TEACHER'S RESOURCE PACK

COMPUTING BASIC 7

NATIONAL COUNCIL FOR CURRICULUM & ASSESSMENT OF MINISTRY OF EDUCATION

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Teacher's Pack Part A

1 INTRODUCTION

1.1 How to use this Pack

The Pack is divided into two (2) main parts. The first part focuses on the cross-cutting curricular issues, mainly the themes of the National Pre-Tertiary Curriculum Framework and the provisions for teaching, learning, and assessment. It further delves into the general aims, rationale, subject areas and core competencies in the curriculum.

The second part is devoted to the discussion of Computing Subject. This section is divided into three (3) main modules namely: (1) Front Matter, (2) Pedagogy and Assessment, (3) Lesson Planning.

In this subject pack, an overview of the subject curriculum in terms of the Subject Aims, Rationale and Philosophy and the structure of the curriculum is provided. Additionally, it contains sample lessons for Basic 7 which includes all the strands and sub-strands to help teachers understand and know how to prepare lessons based on the new format for lesson planning and delivery. There are accompanying assessment tasks for each of the lesson

1.2 Rationale (B7 - B10)

Rationale for the Common Core Programme Computing

The Computing Curriculum is designed to provide students with access to important computing ideas, knowledge and skills that they can draw on in their personal and work lives, and in their learning of other school subjects.

It provides opportunity for learners to develop essential skills and competencies, and motivates them to become flexible problem solvers and lifelong learners in an increasingly technological age.

1.3 Teaching Philosophy

The teaching of this subject should be centred around a supportive and inclusive learning environment by positively developing and engaging teacher-learner relationships.

1.4 Learning Philosophy

- Computing education is a process that develops a wide range of skills including problem solving, design construction, communication, critical thinking, analysis, synthesis and evaluation.
- Teachers are to serve as facilitators by creating an enabling environment that promotes the construction and development of learners' own knowledge.

1.5 Aims of Computing

The Computing Curriculum is aimed at developing individuals to become computer literate, good problem solvers and critical thinkers, having the ability to think creatively, and exhibiting both the confidence and competence to participate fully in the Ghanaian society as responsible local and global citizens.

Specific Aims

The Computing Curriculum is designed to help learners to

- acquire basic ICT literacy
- communicate effectively using ICT tools
- develop interest and acquire skills in the use of the internet
- develop basic ethics in using ICT tools
- acquire basic programming and database skills

1.6 Structure and organisation of the Computing Curriculum

CLASS	STRAND	SUB-STRAND
Basic 7	Introduction to computing	Components of Computers and Computer Systems
		Technology in the Community
		Health and Safety in using ICT Tools
	Productivity Software	Introduction to Word Processing
		Introduction to Presentation
		Introduction to Electronic Spreadsheet
	Communication Networks	Computer Networks
		Internet and Social media
		Information Security
		Web Technologies
	Computational Thinking	Introduction to Programming
		Algorithm
		Robotics
		Artificial Intelligence
Basic: 8	Introduction to computing	Components of Computers and Computer Systems
		Technology in the Community (communication)
		Health and Safety in using ICT Tools
	Productivity Software	Introduction to Word Processing
		Introduction to Presentation
		Introduction to Electronic Spreadsheet
	Communication Networks	Computer Networks
		Internet and Social Media
		Information Security
		Web Technologies
	Computational Thinking	Introduction to Programming
		Algorithm
		Robotics
		Artificial Intelligence
Basic 9	Introduction to computing	Components of Computers and Computer Systems
		Technology in the Community (communication)
		Health and Safety in using ICT tools
	Productivity Software	Introduction to Word Processing
		Introduction to Presentation
		Introduction to Desktop Publishing
		Introduction to Electronic Spreadsheet
	Communication Networks	Computer Networks
		Internet and Social Media
		Information Security
		Web Technologies
	Computational Thinking	Introduction to Programming
		Algorithm
		Robotics
		Artificial Intelligence
Basic: 10	Introduction to Computing	Components of Computers and Computer Systems
		Technology in the community (communication)
		Health and Safety in using ICT tools
	Productivity Software	Introduction to Word Processing
		Introduction to Presentation
		Introduction to Desktop Publishing
		Introduction to Electronic Spreadsheet
	Communication Networks	Computer Networks
		Internet and Social Media
		Information Security
		Web Technologies
	Computational Thinking	Introduction to Programming and Algorithm
		Algorithm
		Robotics
		Artificial Intelligence

