback to you (NTS 1a, 1e and 3l).	10 mins

APPENDIX 12

<table>
<tr><th colspan="6">Weekly Learning Planner</th></tr>
<tr><td>Subject</td><td>Mathematics</td><td>Week</td><td>1</td><td>Form</td><td>SHS 1</td></tr>
<tr><td>Strand</td><td>Making sense of and using data</td><td>Sub-Strand</td><td colspan="3">Statistical reasoning and its application in real life</td></tr>
<tr><td>Content Standard</td><td colspan="5">Demonstrate conceptual understanding of data organisation and presentation for grouped and ungrouped data including 3D graphs/charts with appropriate digital technology.</td></tr>
<tr><td>Learning Outcome(s)</td><td colspan="5">Organise, analyse and present data using frequency tables, line graphs, pie charts, multiple bar graphs, infographics, box and whisker plots, etc.; generate 3D graphs/charts with appropriate digital technology (where available) and solve problems on them.</td></tr>
<tr><td>Learning Indicator(s)</td><td colspan="5">Organise and present data (grouped/ungrouped) using frequency tables, including using appropriate digital technology (where available) and solve problems on them.</td></tr>
<tr><td>Essential Question(s) linked to the Knowledge Hierarchy aligned with the Content Standards and Learning Indicators</td><td colspan="5">• How can quantitative data be used to display the frequency distribution of goods and services?
(Understand, analyse and apply)
• Why are graphical representations of data a good strategy in presenting data?
(Understand, analyse)</td></tr>
<tr><td>Pedagogical Strategies</td><td colspan="5">Project-based learning; Small groups and large groups discussions, mixed ability groups
mixed-gender groups, think-pair-share, “Know, Want-to-know, and Learned (KWL)”
Individualised practice, Experiential learning, etc.</td></tr>
<tr><td>Teaching & Learning Resources</td><td colspan="5">Mathematical sets, computer with data organising software like Excel, A4, A3 papers, manila cards, flip charts, markers, colour pens, projector, etc.</td></tr>
<tr><td colspan="6">Key Notes on Differentiation</td></tr>
<tr><td>Content</td><td colspan="5">Highly Proficient (HP): Extend content to include more than 100 items in a given quantitative data.
Proficient (P): Extend content to include more than 80 items in a given quantitative data.
Approaching Proficiency (AP): Limit content to at most 50 items in the data.</td></tr>
<tr><td>Process</td><td colspan="5">Use mixed-ability, hence assign specific roles to them in their groups and agree on a success criterion (referring to the product) to discuss their performance.</td></tr>
<tr><td>Product</td><td colspan="5">HP: Accept fully completed tasks including frequency table generated with</td></tr>
</table>

	an IT tool and give additional tasks where necessary. ***P:*** *Accept fully completed tasks including frequency table generated with an IT tool.* ***AP:*** *Accept fully completed tasks, allow frequency table constructed by hand.* ***Note:*** *Encourage learners who are able to employ an appropriate IT tool for their assessment task. But show appreciation for learners who are unable to afford or competently employ IT in the delivery of their work.*		
Keywords	*Data, qualitative, quantitative, frequency, validate, grouped, ungrouped, etc.*		
Starter	**Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Manual**		**Assessment DoK aligned to the Curriculum and Subject Manual**
Group Activity- 5min *Review learners' previous knowledge of frequency distribution tables using real-life examples from school records, by; asking learners in mixed-gender groups to discuss the features of the frequency distribution table and prepare a sample for whole-class discussion.*	***Teacher Activities*** ***Introduction: (10 minutes)*** *I. Help learners to organise themselves in mixed-ability groups, then present them with raw numeric data (ungrouped) and task them to discuss and come up with two different ways they can present the data that will make it appealing to users. Encourage learners to show respect for individual diverse views as they interact and collaborate in their groups.* *II. In an all-inclusive class discussion, lead the class to discuss the various data presentation methods. Encourage learners to be tolerant and circumspect with their criticisms and commentary on others' presentations.*	***Learner Activities*** ***Introduction: (10 minutes)*** *I. In your groups, discuss the data and come out with two different ways that you can present the data to make it appealing to other users. Please as you carry out your discussions, show respect to others' views as you interact and collaborate with group members.* *II. In your groups, discuss the various data presentation methods. Please be tolerant and circumspect with your criticisms and commentary on others' presentations.*	***Level 1: Recall;*** *1. Outline the key features of a frequency distribution table.* ***Level 2: Skills of conceptual Understanding;*** *2. Explain with justifications whether there is any worth in organizing a given data collected before presenting it to your audience.* ***Level 2: Skills of conceptual Understanding;*** *3. Obtain a past WASSCE result for your school for data for a particular year and construct a frequency distribution table for the number of "A_s" for all the subjects.*

	Learning Activity 1: (15 minutes) *I. Using learners' previous knowledge to transition them to the new learning.* *II. Put learners in mixed-gender groups and present learners with real sample data collected from the school community (Past WASSCE results, enrolment records, athletics records, etc.) and ask them to organise it into a frequency distribution table using an Excel sheet or Microsoft Word application where available.*	***Learning Activity 1: (15 minutes)*** *I. Share with the class what you know about data collection methods.* *II. In your groups, organise the data into a frequency distribution table using an Excel sheet or Microsoft Word application where available. Please be wary of the use of the IT tool for this task. Use it appropriately as expected of you.*	
	Learning Activity 2: (15 minutes) *I. Using a computer application tool for presentations such as PPTs (where available), call out groups to present their frequency tables to the class. Be fair in the allocation of resources to groups for their presentations.* *II. Offer the opportunity for the class to ask questions and make contributions to the presentations. Encourage learners to comment on how confidently and effectively their*	***Learning Activity 2: (15 minutes)*** *I. Design a presentation using a computer application tool such as PPTs and present your frequency tables to the class.* *II. Please ask questions and contributions to the presentations. Tell how confidently and effectively your friends presented their work including the use of the right vocabulary for the concept being treated.*	

	friends presented their work including the use of the right vocabulary for the concept being treated. ***Learning Activity 3: (10 minutes)*** *In a whole class discussion, demonstrate to the class how data can be properly organised into a frequency table. Give learners the opportunity to ask questions for further clarification to consolidate their ideas. Encourage learners to be wary of biases about the presentations and abilities of different groups as they seek further explanation and clarification from the class.*	***Learning Activity 3: (10 minutes)*** *Contribute to a whole class discussion, how data can be properly organised into a frequency table. Ask questions for further clarification to consolidate your ideas. Please be wary of biases about others seeking further explanation and clarification from the class.*	

Lesson Closure

Activity (10 minutes)

I. *Make a seamless transition to plenary by making reference to the "Essential Questions on Knowledge Hierarchy" and engage learners to share ideas on them.*

II. *Wrap up the lesson by summarising learners' ideas with them and guide them to write these ideas in their notebooks. (Offer learners the opportunity to ask questions for further clarification and address any misconceptions if any)*

III. *Have a general class voting on how learners feel at the end of the lesson.*

Reflection & Remarks

These are the thoughts and comments of the teacher after completing a lesson or class. They include teachers' personal observations, the things learned, and any questions or concerns about the material covered. Teachers reflecting on their learning experience is helpful in reinforcing their understanding of the material and identifying areas where they may need further clarification or practice. Teachers providing feedback and remarks to learners helps improve the quality of the lesson and the learning experience in the next lesson.

Appendix A

Content Standards	Learning Indicators and Pedagogical Exemplars with 21st Century Skills and Competencies, and GESI	Assessment
1.1.1.CS.1	1.1.1.LI.1	1.1.1.AS.1
Demonstrate understanding of number concepts and basic operations.	**Categorise real numbers as natural/ counting numbers, whole numbers, integers, rational and Irrational numbers.** **Talk for Learning:** Discuss a brief history and importance of numbers to arouse the interest of learning about numbers among learners (Numbers are everywhere and are connected to everything we do. Number systems have progressed from the use of fingers and tally marks, perhaps more than 40,000 years ago. Indian mathematicians are credited with developing the integer version of the Hindu–Arabic numeral system. Aryabhata of Kusumapura was known to have developed the place-value notation in the 5th century, and a century later, Brahmagupta introduced the symbol for zero. We use numbers in reading time, date, year and weather. We use numbers in school and work, counting money, measurements, phone numbers, passwords on phones, locks, reading, page numbers, TV and radio channels, measures in feet, inches, meters and yards and what you can think of). **Group work/ Collaborative Learning:** Work in mixed-ability and gender-balanced groups (as appropriate) to identify the set of real numbers (rational and irrational), with the aid of models such as Venn diagram, number lines, number tracks, algebraic tiles, etc.	**Level 1 Recall** **Level 2 Skills of conceptual understanding** Level 3 Strategic reasoning Level 4 Extended critical thinking and reasoning

Appendix B

Subject	**Intervention mathematics**	
Strand	**1. Numbers for everyday life**	
Sub-Strand	**1. Number sense**	
Learning Outcomes	**21st-Century Skills and Competencies**	**GESI, SEL and Shared National Values**
1.1.1.LO.1		
Describe the relationship between subsets of real numbers and perform operations on them.	**Communication:** Connect mathematical ideas between different areas of mathematics, to everyday experiences and to other disciplines. **Critical Thinking:** • Develop visualisation skills to assist in processing information, making connections and solving problems on the real number system. • Carry out tasks accurately, efficiently and appropriately. **Digital Literacy:** Select and use technologies as tools for describing the relationships between the subset of the real number system.	**GESI:** Gender Equality and Social Inclusion is very important with regard to teaching all learners and, most especially, with intervention programme in mathematics. Teaching and learning of mathematics involving describing the relationship between subsets of real numbers and performing operations on them should include: • Respect for individuals' different beliefs, religions and cultures as they learn about the subsets of real numbers through mathematical discourse. • Provide opportunities for learners to communicate orally and in writing in the language they feel most comfortable in when describing subsets of numbers and their relationships. • Create opportunities for learners to work with others in a variety of groups (pairs, small groups, large groups) in establishing subsets and their operations. • Use exemplars that reflect a variety of cultures, environments and settings to consolidate the concept of numbers to develop problem-solving competencies or skills. • Guide and facilitate learning by generating discourse among learners and challenge them to accept responsibility for their own learning based on their unique individual differences. **SEL:** Demonstrate awareness of core skills, individual characteristics and socio-cultural issues in teaching and learning mathematics in the context of the real number system. **Self-Awareness:** Assist learners in developing the ability to recognise their emotions and thoughts as they discuss misconceptions in learning concepts of the real number system.