Strand 1: Introduction to Computing

Sub-strand 1: Components of Computers and Computer Systems
Content standard: B7.1.1.1. Identify parts of a computer and technology tools and their uses
Indicator(s): B7.1.1.1.1. Discuss second and third generation of computers
Key words/vocabulary: Transistors, vacuum tubes, circuit boards, motherboard

Suggested activities for learning and assessment	Equipment/Resources	Learner Resource page ref.	Progression
• Discuss the features of the second and third generation of computers with learners. • Lead learners to identify major components on the motherboard. • Show pictures or parts of the system board and identify a transistor.	Pictures of second and third generation of computers, a real motherboard or sketch diagram, projector, card boards		1. Understanding the features of second and third generation of computers. 2. Identifying major components on the motherboard. 3. Recognising the parts of the system board and identifying a transistor.
Homework/project work/community engagement suggestions			
• List the second and third generation of computers in a chronological order. • Identify their uses and relate them to the benefits. • Sketch a motherboard and label the PCI slots, CPU sockets, power connector, hard drive slots and memory.			
Cross-curriculum links/cross-cutting issues			
• None			
Potential misconceptions/student learning difficulties			
• Learners may not be able to identify the various parts/components of a motherboard • The facilitator/teacher can arrange to use a nearby Senior High School (SHS) ICT laboratory			

Sub-strand 1: Components of Computers and Computer Systems
Content standard: B7.1.1.1. Identify parts of a computer and technology tools and their uses
Indicator(s): B7.1.1.1.2 Demonstrate understanding in the use of input devices (wireless keyboard, mouse, light pen, touch screen)
Key words/vocabulary: Hardware, input devices, peripheral devices, keyboard, mouse

Suggested activities for learning and assessment	Equipment/Resources	Learner Resource page ref.	Progression
• Display pictures of input devices such as mouse, keyboard, digital camera, digitising tablet and microphone. • Lead learners to identify the input devices listed. • Task groups of learners to identify areas or situations where the input devices listed can be used.	Smart phone, manila cards, input devices (mouse and keyboard).		1. Identifying the various types of input devices. 2. Understanding the primary functions of input devices. 3. Understanding the areas or situations where input devices are used.
Homework/project work/community engagement suggestions			
Provide a list of other devices and let learners select the input devices among them. Identify three (3) features of the keyboard and mouse.			
Cross-curriculum links/cross-cutting issues			
None			
Potential misconceptions/student learning difficulties			
Learners may think that peripherals are only those devices that are connected outside of the main computer via cable e.g. via USB cable.			

Sub-strand 1: Components of Computers and Computer Systems
Content standard: B7.1.1.1. Identify parts of a computer and technology tools and their uses
Indicator(s): B7.1.1.1.3 Demonstrate understanding in the use of output devices (Cathode Ray Tube, LED monitor)
Key words/vocabulary: Hardware, output devices, peripheral devices, monitor, printer

Suggested activities for learning and assessment	Equipment/Resources	Learner Resource page ref.	Progression
1. Show pictures of output devices such as printers, monitors, speakers. **2.** Lead learners to identify the output devices listed. Task groups of learners to identify areas or situations where the output devices listed can be used. **3.** Lead learners to compare and contrast LED and CRT.	Manila cards, output devices (monitors, speakers.).		**1.** Identifying the various types of output devices. **2.** Understanding the primary functions of output devices. **3.** Understanding the areas or situations where output devices are used.
Homework/project work/community engagement suggestions			
Select the input devices from the following: keyboard, monitor, mouse, printer, projector, speakers, trackball, scanner, plotters, light pen, microphone, head phone Identify two (2) differences between the LED and CRT.			
Cross-curriculum links/cross-cutting issues			
None			
Potential misconceptions/student learning difficulties			
Learners may not understand that output may be in two forms – tangible and intangible. Learners may not know that output and input devices are all peripheral devices.			

Sub-strand 1: Components of Computers and Computer Systems
Content standard: B7.1.1.1. Identify parts of a computer and technology tools and their uses
Indicator(s): B7.1.1.1.4 Describe storage devices – full-sized external hard drives, hard drive speed, disk caching
Key words/vocabulary: Hard disk drive (HDD), floppy disk, magnetic tape, read, write, bytes

Suggested activities for learning and assessment	Equipment/Resources	Learner Resource page ref.	Progression
• Lead learners to explore magnetic storage devices. • Display pictures of magnetic storage devices and discuss their major features. • Explore the differences among the various HDDs considering the available space, speed of the device and data access performance.	Used hard disk drive and floppy disk. Use an image showing the internal workings of a magnetic HDD to explain how data is actually recorded using platters and read/write heads.		**1.** Identifying the primary functions of storage devices. **2.** Identifying different types of magnetic storage devices. **3.** Understanding major features of the HDD.
Homework/project work/community engagement suggestions			
• Learners should discuss how the hard disk stores data and do a presentation on it. • Learners should identify five (5) features on the HDD.			
Cross-curriculum links/cross-cutting issues			
• None			
Potential misconceptions/student learning difficulties			
• Learners may not appreciate the fact that output may be in two forms – tangible (hard copy) and intangible (soft copy).			

Sub-strand 1: Components of Computers and Computer Systems
Content standard: B7.1.1.2. Demonstrate the use of the features of the Windows Desktop
Indicator(s): B7.1.1.2.1 Discover the new Windows Operating System (start screen, use of tiles, taskbar buttons, preview thumbnails
Key words/vocabulary: Taskbar, thumbnails, start screen, tiles

Suggested activities for learning and assessment	**Equipment/ Resources**	**Learner Resource page ref.**	**Progression**
Show a desktop and guide learners through: • the start menu • how to use tiles • taskbar buttons and • preview thumbnails.	Computer, laptop, cardboard, markers, projector		**1.** Understanding the features of the items on the desktop. **2.** Understanding the use of tiles. **3.** Identifying buttons and previewing thumbnails.
Homework/project work/community engagement suggestions			
• Let learners change the Windows taskbar button appearance of their home PCs and write the procedure down. Alternatively, take a screenshot of the interface and print out a hardcopy. Ask them to annotate or identify which elements can be personalised and indicate how to complete the changes. **NB: Learners without PCs at home can use the PCs at school. Teachers should find alternatives if there are restrictions on the school's computer systems.**			
Cross-curriculum links/cross-cutting issues			
• None			
Potential misconceptions/student learning difficulties			
• Learners may be unfamiliar with the use of the mouse and the keyboard in changing the desktop, the tiles and previewing the buttons.			

Sub-strand 1: Components of Computers and Computer Systems
Content standard: B7.1.1.2. Demonstrate ability to use the features of the Windows Desktop
Indicator(s): B7.1.1.2.2 Practise file management techniques (file and folder management)
Key words/vocabulary: File extension, file path, folder, sub-folder, directories, sub-directories

Suggested activities for learning and assessment	**Equipment/ Resources**	**Learner Resource page ref.**	**Progression**
• Demonstrate file management techniques by following the naming conventions. Lead learners to understand what is allowed and what is not when naming files. • Lead learners to explore the types and importance of file extensions. • Demonstrate how to organise files in folders and sub-folders.	Computer, internet and projector		**1.** Understanding why work done with applications on the computer needs to be saved. **2.** Understanding file naming conventions in Windows. **3.** Identifying extensions from different applications. **4.** Understanding directories, folders, sub-folders and paths to file locations.
Homework/project work/community engagement suggestions			
• List five (5) conventions to follow when naming files. • List ten (10) file extensions and applications used to open those files. • Give an example of a file path and let learners explain its meaning.			
Cross-curriculum links/cross-cutting issues			
• None			
Potential misconceptions/student learning difficulties			
• Learners may confuse the difference between directories and folders. • Learners may not know that certain characters and word constructions like "con," "nul," "prn" are not allowed when naming files.			

Sub-strand 2: Technology in the Community
Content standard: B7.1.2.1. Demonstrate the ability to use Technology in the community
Indicator(s): B7.1.2.1.1. Describe and give examples of at least five (5) technology tools for learning in each JHS subject (e.g. spreadsheets, Encarta, virtual museum, scrabble, presentation, scratch, etc.)
Key words/vocabulary: Technology tools, educational software, virtual museum, teaching and learning materials

Suggested activities for learning and assessment	Equipment/Resources	Learner Resource page ref.	Progression
• Explore various technology tools that can be used for learning (Educational Software) by guiding learners to surf the internet to discover more about such tools. • Guide learners to brainstorm some technology tools for learning.	Internet connection, laptop/mobile phone, applications (Scratch), light bot, spreadsheet (MS Excel or Open office Calc), presentation (MS PowerPoint or Open office Impress), Virtual Museum (second canvas).		1. Understanding what technology tools are, and their uses. 2. Identifying and exploring some technology tools e.g. light bot, scratch.
Homework/project work/community engagement suggestions			
• Task learners to surf the internet or newspaper articles to identify other technology tools not mentioned.			
Cross-curriculum links/cross-cutting issues			
• None			
Potential misconceptions/student learning difficulties			
• Learners may have a problem browsing the internet in areas with weak network reception. • Learners experiencing challenges with various websites may need assistance when browsing the internet and using the technology tools.			