	Integrated Problem-Solving Competency: Engage learners in different problem-solving processes in numbers to develop viable, inclusive and equitable solution options that promote sustainable learning outcomes.	**Social- Awareness:** • Harness students' strengths, interests, and challenges by incorporating activities that allow them to build and share their experiences as they interact with each other to identify the set of real numbers. • Provide mathematical problems with contexts that are meaningful to all learners, such as problems that reflect learners' interests, home–life, experiences and cultural backgrounds that can arouse their curiosity. **Shared National Values:** **Truth and Honesty:** Encourage truth and honesty to create a foundation of trust within the learning environment through learners' interactions with one another. **Tolerance and Respect:** Create opportunities for learners to appreciate diverse perspectives, cultures, and backgrounds through collaboration and group work. **Equity and Equality:** Promote equity and equality among learners by addressing issues of bias, discrimination, and inequality when forming groups for learners to work in. This will create a classroom environment where all students feel valued and respected.

Content Standards	Learning Indicators and Pedagogical Exemplars with 21st Century Skills and Competencies, and GESI	Assessment
3.3.2.CS.3	3.3.2.LI.1	3.3.2.AS.1
Demonstrate knowledge, understanding of food production and entrepreneurial skills necessary for gainful employment	**Package food products and suggest various strategies to market them** **Problem based learning:** In mixed ability/gender/ friendly/cultural /random groups, review qualities of food packaging materials learnt in SHS 2. **Experiential Learning/Group work/ Collaborative learning:** In mixed ability/gender/friendly/cultural /random groups: • Develop and package various food products. • Label the product appropriately. • Suggest marketing strategies. • Display samples of packaged products for appraisal and sale.	Level 1 Recall **Level 2 Skills of conceptual understanding** **Level 3 Strategic reasoning** **Level 4 Extended critical thinking and reasoning**
	3.3.2.LI.2	3.3.2.AS.2
	Discuss work ethics in food industry **Problem based learning:** In mixed ability/gender/friendly/cultural /random groups, employ think-pair-share to explain the term work ethics and its importance in the food industry. **Group work/ Collaborative learning:** In mixed ability/gender/ friendly/cultural /random groups, discuss qualities that promote good work ethics E.g., • Punctuality at work • Honesty • Being reliable **Experiential learning:** In mixed ability/gender/friendly/cultural /random groups' role play to depict some work ethics at a food production or service establishment.	Level 1 Recall **Level 2 Skills of conceptual understanding** **Level 3 Strategic reasoning** **Level 4 Extended critical thinking and reasoning**

APPENDIX C: EXCERPTS FROM THE SHS/SHTS/STEM CURRICULUM

THE SHS/SHTS/STEM CURRICULUM OVERVIEW

The vision for this curriculum is to ensure the nation has a secondary education system which enables all Ghanaian children to acquire the 21st Century skills, competencies, knowledge, values and attitudes required to be responsible citizens, ready for the world of work, further studies and adult life. The nation's core values drive the SHS curriculum, and it is intended to achieve the Sustainable Development Goal 4: 'Inclusive, equitable quality education and life-long learning for all'. Above all, it is a curriculum enabling its graduates to contribute to the ongoing growth and development of the nation's economy and well-being.

The curriculum is inclusive, flexible, and robust. It was written under the auspices of the National Council for Curriculum and Assessment by a team of expert curriculum writers from across Ghana. It reflects the needs of critical stakeholders, including industry, tertiary education, the West African Examination Council, SHS learners, teachers, and school leaders. It has been written in accordance with the National Pre-tertiary Learning and Assessment Framework and the Secondary Education Policy.

The Key features of the curriculum include:

- flexible learning pathways at all levels, including for Gifted and Talented learners and those with deficiencies in numeracy and literacy, to ensure it can meet the needs of learners from diverse backgrounds and with different interests and abilities.
- the five core learning areas for secondary education: science and technology, language arts, humanities, technical and vocational and business; with emphasis placed on STEM and agriculture as integral to each subject.
- a structured, standards-based approach is used to support the acquisition of knowledge, skills and competencies, and transition and seamless progress throughout secondary education, from JHS to SHS and through the three years of SHS.
- a focus on interactive approaches to teaching and assessment to ensure learning goes beyond recall enabling learners to acquire the ability to understand, apply, analyse and create.
- guidance on pedagogy, coupled with exemplars, demonstrating how to integrate cross-cutting themes such as 21st Century skills, core competencies, the use of ICT, literacy and mathematics, Social Emotional Learning and Gender Equality and Social Inclusion as tools for learning and skills for life. Shared Ghanaian values are also embedded in the curriculum.

The curriculum writing process was rigorous and involved developing and using a Curriculum Writing Guide which provided systematic instructions for writers. The process was quality assured at three levels: through (a) evaluation by national experts, (b) trialling curriculum materials in schools and (c) through an external evaluation by a team of national and international experts. Evidence and insights from these activities helped hone the draft's final version. The outcome is a curriculum coherently aligned with national priorities, policies and the needs of stakeholders. A curriculum tailored to the Ghanaian context ensures that all learners benefit from their schooling and develop their full potential.

The following section highlights the details of the front matter of the draft curriculum. The vision, philosophy and the goal of the curriculum are presented. The details of the 21st Century skills and competencies, teaching and learning approaches, instructional design and assessment strategies follow this. The template for the curriculum frame, which outlines the scope and sequence, the design that links the learning outcomes to particular 21st Century skills and competencies, as well as Gender Equality and Social Inclusion, Social and Emotional Learning and Ghanaian Values are presented together with the structure of the lesson frame showing the links between the content standards, learning indicators with their corresponding pedagogical exemplars and assessment strategies.

Introduction

Effective implementation of this Senior High School (SHS) curriculum is the key to creating a well-educated and well-balanced workforce that is ready to contribute to Ghana's progress by harnessing the potential of the growing youth population, considering the demographic transition the country is currently experiencing (Educational Strategic Plan [ESP] 2018-2030). SHS curriculum aims to expand equitable, inclusive access to relevant education for all young people, including those in disadvantaged and underserved communities, those with special educational needs and those who are gifted and talented. Senior High School allows young people to develop further skills and competencies and progress in learning achievement, building from the foundation laid in Junior High School. This curriculum intends to meet the learning needs of all high school learners by acquiring 21st Century skills and competencies to prepare them for further studies, the world of work and adult life. Changing global economic, social and technological context requires life-long learning, unlearning, continuous processes of reflection, anticipation and action.

Philosophy of Senior High School Curriculum

The Philosophy underpinning the SHS curriculum is that every learner can develop their potential to the fullest if the right environment is created and skilled teachers effectively support them to benefit from the subjects offered at SHS. Every learner needs to be equipped with skills and competencies of interest to further their education, live a responsible adult life or proceed to the world of work.

Vision of Senior High School Curriculum

The vision of the curriculum is to prepare SHS graduates equipped with relevant skills and competencies to progress and succeed in further studies, the world of work and adult life. It aims to equip all learners with the 21st Century skills and competencies required to be responsible citizens and lifelong learners. When young people are prepared to become effective, engaging, and responsible citizens, they will contribute to the ongoing growth and development of the nation's economy and well-being.

Goal of Senior High School Curriculum

The goal of the curriculum is to achieve relevant and quality SHS through the integration of 21st Century Skills and Competencies as set out in the Secondary Education Policy. The key features to integrate into the curriculum are:

- **Foundational Knowledge**: literacy, numeracy, scientific literacy, information, communication and digital literacies, financial literacy and entrepreneurship, cultural identity, civic literacy and global citizenship
- **Competencies:** critical thinking and problem-solving, innovation and creativity, collaboration, and communication
- **Character Qualities:** discipline and integrity, self-directed learning, self-confidence, adaptability and resourcefulness, leadership, and responsible citizenship.

The JHS curriculum has been designed to ensure that learners are adequately equipped to transition seamlessly into SHS, where they will be equipped with the relevant knowledge, skills and competencies. The SHS curriculum emphasizes character building, acquisition of 21st Century skills and competencies and nurturing core values within an environment of quality education to ensure the transition to further study, the world of work and adult life. This requires the delivery of robust secondary education that meets the varied learning needs of the youth in Ghana. The SHS curriculum, therefore, seeks to develop learners to become technology-inclined, scientifically literate, good problem solvers who can think critically and creatively and are equipped to communicate with fluency, and possess the

confidence and competence to participate fully in Ghanaian society as responsible local and global citizens – (referred to as 'Glocal citizens').

The SHS curriculum is driven by the nation's core values of truth, integrity, diversity, equity, discipline, self-directed learning, self-confidence, adaptability and resourcefulness, leadership, and responsible citizenship, and with the intent of achieving the Sustainable Development Goal 4: 'Inclusive, equitable quality education and life-long learning for all'. The following sections elaborate on the critical competencies required of every SHS learner:

Gender Equality and Social Inclusion (GESI)

- Appreciate their uniqueness about others.
- Pay attention to the uniqueness and unique needs of others.
- Value the perspective, experience, and opinion of others.
- Respect individuals of different beliefs, political views/ leanings, cultures, and religions.
- Embrace diversity and practice inclusion.
- Value and work in favour of a democratic and inclusive society.
- Be conscious of the existence of minority and disadvantaged groups in society and work to support them.
- Gain clarity about misconceptions/ myths about gender, disability, ethnicity, age, religion, and all other excluded groups in society
- Interrogate and dispel their stereotypes and biases about gender and other disadvantaged and excluded groups in society.
- Appreciate the influence of socialization in shaping social norms, roles, responsibilities, and mindsets.
- Identify injustice and advocate for change.
- Feel empowered to speak up for themselves and be a voice for other disadvantaged groups.