Sub-strand 2: Technology in the Community
Content standard: B7.1.2.1. Demonstrate the use of Technology in the community
Indicator(s): B7.1.2.1.2. Demonstrate the use of at least three (3) technology tools identified in the community
Key words/vocabulary: Technology tools, scratch, presentation, spreadsheet

Suggested activities for learning and assessment	Equipment/Resources	Learner Resource page ref.	Progression
• Lead learners to discover the use of any three (3) technology tools and present their findings to class as a group. • Offer learners opportunity to demonstrate the use of any of the tools discussed.	Manila card, flipchart		1. Identifying any three (3) technology tools that aid learning. 2. Understanding the uses of the technology tools mentioned.
Homework/project work/community engagement suggestions			
• Learners should look for additional technology tools and their uses.			
Cross-curriculum links/cross-cutting issues			
• None			
Potential misconceptions/student learning difficulties			
• Learners may have a problem browsing the internet in areas with weak network reception. • Learners experiencing challenges with various websites may need assistance when browsing the internet and using the technology tools. • Learners may not appreciate that the internet is also a technology tool.			

Sub-strand 2: Technology in the Community
Content standard: B7.1.2.1. Demonstrate the use of Technology in the community
Indicator(s): B7.1.2.1.3. Discuss the benefits of using technology tools in learning/education
Key words/vocabulary: Technology tools, scratch, presentation, spreadsheet

Suggested activities for learning and assessment	Equipment/Resources	Learner Resource page ref.	Progression
• Pair learners to discuss the benefits of using technology tools in learning (e.g. using spreadsheet to draw graphs). • Lead learners to identify at least five (5) uses of technology tools. Group learners to discuss the benefits of technology tools and present their conclusions to the class.	Manila card, flipchart, surfing the internet for solutions		**1.** Identifying any three (3) benefits of technology tools that aid learning. **2.** Describing the benefits of technology tools that aid learning.
Homework/project work/community engagement suggestions			
• Learners should be tasked in groups to identify the potential benefits of using technology tools in their schools.			
Cross-curriculum links/cross-cutting issues			
• None			
Potential misconceptions/student learning difficulties			
• Learners may have a problem browsing the internet in areas with weak network reception. • Learners experiencing challenges with various websites may need assistance when browsing the internet and using the technology tools. • Learners may not appreciate that the internet is also a technology tool.			

Sub-Strand 3: Health and Safety in using ICT Tools
Content standard: B7.1.3.1. Demonstrate how to apply Health and Safety measures in using ICT Tools
Indicator(s): B7.1.3.1.1 Describe current regulatory requirements and potential computing-related disorders
Key words/vocabulary: Health hazards, bad posture, ergonomics, repetitive-stress injuries, eyestrain, back/neck pain

Suggested activities for learning and assessment	Equipment/Resources	Learner Resource page ref.	Progression
• Watch videos on the health hazards of prolonged use of computing devices. • Show pictures of bad postures and other hazards in using computing devices. • Identify the health hazards associated with each device. • Outline the preventive measures relating to the health and safety risks discussed.	Pictures showing sitting postures, marker boards, relevant videos		**1.** Identifying the possible health hazards of prolonged use of computing devices. **2.** Understanding the preventive measures to offset the health and safety risks.
Homework/project work/community engagement suggestions			
• Learners should complete a group-based project, listing any five (5) health and safety issues associated with the use of technology tools and suggest preventive measures to combat each.			
Cross-curriculum links/cross-cutting issues			
• None			
Potential misconceptions/student learning difficulties			
• Learners may not consider bad postures as health hazards.			