21st Century Skills and Competencies

In today's fast-changing world, high school graduates must be prepared for the 21st Century workforce. The study of Mathematics, Science, and Language arts alone are no longer enough. High school graduates need a variety of skills and competencies to adapt to the global economy. Critical thinking, creativity, collaboration, communication, information literacy, media literacy, technology literacy, flexibility, leadership, initiative, productivity, and social skills are needed. These skills help learners to keep up with today's fast-paced job market. Employers want workers with more than academic knowledge. The 21st Century skills and competencies help graduates navigate the complex and changing workplace. Also, they help them become active citizens who improve their communities. Acquisition of 21st Century skills in high school requires a change in pedagogy from the approach which has been prevalent in Ghana in recent years. Teachers should discourage and abandon rote memorization and passive learning. Instead, they should encourage active learning, collaboration, and problem-solving. Project-based, inquiry-based, and other learner-centered pedagogy should be used. As well as aligning with global best practices, these approaches also seek to reconnect formal education in Ghana with values-based indigenous education and discovery-based learning which existed in Ghana in pre-colonial times. This is aligned with the 'glocal' nature of this curriculum, connecting with Ghana's past to create confident citizens who can engage effectively in a global world. Digitalization, automation, technological advancement and the changing nature of work globally means that young people need a new set of skills, knowledge and competencies to succeed in this dynamic and globalized labour market.

Critical thinking and Problem-Solving competency	***Creativity***
• Ability to question norms, practices, and opinions, to reflect on one's own values, perceptions, and actions. • Ability to use reasoning skills to come to a logical conclusion. • Being able to consider different perspectives and points of view. • Respecting evidence and reasoning. • Not being stuck in one position • Ability to take a position in a discourse. • The overarching ability to apply different problem-solving frameworks to complex problems and develop viable, inclusive, and equitable solution options that integrate the above- mentioned competences and, promote sustainable development.	• Ability to identify and solve complex problems through creative thinking. • Ability to generate new ideas and innovative solutions to old problems. • Ability to demonstrate originality and flexibility in approaching tasks and challenges. • Collaborating with others to develop and refine creative ideas. • Ability to incorporate feedback and criticism into the creative process. • Utilizing technology and other resources to enhance creativity. • Demonstrating a willingness to take risks and experiment with new approaches. • Adapting to changing circumstances and further information to maintain creativity. • Integrating multiple perspectives and disciplines to foster creativity. • Ability to communicate creative ideas effectively to a variety of audiences.
Collaboration	***Communication***
• The ability to learn from others; to understand and respect the needs, perspectives, and actions of others (empathy). • Ability to understand, relate to and be sensitive to others (empathic leadership). • Ability to deal with conflicts in a group. • Ability to facilitate collaborative and participatory problem solving. • Ability to work with others to achieve a common goal. • Ability to engage in effective communication, active listening, and the ability to compromise. • Ability to work in groups on projects and assignments.	• Know the specific literacy and language of the subjects studied. • Use language for academic purposes. • Communicate effectively and meaningfully in a Ghanaian language and English Language. • Communicate confidently, ethically, and effectively in different social contexts. • Communicate confidently and effectively to different participants in different contexts. • Ability to communicate effectively, verbally, non-verbally and through writing. • Demonstrate requisite personal and social skills that are consistent with changes in society. • Ability to express ideas clearly and persuasively, listen actively, and respond appropriately. • Ability to develop digital communication skills such as email etiquette and online collaboration. • Ability to engage in public speaking, debate,

	and written communication.
Learning for life	
• Understand subject content and apply it in different contexts. • Apply mathematical and scientific concepts in daily life. • Demonstrate mastery of skills in literacy, numeracy, and digital literacy. • Develop an inquiry-based approach to continual learning. • Be able to understand higher order concepts and corresponding underlying principles. • Participate in the creative use of the expressive arts and engage in aesthetic appreciation. • Use and apply a variety of digital technologies. • Be digitally literate with a strong understanding of ICT and confident in its application. • Be equipped with the necessary qualifications to gain access to further and higher education and the world of work and adult life. • Ability to apply knowledge practically in the workplace so that they are able to utilise theory by translating it into practice. • Develop their abilities, gifts and talents to be able to play a meaningful role in the development of the country. • Be able to think critically and creatively, anticipate consequences, recognise opportunities and are risk- takers.	• Ability to pursue self-directed learning with the desire to chart a path to become effective lifelong learners. • Independent thinkers and doers who show initiative and take action. • Ability to innovate and think creatively, building on their knowledge base so that they take risks to achieve new goals. • Ability to think critically and solve problems so that they become positive change agents at work, in further study and in their personal lives. • Be motivated to adapt to the changing needs of society through self-evaluation and on-going training. • Be able to establish and maintain innovative enterprises both individually and in collaboration with others. • Be able to ethically prioritise economic values to ensure stability and autonomy. • Show flexibility and preparedness to deal with job mobility. • Be committed towards the improvement of their quality of life and that of others. • Feel empowered in decision-making processes at the various levels e.g., personal, group, class, school, etc. • Be able to seek and respond to assistance, guidance and/or support when needed. • Ability to make and adhere to commitments. • Adopt a healthy and active lifestyle and appreciate how to make good use of leisure time. • Be enthusiastic, with the knowledge, understanding and skill that enable them to progress to tertiary level, world of work and adult life. • Ability to transition from school to the world or work or further study by applying knowledge, skills and attitudes in new situations. • Be independent, having academic and communication skills such as: clarity of expression (written and spoken), and the ability to support their arguments.

	• Be innovative and understand the 21st Century skills and competencies and apply them to everyday life.
Global and Local (Glocal) Citizenship	***Systems thinking competency***
• Appreciate and respect the Ghanaian identity, culture, and heritage. • Be conscious of current global issues and relate well with people from different cultures. • Act in favour of the common good, social cohesion and social justice. • Have the requisite personal and social skills to handle changes in society. • Appreciate the impact of globalisation on the society. • Ability to be an honest global citizen displaying leadership skills and moral fortitude with an understanding of the wider world and how to enhance Ghana's standing.	• Ability to recognize and understand relationships. • Ability to analyse complex systems. • Ability to think of how systems are embedded within different domains and different scales. • Ability to deal with uncertainty.
Normative competency	***Anticipatory competency***
• Ability to understand and reflect on the norms and values that underlie one's actions. • Ability to negotiate values, principles, goals, and targets, in a context of conflicts of interests and trade-offs, uncertain knowledge and contradictions.	• Ability to understand and evaluate multiple futures – possible, probable, and desirable. • Ability to create one's own visions for the future. • Ability to apply the precautionary principle. • Ability to assess the consequences of actions. • Ability to deal with risks and changes.
Strategic competency	***Self-awareness competency***
• Ability to collectively develop and implement innovative actions that further a cause at the local level and beyond. • Ability to understand the bigger picture and the implications of smaller actions on them.	• The ability to reflect on one's own role in the local community and (global) society. • Ability to continually evaluate and further motivate one's actions. • Ability to deal with one's feelings and desires.

Social Emotional Learning (SEL): Five Core Competencies with examples

Understanding one's emotions, thoughts, and values and how they influence one's behaviour in various situations. This includes the ability to recognise one's strengths and weaknesses with a sense of confidence and purpose. For instance:

- *Integrating personal and social identities;*
- *Identifying personal, cultural, and linguistic assets;*
- *Identifying one's emotions;*
- *Demonstrating honesty and integrity;*
- *Connecting feelings, values, and thoughts;*
- *Examining prejudices and biases;*
- *Experiencing self-efficacy;*
- *Having a growth mindset;*
- *Developing interests and a sense of purpose;*

The capacity to control one's emotions, thoughts, and actions in a variety of situations and to realise one's ambitions. This includes delaying obtaining one's desires, dealing with stress, and feeling motivated and accountable for achieving personal and group goals. For instance:

- *Managing one's emotions;*
- *Identifying and utilising stress-management strategies;*
- *Demonstrating self-discipline and self-motivation;*
- *Setting personal and group goals;*
- *Using planning and organisation skills;*
- *Having the courage to take the initiative;*
- *Demonstrating personal and collective agency;*

The capacity to comprehend and care for others regardless of their backgrounds, cultures, and circumstances. This includes caring for others, understanding larger historical and social norms for behaviour in different contexts, and recognising family, school, and community resources and supports. For instance:

- *Recognizing others' strengths*
- *Demonstrating empathy and compassion*
- *Caring about others' feelings*
- *Understanding and expressing gratitude*
- *Recognizing situational demands and opportunities*
- *Understanding how organizations and systems influence behaviour.*

The capacity to establish and maintain healthy, beneficial relationships and adapt to various social situations and groups. This includes speaking clearly, listening attentively, collaborating, solving problems and resolving conflicts as a group, adapting to diverse social and cultural demands and opportunities, taking the initiative, and asking for or offering assistance when necessary. For instance:

- *Communicating effectively;*
- *Building positive relationships;*
- *Demonstrating cultural competence;*
- *Working as a team to solve problems;*
- *Constructively resolving conflicts;*
- *Withstanding negative social pressure;*
- *Taking the initiative in groups;*
- *Seeking or providing assistance when needed;*
- *Advocating for the rights of others.*

The capacity to make thoughtful and constructive decisions regarding acting and interacting with others in various situations. This includes weighing the pros and cons of various personal, social, and group well-being actions. For example:

- *Demonstrating curiosity and an open mind;*

- *Solving personal and social problems;*
- *Learning to make reasonable decisions after analysing information, data, and facts;*
- *Anticipating and evaluating the effects of one's actions;*
- *Recognising that critical thinking skills are applicable both inside and outside of the classroom;*
- *Reflecting on one's role to promote personal, family, and community well-being;*
- *Evaluating personal, interpersonal, community, and institutional impacts.*

Learning and Teaching Approaches

Learning and teaching should develop learners as self-directed and lifelong learners. Learners must be helped to build up deep learning skills and competences to develop the ability to acquire, integrate and apply knowledge and skills to solve authentic and real-life problems. Learners need to be exposed to a variety of learning experiences to enable them to collaborate with others, construct meaning, plan, manage, and make choices and decisions about their learning; this will allow them to internalise newly acquired knowledge and skills and help them to take ownership of their education. The 21st Century skills and competencies describe the relevant global and contextualised skills that the SHS curriculum is designed to help learners to acquire in addition to the 4Rs (reading, writing, arithmetic and creativity). These skills and competencies, as tools for learning and teaching and skills for life, will allow learners to become critical thinkers, problem-solvers, creators, innovators, good communicators, collaborators, digitally literate, and culturally and globally sensitive citizens who are life-long learners with a keen interest in their personal development and contributing to national development.

Given the diverse needs of learners, teachers need to have a thorough grasp of the different pedagogies as they design and enact meaningful learning experiences to meet the needs of different learners in the classroom. The teaching-learning techniques and strategies should include practical activities, discussion, investigation, role play, problem-based, context-based, and project-based learning. Active learning strategies have become increasingly popular in education as they provide learners with meaningful opportunities to engage with the material. These strategies emphasise the use of creative and inclusive pedagogies and learner-centred approaches anchored on authentic and enquiry-based learning, collaborative and cooperative learning, differentiated teaching and learning, holistic learning, and cross-disciplinary learning. They include experiential learning, problem-based learning, project-based learning, and talk for learning approaches. Some of the pedagogical exemplars to guide learning and teaching of the SHS curriculum include:

- **Experiential Learning:** Experiential learning is a hands-on approach to learning that involves learners in real-world experiences. This approach focuses on the process of learning rather than the end result. Learners are encouraged to reflect on their experiences and use them to develop new skills and knowledge. Experiential learning can take many forms, including internships, service learning, and field trips. One of the main benefits of experiential learning is that it allows learners to apply what they have learned in the classroom to real-world situations. This can help them develop a deeper understanding of the material and make connections between different concepts. Additionally, experiential learning can help learners develop important skills such as critical thinking, problem-solving and communication.
- **Problem-Based Learning:** Problem-based learning is an approach that involves learners in solving real-world problems. Learners are presented with a problem or scenario and are asked to work together to find a solution. This approach encourages learners to take

an active role in their own learning and helps them develop important skills such as critical thinking and problem-solving. One of the main benefits of problem-based learning is that it encourages learners to take ownership of their own learning. By working together to solve problems, learners are able to develop important skills such as collaboration and communication. Additionally, problem-based learning can help learners develop a deeper understanding of the material as they apply it to real-world situations.

- **Project-Based Learning:** Project-based learning is a hands-on approach to learning that involves learners in creating a project or product. This approach allows learners to take an active role in their own learning and encourages them to develop important skills such as critical thinking, problem-solving, collaboration, and communication. One of the main benefits of project-based learning is that it allows learners to apply what they have learned in the classroom to real-world situations. Additionally, project-based learning can help learners develop important skills from each other and develop a deeper understanding of the material.
- **Talk for Learning Approaches:** Talk for learning approaches (TfL) are a range of techniques and strategies that are used to encourage learners to talk by involving them in discussions and debates about the material they are learning. This approach encourages learners to take an active role in their own learning and helps them develop important skills such as critical thinking, collaboration and communication and also makes them develop confidence. One of the main benefits of TfL is that it encourages learners to think deeply about the material they are learning. By engaging in discussions and debates, learners are able to develop a deeper understanding of the material and make connections between different concepts.
- **Initiating Talk for Learning:** Initiating talk for learning requires the use of strategies that would encourage learners to talk in class. It helps learners to participate meaningfully and actively in the teaching and learning process. Apart from developing skills such as communication and critical thinking, it also helps learners to develop confidence. Some strategies for initiating talk amongst learners are Activity ball; Think-Pair-Share; always, sometimes, never true; matching and ordering of cards.
- **Building on What Others Say:** Building on what others say is an approach that involves learners in listening to and responding to their classmates' ideas. This approach encourages learners to take an active role in their own learning and helps them develop important skills such as critical thinking and communication. One of the main benefits of building on what others say is that it encourages learners to think deeply about the material they are learning. By listening to their classmates' ideas, learners are able to develop a deeper understanding of the material and make connections between different concepts. Additionally, building on what others say can help learners develop important skills such as collaboration and reflection. Some of the strategies to encourage learners to build on what others say are brainstorming, concept cartoons, pyramid discussion, 5 whys, amongst others.
- **Managing Talk for Learning:** Managing talk for learning requires the use of various strategies to effectively coordinate what learners say in class. Effective communication is a crucial aspect of learning in the classroom. Teachers must manage talk to ensure that learners are engaged, learning, and on-task in meaningful and purposeful ways. Some strategies for managing learners' contributions are debates, think-pair-share, sage in the circle, etc.

- **Structuring Talk for Learning:** One effective way to shape learners' contributions is to structure classroom discussions. Structured discussions provide a framework for learners to engage in meaningful dialogue and develop critical thinking skills. Teachers can structure discussions by providing clear guidelines, such as speaking one at a time, listening actively, and building on each other's ideas. One popular structured discussion technique is the "think-pair-share" method. In this method, learners think about a question or prompt individually, then pair up with a partner to discuss their ideas. Finally, the pairs share their ideas with the whole class. This method encourages all learners to participate and ensures that everyone has a chance to share their thoughts. Another effective way to structure talk for learning is to use open-ended questions. Open-ended questions encourage learners to think deeply and critically about a topic. They also promote discussion and collaboration among learners. Teachers can use open-ended questions to guide classroom discussions and encourage learners to share their ideas and perspectives. Other strategies that can be used are concept/mind mapping, Know, Want to know, Learned (KWL); participatory feedback; 5 whys.
- **Diamond Nine:** The Diamond Nine activity is a useful tool for managing talk for learning in the classroom. This activity involves ranking items or ideas in order of importance or relevance. Learners work in groups to arrange cards or sticky notes with different ideas or concepts into a diamond shape, with the most important idea at the top and the least important at the bottom. The Diamond Nine activity encourages learners to think critically about a topic and prioritize their ideas. It also promotes collaboration and discussion among group members. Teachers can use this activity to introduce a new topic, review material, or assess student understanding.
- **Group Work/Collaborative Learning:** Group work or collaborative learning are effective strategies for managing talk for learning in the classroom. These strategies encourage learners to work together to solve problems, share ideas, and learn from each other. Group work and collaborative learning also promote communication and collaboration skills that are essential for success in the workplace and in life. To implement group work effectively, teachers must provide clear guidelines and expectations for group members. They should also monitor group work to ensure that all learners are participating and on-task. Teachers can also use group work as an opportunity to assess individual student understanding and participation.
- **Inquiry-based learning:** Learners explore and discover new information through asking questions and investigating.
- **Problem-based learning:** Learners are given real-world problems to solve and must use critical thinking and problem-solving skills.
- **Project-based learning:** Learners work on long-term projects that relate to real-world scenarios.
- **Flipped classroom:** Learners watch lectures or instructional videos at home and complete assignments and activities in class.
- **Mastery-based learning:** Learners learn at their own pace and only move on to new material once they have mastered the current material.
- **Gamification:** Learning is turned into a game-like experience with points, rewards, and competition.

These strategies provide learners with opportunities to engage with the material in meaningful ways and develop important skills such as critical thinking, problem-solving, collaboration, and communication. By incorporating these strategies into their teaching, teachers can help learners develop a deeper understanding of the material and prepare

them for success in the real world. Effective communication is essential for learning in the classroom. Teachers must manage talk to ensure that learners are engaged in learning, and on-task. Strategies such as structuring talk for learning, using diamond nine activities, and implementing group work/collaborative learning can help teachers manage talk effectively and promote student learning and engagement. By implementing these strategies, teachers can create a positive and productive learning environment where all learners can succeed.

Universal Design for Learning (UDL) in the SHS Curriculum

The design of the curriculum uses UDL to ensure the creation of flexible learning environments that can accommodate a wide range of learner abilities, needs, and preferences. The curriculum is designed to provide multiple means of engagement, representation, and action and expression, teachers can create a more inclusive and effective learning experience for all learners. UDL is beneficial for all learners, but it is particularly beneficial for learners needing special support and learners who may struggle with traditional teaching approaches. The integration of UDL in the pedagogy is aimed at making learning accessible to everyone and to help all learners reach their full potential. For instance, teachers need to:

- incorporate multiple means of representation into their pedagogy, such as using different types of media and materials to present information.
- provide learners with multiple means of action and expression, such as giving them options for how they can demonstrate their learning.
- consider incorporating multiple means of engagement into their choice of pedagogy, such as incorporating games or interactive activities to make learning more fun and engaging.

By doing these, teachers can help ensure that the curriculum is accessible and effective for all learners, regardless of their individual needs and abilities.

Curriculum and Assessment design: Revised Bloom's Taxonomy and Webb's Depth of Knowledge

The design of this curriculum uses the revised Blooms Taxonomy and Webb's Depth of Knowledge (DoK) as frameworks to design what to teach and assess.

The Revised Bloom's Taxonomy provides a framework for designing effective learning experiences. By understanding the different levels of learning, it informed the creation of activities and assessments that challenge learners at the appropriate level and help them progress to higher levels of thinking. Additionally, the framework emphasises the importance of higher-order thinking skills, such as analysis, evaluation, and creation, which are essential for success in today's complex and rapidly changing world. This framework is a valuable tool for educators who want to design effective learning experiences that challenge students at the appropriate level and help them develop higher-order thinking skills. By understanding the six levels of learning and incorporating them into their teaching, educators can help prepare students for success in the 21st century. The six hierarchical levels of the revised Blooms Taxonomy are:

1. **Remember** – At the foundation is learners ability to remember. That is retrieving knowledge from long term memory. This level requires learners recalling concepts—identify, recall, and retrieval of information.	4. **Analyse** – The ability to break things down into their parts and determine relationships between those parts and being able to tell the difference between what is relevant and irrelevant. At this level, information is deconstructed, and its relationships are understood. Comparing and contrasting information and organising it is key.