Strand 2: Productivity Software

Sub-strand 1: Introduction to Word Processing
Content standard: B7.2.1.1 Demonstrate ability to use Microsoft Word (Editing)
Indicator(s): B7.2.1.1.1. Demonstrate how to insert, select, delete and move text
Key words/vocabulary: Microsoft Word, home tabs, change case, lowercase, uppercase, sentence case, font size, status bar, right-click

Suggested activities for learning and assessment	Equipment/Resources	Learner Resource page ref.	Progression
Learners must understand the MS Word background, its purpose and benefits. Learners **insert, select, delete,** and **move text** on the screen. Learners practise overtype or insert text technique using the status bar. **Main Activity (35 mins):** Learners generate random text using the =rand() command. Learners select text by double clicking a word, using the shift key, or the control key. Learners practise right-clicking to change the mode of typing. Learners practise inserting text into a sentence using the insert mode. Learners practise inserting text into a sentence using the overtype mode. Learners practise moving text using drag-and-drop technique.	Computer with Microsoft Word, mouse or touchscreen input device		**1.** Learning how to find and replace content and undo edited changes.
Learners practise moving text using cut-and-paste technique. ***Assessment*:** Provide sample text for learners to practise techniques learnt. **Plenary/Reflections (10 mins): What have we learnt today?** We have learnt how to **insert, select, delete** and **move text**. Engage learners in a think-pair-share activity on how to select, move and insert text in a passage.			
Homework/project work/community engagement suggestions			
Do further reading on **how to find and replace content and undo edited changes**			
Cross-curriculum links/cross-cutting issues			
None			
Potential misconceptions/student learning difficulties			
The facilitator/teacher can arrange to use a nearby Senior High School (SHS) ICT laboratory.			

Sub-strand 1: Introduction to Word Processing
Content standard: B7.2.1.1 Demonstrate ability to use Microsoft Word (Editing)
Indicator(s): B7.2.1.1.2. Demonstrate ability to find and replace content and undo edited changes
Key words/vocabulary: Microsoft Word, find and replace

Suggested activities for learning and assessment	Equipment/Resources	Learner Resource page ref.	Progression
Learners explore the use of the Find and Replace tool. Learners explore the use of the Editing group in the home ribbon.	Computer with Microsoft Word, mouse or touchscreen input device		Learning how to spell check content translation, language setting.
Main Activity (35 mins): Learners generate random text using the =rand() command. Learners practise finding text. Learners practise finding and replacing text. Learners practise the Replace and Replace All technique. ***Assessment*:** Provide sample text for learners to practise techniques learnt.			
Plenary/Reflections (10 mins): What have we learnt today? We have learnt how to **find** and **replace** text. Engage learners in a think-pair-share activity on how to find and replace text in a passage.			
Homework/project work/community engagement suggestions			
Do further reading on **how to find and replace content and undo edited changes**			
Cross-curriculum links/cross-cutting issues			
None			
Potential misconceptions/student learning difficulties			
The facilitator/teacher can arrange to use a nearby Senior High School (SHS) ICT laboratory.			

Sub-strand 1: Introduction to Word Processing
Content standard: B7.2.1.1 Demonstrate ability to use Microsoft Word (Editing)
Indicator(s): B7.2.1.1.3 Demonstrate how to spell check, do content translation, and carry out language setting
Key words/vocabulary: Microsoft word, proofing and language, spelling & grammar, thesaurus

Suggested activities for learning and assessment	Equipment/Resources	Learner Resource page ref.	Progression
Learners explore the use of icons in the Proofing group. Learners explore the use of the Language group in the Review ribbon.	Computer with Microsoft Word, mouse or touchscreen input device		Learning how to use text-decoration, change text case, text size and colour.
Main Activity (35 mins): Learners generate random text using the =rand() command. Learners practise Spelling and Grammar check. Learners explore Ignore, Ignore All, Add, Change and Change All options in the Spelling and Grammar icon. Learners explore the meaning of red, blue and green wavy lines under a piece of text. Learners explore setting language preferences. ***Assessment*:** Give learners sample text to practise techniques learnt.			
Plenary/Reflections (10 mins): What have we learnt today? We have learnt how to use spelling and grammar check as well as setting language preferences. Engage learners in a think-pair-share activity to practise how to spell and grammar check text in a passage.			
Homework/project work/community engagement suggestions			
Do further reading on how to use text-decoration, change text case, text size and colour..			
Cross-curriculum links/cross-cutting issues			
None			
Potential misconceptions/student learning difficulties			
The facilitator/teacher can arrange to use a nearby Senior High School (SHS) ICT laboratory.			