Remembering is comprised of identifying, listing, and describing. Retrieving relevant knowledge from long-term memory includes, recognizing, and recalling is critical for this level. 2. **Understand** – At understanding, learners are required to construct meaning that can be shown through clarification, paraphrasing, representing, comparing, contrasting and the ability to predict. This level requires interpretation, demonstration, and classification. Learners explain and interpret concepts at this level. 3. **Apply** – This level requires learners ability to carry out procedures in the right time in a given situation. This level requires the application of knowledge to novel situations as well as execute, implement, and solve problems. To apply, learners must solve multi-step problems.	Breaking material into its constituent parts and detecting how the parts relate to one another and to an overall structure or purpose is required. Analysis also includes differentiating, organising and attributing. 5. **Evaluate** – The ability to make judgments based on criteria. To check whether there are fallacies and inconsistencies. This level involves information evaluation, critique, examination, and formulation of hypotheses. 6. **Create** – The ability to design a project or an experiment. To create, entails learners bringing something new. This level requires generating information— designing, constructing and planning.

Webb's Depth of Knowledge (DoK) is a framework that helps educators and learners understand the level of cognitive engagement required for different types of learning tasks. The framework includes four levels. By understanding the four DoK levels, educators can design learning activities that challenge students to engage in deeper thinking and problem-solving. DoK is an essential tool for designing effective instruction and assessments. By understanding the different levels of DoK, teachers can design instruction and assessments that align with what they intend to achieve. DoK is a useful tool for differentiating instructions and to provide appropriate challenges for all learners. Teachers can use DOK to identify students who need additional support or those who are ready for more advanced tasks. The four levels of Webb's' DoK assessment framework are:

- **Level 1: Recall and Reproduction -** Assessment at this level is on recall of facts, concepts, information, and procedures—this involves basic knowledge acquisition. Learners are asked specific questions to launch activities, exercises, and assessments. The assessment is focused on recollection and reproduction.
- **Level 2: Skills of conceptual understanding –** Assessment at this level goes beyond simple recall to include making connections between pieces of information. Learner's application of skills and concepts is assessed. The assessment task is focused more on the use of information to solve multi-step problems. A learner is required to make decisions about how to apply facts and details provided to them.

- **Level 3: Strategic reasoning** – At this level, learner's strategic thinking and reasoning that is abstract and complex is assessed. The assessment task requires learners to analyse and evaluate composite real-world problems with predictable outcomes. A learner must apply logic, employ problem-solving strategies, and use skills from multiple subject areas to generate solutions. Multitasking is expected of learners at this level.
- **Level 4: Extended critical thinking and reasoning –** At this level of assessment, learner's extended thinking to solve complex and authentic problems with unpredictable outcomes is the goal. The learner must be able to strategically analyse, investigate, and reflect while working to solve a problem, or changing their approach to accommodate new information. The assessment requires sophisticated and creative thinking. As part of this assessment, the learner must know how to evaluate their progress and determine whether they are on track to a feasible solution for themselves.

The main distinction between these two conceptual frameworks is what is measured. The revised Bloom's Taxonomy assesses the cognitive level that learners must demonstrate as evidence that a learning experience occurred. The DoK, on the other hand, is focused on the context—the scenario, setting, or situation—in which learners should express their learning. In this curriculum, the revised Bloom's taxonomy guided the design, and the DoK is used to guide the assessment of learning. The taxonomy provides the instructional framework, and the DoK analyses the assignment specifics. It is important to note that Bloom's Taxonomy requires learners to master the lower levels before progressing to the next. So, suppose the goal is to apply a mathematical formula, they must first be able to identify that formula and its primary purpose (Remember and Understand). The cognitive rigour is therefore presented in incremental steps to demonstrate the learning progression. When measuring assessments in DoK, learners move fluidly through all levels. In the same example, while solving a problem with a formula, learners recall the formula (DoK 1) to solve the problem (DoK 2 and DoK 3). Depending on the difficulty of the problem to be solved, the learning may progress to DoK 4.

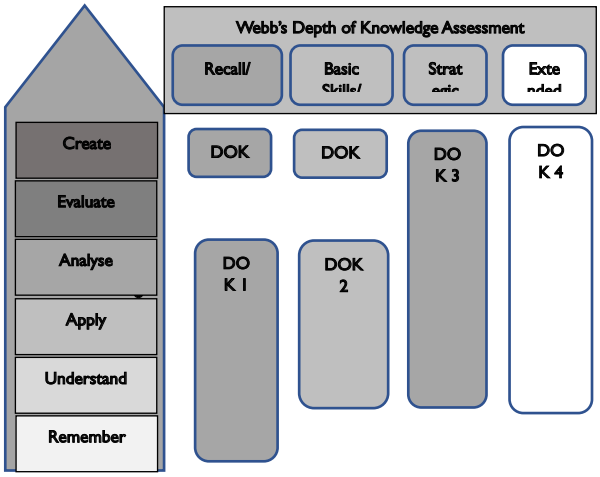


Figure 1: Revised Bloom Taxonomy combined with Webb's Depth of Knowledge for Teaching and Assessment

The structure of teaching and the assessment should align with the six levels of Bloom's knowledge hierarchy and DoK shown in Figure 1. Each level of DoK should be used to assess specific domains of Bloom's Taxonomy as illustrated in the table below:

Depth of Knowledge (DoK) Assessment	Bloom's Taxonomy applied to DoK
• Level 1: Recall and Reproduction	• Remembering, Understanding, Application, Analysis and Creation
• Level 2: Basic Skills and Concepts	• Understanding, Application, Analysis and Creation
• Level 3: Strategic Thinking	• Understanding, Application, Analysis, Evaluation and Creation
• Level 4: Extended Reasoning	• Understanding, Application, Analysis, Evaluation and Creation

In line with the National Pre-tertiary Learning and Assessment Framework, the Secondary Education Assessment Guide (SEAG) requires that classroom assessments should cover **assessment as learning (AaL), assessment of learning (AoL) and assessment for learning (AfL).** Teachers should, therefore, align the Revised Bloom's Taxonomy to the DoK framework of assessment. Formative assessments should include classroom discussions, project-based assignments, and self-reflection exercises, while summative assessments should include standardized tests and rubric-based evaluations of learners work. It is important to seek feedback from learners themselves, as they may have unique insights into how well they are developing these skills in the classroom.

To assess 21st Century skills and competencies in the classroom, teachers will have to use a combination of both formative and summative assessments to evaluate learners' acquisition of these skills and competencies. For instance:

- Identify the specific 21st Century skills and competencies to be assessed. For instance, you might want to assess *critical thinking, problem-solving, or creativity*.
- Align the skills and competencies with the DoK levels. For example, lower DoK levels might be more appropriate for assessing basic knowledge and comprehension, whereas higher DoK levels might be more appropriate for assessing more complex skills such as *analysis, synthesis, and evaluation*.
- Develop assessment items that align with the DoK levels and the skills and competencies you want to assess. These items should be designed to elicit evidence of learning across the different levels of the DoK framework.
- Administer the assessment and collect data. Analyse the data to gain insights into student learning and identify areas where learners may need additional support or instruction.

The DoK framework is a powerful tool for assessing the acquisition of 21st Century skills and competencies in the classroom, helping teachers to better understand how learners are learning and identify areas for improvement.

Educational success is no longer about producing content knowledge, but rather about extrapolating from what we know and applying the knowledge creatively in new situations.

The overall assessment of learning at SHS should be aligned to the National Pre-tertiray Learning and Assessment Framework and the Secondary Education Assessment Guide. It is critical that formative and summative assessment strategies are used.

Context

The Secondary Education Reform Guide (SERG) pays special attention to certain critical but interconnected issues affecting SHS. They include increasing enrolment, the low quality of learning, the heterogeneity of learners' entry behaviours, experiences, aptitudes and abilities, and the rapidly changing work environment resulting in the need for a different

type of SHS to meet the demand for a changing workforce and further education. Two major critical issues that are relevant to guide the curriculum implementation are the country's vision for SHS and how to measure the relevance and quality of SHS education with a focus on the 21st Century skills and competencies: the knowledge, competencies and character qualities expected of senior high school graduates. A summary of key issues about SHS education that have implications for enacting the curriculum includes:

- how to ensure that skills, including 21st Century skills, and competencies that SHS graduates are expected to acquire are adequately addressed in the classroom.
- the need to build the capacity of SHS teachers to appreciate the concept of 21st Century Skills and how to teach and assess them within the school curriculum.
- addressing the content overload and limited depth in some of the subjects.
- Train SHS teachers to prepare and accurately assess secondary school graduates based on desired competencies and skills.
- Focus on instructional leadership, with school leaders supporting, evaluating and developing teacher quality and the design of innovative learning environment.
- appreciating the diverse academic background including literacy and numeracy needs of SHS learners that must be taken into consideration when planning for teaching and teaching lessons.
- limited differentiation in teaching overall, resulting in many learners becoming disengaged and disaffected during the instructional processes.
- inadequate linkage between curriculum and indigenous knowledge and culture making it difficult for learners to relate concepts in the curriculum to everyday life.
- the awareness that, assessment and examinations systems have been driving teacher and learner behaviour at the expense of achieving broad curriculum outcomes.
- awareness of how the content and form of assessment has been emphasising factual recall and rote learning, which results in heavy reliance on content memorisation.
- Deficiency in the deployment of practical indigenous knowledge in the teaching and learning practice.
- Lack of focus on skills acquisition.
- Overreliance on rote learning and the memorization of facts.
- Social and emotional consideration of learners.
- Holistic development of responsible local and Global citizens through the integration of value systems as part of the hidden curriculum.

Learning Areas in the SHS Curriculum

The learning areas and the different combination of subjects selected for SHS education are intended to provide optimal conditions for learners to acquire the knowledge, skills and competencies and appropriate values a secondary school graduate should have to proceed for further studies, enter the world of work or achieve a better adult life. The subjects fully reflect the intent of the secondary education policy documents, and each has been selected for what it can contribute to nation building.

- **Science and Technology:** STEM incorporates the 21st Century skills and competences. It encourages investigations and projects in groups or individually which help build competencies. STEM subjects therefore contribute to producing successful scientific researchers, innovators, creators, and problem solvers.
- **Language arts:** English language is the medium of instruction and communication in the country and is a main language for studying all subjects except Ghanaian language in Ghana. Fluency in the use of English can improve academic performance, strengthen the

use of higher order thinking and communication skills, broaden minds, develop emotional articulacy and access to the world of work and further study. Ghanaian language helps in improving communication especially for the large percentage of Ghanaians who are not literate in English. It serves as the bearer of the culture of the country. French is critical as Ghana is surrounded by francophone countries that requires the youth in Ghana to be fluent in French. Arabic has become important as it serves a moderately large group of people in the country whose education is through this medium.

- **Humanities:** The subjects in the humanities are critical for the development of the critical thinking skills, valuable social skills that enables the youth to make sense of their surroundings and the world at large. Through the humanities, learners can understand the links between theory and practice. This is needed to help improve living standards and makes society better.
- **Technical and Vocational:** Technical and Vocational education programmes help the youth in the acquisition of appropriate skills, abilities and competencies as necessary tools for the individual to live with, adapt to the real work situation and contribute to the development of society. Technical and vocational education is the preparation of individuals to acquire practical skills as well as basic scientific knowledge. It provides skilled manpower for the world of work. This helps in increasing the work force in the country as the youth are trained and equipped, with workable practical skills, knowledge, aptitude, and competencies required in specific occupations.
- **Business:** The business programme prepares learners to acquire practical learning about the business world. Studying business subjects improves learners' credibility in the workplace in the future. The subjects ensure that learners will be entering further study or the world of work with some credibility through the foundation to the role as a professional. Studying business is important in ensuring that learners gain real-life scenarios. In this way, they will be more prepared for the workplace. Learners will not only learn the subjects but undergo a complete development of their personality by applying what they learn practically. It gives learners the skill set and abilities to manage their work life successfully as well as helping learners to understand the corporate culture and to prepare them for professional environments.

Science, Technology, Engineering and Mathematics (STEM)

STEM education is a curriculum-based interdisciplinary and integrated approach to teaching and learning based on four specific areas of Science, Technology, Engineering, and Mathematics (STEM). It is a cohesive learning paradigm based on real-world applications under which learners are given the opportunity to imagine, explore, create, and integrate a variety of experiential learning approaches such as project/problem-based learning. STEM is thus a departure from the traditional approach to studying these subjects, as separate subjects in their respective silos, focusing only on the memorization of theories and facts, which practice unfortunately guarantees success in summative examinations, which excessively focuses on the regurgitating of theories and facts only.

Thus, changes must be made to the education system that will create a new wave of excitement and enthusiasm in STEM Education in order to create the pipeline of highly talented and skilled workforce for the digital economy of the 21st century and beyond; so as to make Ghana globally competitive. Robust STEM education creates critical thinkers and problem solvers who will constitute the next generation innovators to lead in new product and process development for sustained economic growth. Through STEM, learners will acquire the 7 Essential skills outlined in the STEM Education Framework (Global STEM

Academy, 2020): Critical thinking, problem-solving, Creativity, Communication, Collaboration, Data literacy, Digital Literacy & Computer Science.

STEM permeates every aspect of today's fourth industrial revolution, also known as industry 4.0, which integrates the physical, digital, and biological worlds. Industry 4.0 is a fusion of advances in Artificial Intelligence (AI), automation, robotics, the Internet of Things (IoT), 3D printing, genetic engineering, quantum computing, and other technologies. It integrates cutting-edge production techniques and smart systems with organizations and people through technologies to drive and accelerate human progress. Ghana, like any other country, aims to strengthen STEM education. Without efficient STEM education, the nation's economy will lag while other countries thrive with new innovations and technologies. This is crucial for underrepresented STEM groups like women, the poor, and minorities. STEM education helps inspire and excite learners to love learning through hands-on projects and real-world problem-solving. This can boost human resource development in STEM careers.

Implementing STEM education requires curriculum and teaching changes. Teachers need STEM integration and hands-on project training. Quality STEM education is heavily resource-dependent requiring technology, equipment, and materials. Local businesses and organization partnerships can boost STEM education. For example, learners can work with STEM professionals on real-world problems through these partnerships. Collaboration can also help schools get STEM funding and resources. Robotics clubs, coding clubs, and science fairs can also incorporate STEM education. These activities help learners develop their interests and skills outside of school.

Future STEM education has its drawbacks. It needs more diversity to be successful. The STEM fields exclude the disadvantaged in society, women, rural dwellers, and minority groups. As such, schools and organizations must provide STEM education to all learners to address this issue and include all groups. Implementing STEM education is expensive. Schools may need more funds for hands-on project technology, equipment, and materials. Such issues may hinder STEM education and deter some learners. STEM education will remain vital to workforce preparation. In the future, STEM workers will be needed as technology advances. Schools and organizations must invest in STEM education and address its challenges.

In conclusion, STEM education blends science, technology, engineering, and maths together with other subjects. It fosters critical thinking, problem-solving, and analysis. STEM education helps learners become career-ready and love learning. STEM education requires pedagogical change and resource investment to prepare learners for the future.

The learning areas/subjects to be studied at the secondary school as defined in the NPTECF and SEP are:

Definition of Key Terms and Concepts in the Curriculum

- **Learning Outcomes:** It is a statement that defines the knowledge, skills, and abilities that a learner should possess and be able to demonstrate after completing a learning experience. They are specific, measurable, attainable, and aligned with the content standards of the curriculum. It helps the teachers to determine what to teach, how to teach, and how to assess learning. Also, it communicates expectations to learners and help them to better master the subject.

- **Learning Indicators:** They are measures that allow teachers to observe progress in the development of capacities and skills. They provide a simple and reliable means to evaluate the quality and efficacy of teaching practices, content delivery, and attainment of learning outcomes.
- **Content Standards:** It is a statement that defines the knowledge, skills, and understanding that learners are expected to learn in a particular subject area or grade level. They provide a clear target for learners and teachers and help focus resources on learner achievement.
- **Pedagogical Exemplars:** They are teaching examples used to convey values and standards to learners. Pedagogical Exemplars are usually demonstrated through teacher behaviour.
- **Assessment:** It is the ***systematic collection and analysis of data about learners learning*** with the intention of improving the learning process or making a judgement on learner achievement levels. Assessment is aimed at developing a deep understanding of what learners know, understand, and can do with their knowledge because of their educational experiences. Assessment involves the use of empirical data on learners learning to improve learning. Assessment is an essential aspect of teaching and learning process in education, which enables teachers to assess the effectiveness of their teaching by linking learner performance to specific learning outcomes.
- **Teaching and Learning Resources:** Teaching and learning resources are essential tools for teachers to provide high-quality education to their learners. These resources can take various forms, including textbooks, audiovisual materials, online resources, and educational software. It is also important to avoid stereotypes and use inclusive language in teaching and learning resources. This means avoiding language that reinforces negative stereotypes and using language that is respectful and inclusive of all individuals regardless of their background. Using a consistent tone, style, and design is very important.

APPENDIX D: EXCERPTS FROM THE SECONDARY EDUCATION ASSESSMENT GUIDE

SEAG p.8

"Some of examples of assessment methods that can be used for internal assessment are self- assessment and peer-assessment, learner-teacher meeting (conference), portfolio assessment, collaborative group work assessment, projects and research, presentations and seminars, practical assessment, concept maps, questioning and oral assessment, teacher observation, teacher-designed tasks and tests, role play and demonstrations, standardised test, open book/open-source tests andhomework.

Principles in Designing Internal Assessment

The following are provided to guide the conduct of internal assessment.

- Align internal assessment(s) with the learning outcomes and content standards, with emphasison skills, attitudes, values, and competencies.
- Internal assessment(s) should be an integral part of the teaching and learning process.
- Internal assessments have to be designed with reference to learners' current progress in learning (i.e., assessments should be descriptive in nature).
- Assessment practices should be fair. It should incorporate the different levels of difficulty and address the different levels of learner background and diversity, as well as give equal opportunities for learners to demonstrate their achievements.
- Internal assessment should provide avenues for informative and ethical reporting.
- Rubrics should be designed to ensure internal assessments are accurate and consistent and can contribute to overall grading.
- Assessment feedback should be timely and unthreatening to provide opportunities foroptimal learning and highlight learners' strengths and weaknesses.
- Internal assessment(s) results/data should be sound and useful (valid).
- There should be external moderation of internal assessments.
- Should be subject-appropriate and inclusive based on a recommended table of specification(ToS) and assessment rubrics.
- These should be QA externally through blind sampling to ensure consistency and accuracyand to develop trust in the quality of internal SB.

SEAG pp 9-10

"Internal Assessment Practices

SN	Type	Uses	Examples
1	Diagnostic Assessment	• To identify the learner's strengths and weaknesses in a subject. • To help clarify misconceptions before teaching and learning begin. • To help teachers plan what toteach and how to teach it.	1. Self-assessment to identify skills and competencies. 2. Posters/Discussion board responses on content-specific prompts. 3. Out-of-level assessments (asking lower or higher grade-level questions) 4. Teacher-learner conferences. 5. Think-aloud protocols. 6. Observation schedules. 7. Conversations and dialogues. 8. Group discussions. 9. Interviews (individual or group). 10. Learner survey. 11. Pre-tests.
2	Formative Assessment (AfL & AaL)	• To provide feedback and information during the instructional process, while learning is taking place. • To help teachers to guide learners to develop internal feedback or self-monitoring mechanisms. • To identify areas of learning thatmay need improvement. • To provide opportunities to develop more constructive views about how learners canadjust to different learning situations. • To focus on the process of achieving the curriculum goals and standards.	1. Observations during in-class activities (including non-verbal feedback). 2. Homework exercises for class discussions. 3. Take-home tests. 4. Reflection journals that are reviewed periodically during the term. 5. Concept maps. 6. Question and answer sessions (formal and informal). 7. In-class activities and presentations (both individual and group). 8. Self- and Peer-assessment. 9. Project and research. 10. Teacher-learner conferences. 11. Seminars to discuss research/project reports. 12. Portfolios/works in progress. 13. Field trips. 14. Inventories and questionnaire/surveys. 15. Pop quizzes. 16. Checklist/Rating scales/Rubrics. 17. Practical assessment. 18. Role play/demonstrations/performance assessment. 19. Open-book/Open-source assessments.

3	Summative Assessment(AoL)	• To report learner progress to parents, school, district, regional and national authorities. • To report learner performanceto external authorities such as tertiary institutions. • To grade learners' achievements for certification, selection, or placement. • To determine the learner's progression to the next grade level. • To ascertain and monitor the achievement of the goals of the curriculum.	1. End-of-term examinations 2. End-of-year examinations 3. End-of-programme examinations 4. Quizzes 5. Project Work 6. Test of practical 7. Class test (written, oral, aural and/or practical) 8. Term papers 9. Research 10. Portfolios 11. Performance assessment 12. Practicum/ Industrial attachment
4	Performance-basedAssessment	• To determine how well learners can apply or use whatthey know, often in real-worldsituations. • To demonstrate an understanding of knowledge, skills, competencies, attitudes,values, and character qualities.	1. Exhibitions/Fairs 2. Experiments 3. Writing Long Essays 4. Seminars/Discussions/Debates 5. Reflective Journals 6. Demonstrations 7. Presentations 8. Performances/Show 9. Oral Assessments

SEAG pp.11-12

"Classroom assessment strategies

Self-assessment and peer-assessment

Self-assessment gives the opportunity to learners to evaluate their own learning processes and outcomes of learning based on established standards agreed on with their teachers. This assessment strategy helps learners to develop self-assessment skills to monitor their own or that of other learners'abilities and performance to become autonomous (self-regulated) learners.

Teacher's Roles in Self-Assessment/Peer-Assessment

- Guide learners to develop internal feedback or self-monitoring mechanism such as setting goals and clear targets with the learners to validate and question their own thinking. Let learners be aware that errors, ambiguities, and uncertainties are part of learning new things.
- Provide regular and challenging opportunities for learners to assess the outcomes of their learning themselves, so that they can become confident and competent self-assessors.
- Monitor learners' feedback on their own work and provide descriptive feedback.
- Create an environment where it is safe for students to take risks and where support is readily available.
- Provide examples of good performance as a reference for learners' reflections on their work.

Learner-Teacher Meeting (Conference)

Learner-teacher meetings/conferencing is an assessment method where a teacher and a learner engage in a one-on-one meeting to discuss the most effective ways of teaching to meet the learner's needs. Both the learner and the teacher identify strengths and areas that need improvement during their discussions and collaboratively select specific teaching and learning strategies that will support the learner's progress and development. This type of meeting helps increase learner motivation and achievement.

Portfolio assessment

Portfolios are compilations of learners' work, accumulated efforts, and growth throughout time. They provide insightful information on a learner's development and skill mastery. Such data, together with the teacher's and learner's comments, offers insightful details on how each learner learns and what matters to him or her during the learning process. For a portfolio to serve its purpose, only the relevant works of the learner should be collected. Therefore, the pieces contained in a portfolio shouldbe carefully and deliberately selected. Some examples of artifacts in a portfolio are:

1. Samples of work
2. Drama diary
3. Reflective journal

Homework

Homework is a set of tasks or exercises given to learners by their teachers to be completed outside the classroom instructional hours.

Types of homework

These are some suggested types of homework that could be selected to reflect the levels and depth of knowledge hierarchy embedded in the standards-based curricula. Even though these types of homework have their unique roles in teaching and learning, they are interdependent. The important
task for teachers is to select homework that will best provide support to a learner aligned with whatthey are expected to learn.

- Practice homework is the most common task learners are engaged in when they are given homework. It involves reinforcing information learned in school so that learners will commit it to long-term memory.
- Preparation homework is given to learners before a lesson, so they have the relevant information at hand before class.
- Extension homework involves providing learners with tasks that are based on what was learned in class but go over and above those tasks.
- Integration homework requires learners to bring together or integrate, knowledge from various subjects and knowledge areas into one project.
- Research homework involves learners using their time after school and on weekends to gather data that will be discussed in class.
- Application homework involves learners using knowledge and skills learned in class and applying it to real-world situations.
- The flipped homework involves learning and researching at home, often using technology, then coming to class to apply it through practical hands-on activities and group work. The role of the teacher is 'flipped', and the focus moves from the transmission of information from the teacher to the learner to collaborative knowledge construction.
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Activities	AfL		AaL		AoL	
	Learner	**Teacher**	**Learner**	**Teacher**	**Learner**	**Teacher**
Gathering assessment evidence	• Co-create assessment tasks and information • Responds to assessment tasks	• Plans and shares learning goals • Create a conducive environment for assessment task • Create/co-create assessment tasks andappropriate tools	• Create/co-create assessment tasks with teachers and/or peers. • Learners determine the criteria for assessment based on previous learning experience and personal learning goals.	• Co-create assessment tasks with learners. • Provides support for the gathering of assessment data.	• Responds to assessment tasksand activities.	• Determines what learning outcomes areto be assessed. • Selects the format of assessment to adapt. • Scores and records learner's achievement.
Recording and managing assessment evidence	• Reflect on assessment data to improve learning.	• Keep assessment data. • Note areas of learners' work thatrequires additionalsupport. • Manage the data to improve instructions.	• Keep their own assessment data. • Manage the data to improve their	• Guides learners to keep appropriate assessment data. • Facilitates the use and	• Keeps assessment data for future reference and use.	• Keeps or files assessment data for future grading of learners. • Uses or creates rubrics or assessmentcriteria to ensure accuracy and

		• Uses or creates rubrics or assessment criteria to ensure accuracy and consistency in assessment.	learning outcomes.	management of assessment data to improve learning outcomes. • Uses or creates rubrics or assessment criteria to ensure accuracy and consistency in Assessment.		consistency in assessment • Manages the data forselection and placement purposes.
Analysing and Interpreting assessment evidence	• Analyse and reflect on teachers' feedbacks.	• Provides analysis of learners' performance. • Help learners to understand their performance.	• Analysis and reflection of results to identify strengths and weakness.	• Guide learners with appropriate criteria for the analyses and interpretatio nof their results.		• Analyses and interpretation of results for final decision making.
Using assessment evidence	• Track learners' own progress in learning. • To identify areas of	• For instructional management decisions (e.g., guidance and counselling,	• To improve learners' own learning.	• Helps learners to improve learning.	• Provides analysis of learners' performance.	• To grade learners' performance. • For selection and placement purposes. • For certification and credential purposes.

	learning that need improvement.	• remediation, and intervention). • To get insight into learners' preferred ways of learning and adapt suitable teaching and learningmethods/ resources. • To guide in the selection of appropriate assessment strategies.	• To motivate themselves.			• To provide assessment evidence/results to external stakeholderse.g., universities, parents, employment agencies, etc.
Reporting assessment evidence	• Present their answers and sample of works	• Provide assessment evidence to learners. • Make assessment evidence to other stakeholders.	• Provide descriptive feedback to self and their peers	• Provide descriptive feedback to learners for reflection		• Making reporting cards and other assessment records to stakeholders.

APPENDIX E: LESSON OBSERVATION SHEET

Teacher Lesson Observation Sheet					
Region: District: Circuit: School:					
Name of Teacher:					
Class:					
Time:					
Question		**Yes**	**No**	**In Part**	**Comment**
1.	Is the purpose of the lesson clearly stated in the lesson plan and focused on learners achieving the lesson learning outcomes?				
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.				

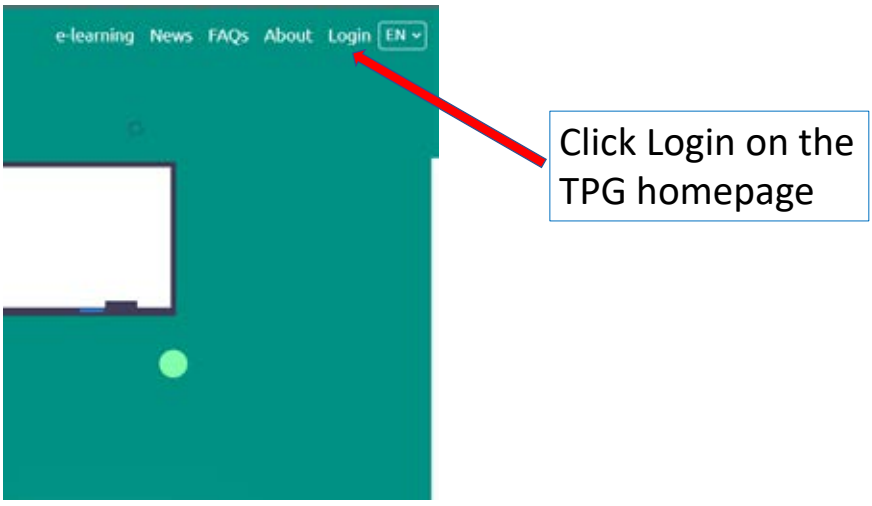
3.	Does the teacher maintain a positive and non-threatening learning environment throughout the lesson?				
4.	Are teaching/learning materials and other resources including ICT being used to support learning of all categories of learners?				
5.	Are learners engaged in tasks that challenge them and demonstrate the teacher's high expectation of learner achievement? Does the teacher take into consideration the uniqueness of learners?				
6.	Is there evidence that students are learning?				
7.	Is teaching differentiated to cater for the varied needs of all male learners, female learners, learners with special education needs and those with poor literacy and/ or numeracy proficiency?				
8.	Does the teacher use real life examples which are familiar to learners to explain concepts and their relevance?				
9.	Does the teacher point out or question traditional gender roles when they come up during the lessons as appropriate?				
?	Does the lesson include appropriate interactive and creative approaches e.g., group work, role play, storytelling to support learners achieving the learning outcomes?				
10.	Have cross-cutting issues and /or 21st century skills been integrated in the lesson e.g., problem-solving, critical thinking, communication? If yes, give examples				

	of the issues and skills that have been so integrated.				
11.	Does the teacher incorporate ICT into their practice to support learning?				
12.	Does the teacher encourage learners to ask questions during the lesson?				
13.	Is assessment evident in the lesson? If yes, did it include assessment of, for or as learning and go beyond recall?				
14.	Do learners make use of feedback from teacher and peers?				
15.	Does the teacher evaluate the lesson against the learning outcomes?				
Key strengths in the lesson					
Areas for development					
Next steps for teacher / STEP					

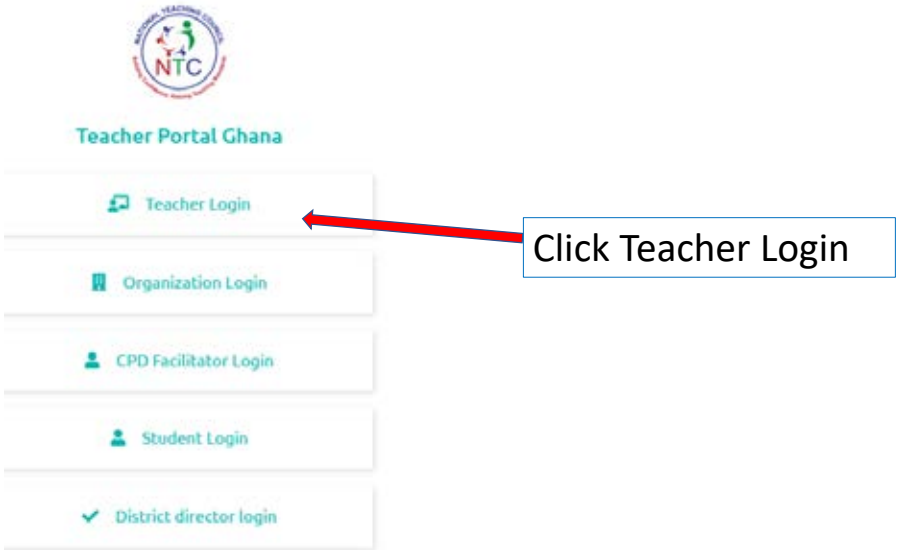
APPENDIX F: HOW TO AWARD CPD POINTS TO DESERVING TEACHERS

HOW TO CHECK CPD POINTS AND TRAINING RECORDS ON TEACHER PORTAL GHANA

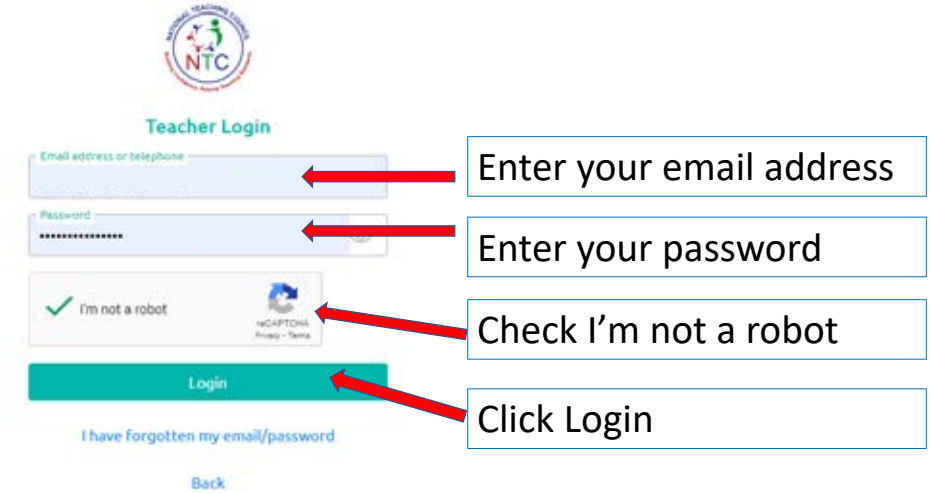
1. Visit *tpg.ntc.gov.gh* and click Login



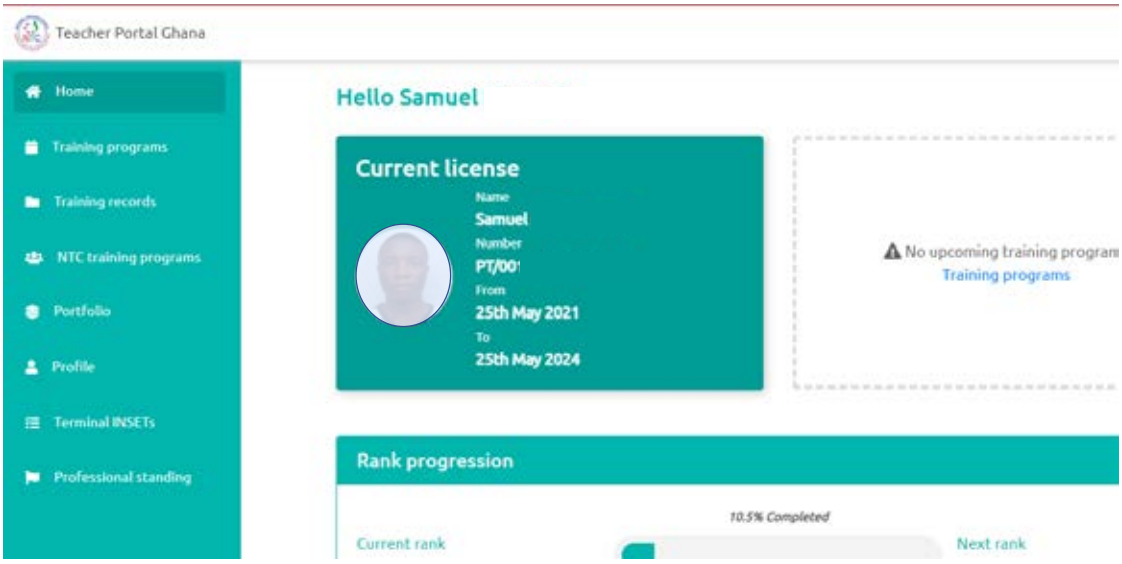
2. On the Login page, click Teacher Login



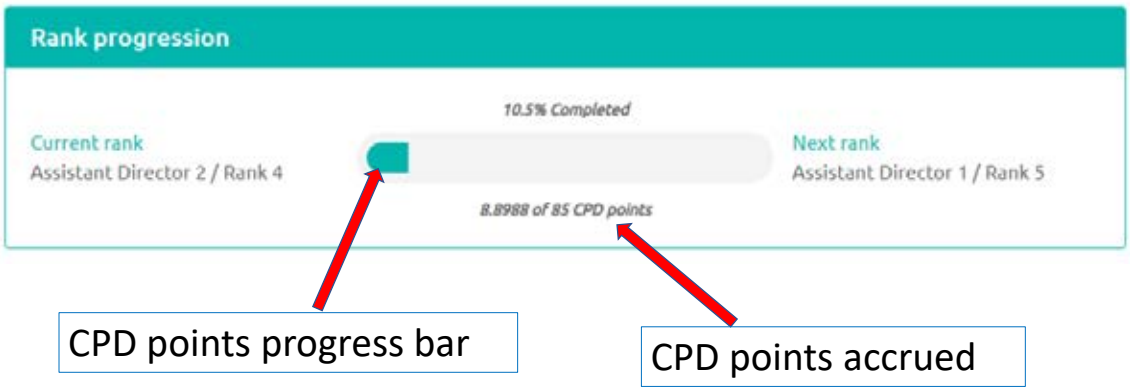
3. On the Teacher Login page enter your email address and password and then click Login



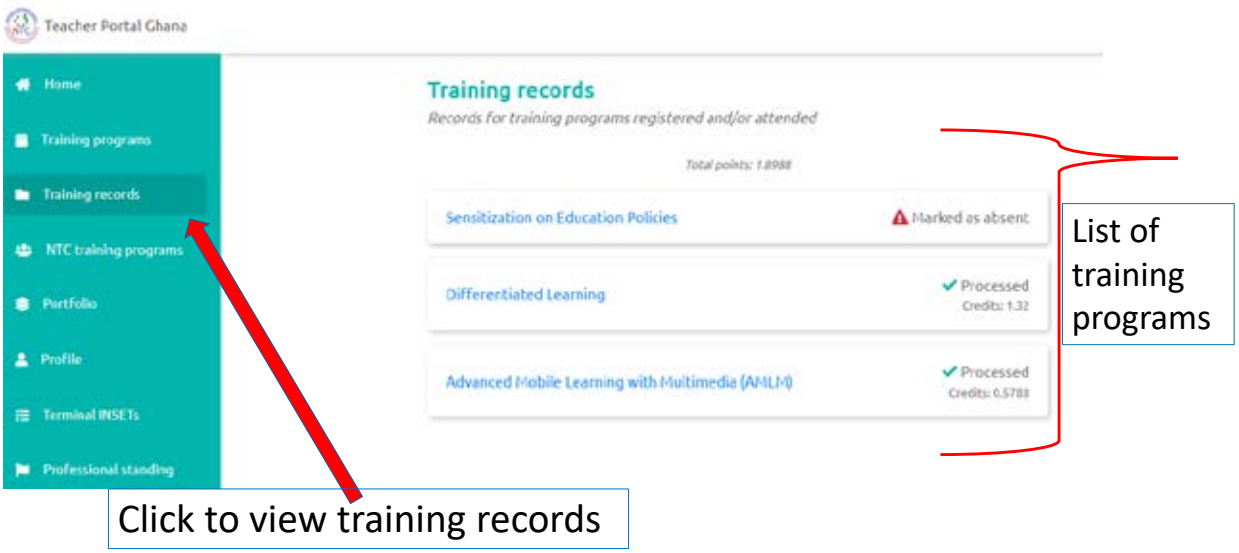
4. After a successful login you will get access to your TPG account (Check image below)



5. To check CPD points, scroll down to Rank progression. You will see the CPD points progress bar and actual points accrued (Check image below)



6. To view training records, from the side menu tap on Training records (Check image below)



THANK YOU