Sub-strand 2: Introduction to Presentation			
Content standard: B7.2.2.1 Demonstrate ability to use Microsoft PowerPoint (Editing)			
Indicator(s): B7.2.2.1.1. Explore features of MS PowerPoint interface			
Key words/vocabulary: Microsoft PowerPoint, review tabs, language, Spelling & Grammar, thesaurus			
Suggested activities for learning and assessment	**Equipment/Resources**	**Learner Resource page ref.**	**Progression**
Learners must understand the background of MS PowerPoint, its purpose and benefits. Learners explore the use of the Proofing and Language sections under the Review tab. Learners practise the use of the Language, Spelling & Grammar, Thesaurus and other buttons.	Computer with Microsoft PowerPoint, mouse or touchscreen input device, projector		Read on how to use special characters under the Insert tab within the Symbol group.
Main Activity (35 mins): Learners launch MS-PowerPoint and explore the templates available. Learners type text in a placeholder. Learners practise using the Thesaurus button. ***Assessment*:** Give learners sample text to practise techniques learnt.			
Plenary/Reflections (10 mins): What have we learnt today? We have learnt how to use templates and icons in the Review tab. Engage learners in a think-pair-share activity on how to use templates and themes.			
Homework/project work/community engagement suggestions			
Task learners to develop a 5-page slide and apply the special characters under the Insert tab within the Symbol group.			
Cross-curriculum links/cross-cutting issues			
None			
Potential misconceptions/student learning difficulties			
The facilitator/teacher can arrange to use a nearby Senior High School (SHS) ICT laboratory.			

Sub-strand 2: Introduction to Presentation			
Content standard: B7.2.2.1 Demonstrate the ability to use Microsoft PowerPoint (Editing)			
Indicator(s): B7.2.2.1.2. Demonstrate how to use special characters. Author a 7-slide presentation in MS-PowerPoint using the tools of the Editing section.			
Key words/vocabulary: Microsoft PowerPoint, insert tab, symbol			
Suggested activities for learning and assessment	**Equipment/Resources**	**Learner Resource page ref.**	**Progression**
Learners explore the use of the Symbol icon under the Insert tab.	Computer with Microsoft PowerPoint, mouse or touchscreen input device, projector		Read on how to change text case, text-decoration, text size and colour.

Main Activity (35 mins): Learners launch MS-PowerPoint. Learners type text in a placeholder. Learners practise using the Symbol icon in the Insert tab. Learners insert the degree, cent, lambda, alpha, beta symbols. ***Assessment*:** Give learners sample text to practise techniques learnt.			
Plenary/Reflections (10 mins): **What have we learnt today?** We have learnt how to use templates and icons in the Review tab. Engage learners in a think-pair-share activity on how to use templates and themes.			
Homework/project work/community engagement suggestions			
Present a prepared project or exercise using the editing section of the ribbons studied.			
Cross-curriculum links/cross-cutting issues			
• None			
Potential misconceptions/student learning difficulties			
The facilitator/teacher can arrange to use a nearby Senior High School (SHS) ICT laboratory.			

Sub-strand 3: Introduction to Electronic Spreadsheet

Content standard: B7.2.3.1. Demonstrate ability to use Spreadsheet (Editing Worksheets)

Indicator(s): B7.2.3.1.1 Explore the features of the MS Excel interface

Key words/vocabulary:
Microsoft Excel, inserting, selecting, deleting and moving data

Suggested activities for learning and assessment	Equipment/Resources	Learner Resource page ref.	Progression
Explain the background knowledge and benefits of a spreadsheet. Use one of the benefits to model a scenario for lab practice. E.g. how to develop class examination terminal report. Learners explore techniques of inserting, selecting, deleting and moving data in groups. Learners practise how to insert, select, delete and move data using a sample data set.	Computer with Microsoft Excel, mouse or touchscreen input device, projector		Read on how to set the cell data type (General, Number, Currency, etc.)

Suggested activities for learning and assessment	Equipment/Resources	Learner Resource page ref.	Progression
Main Activity (35 mins): Learners launch MS-Excel and use the autofill to enter days of the week and numbers from 1-10. Learners select numbers 1-5. Learners then move text using either the cut-and-paste or the copy-and-paste technique, and afterwards delete previous text. Learners practise moving parts of the list of names of the week. ***Assessment*:** Give learners sample text to practise techniques learnt.			
Plenary/Reflections (10 mins): What have we learnt today? We have learnt how to select and move data. Engage learners in a think-pair-share activity on how to use other techniques for moving text.			
Homework/project work/community engagement suggestions			
Do further reading on how to set the cell data type (General, Number, Currency, etc.)			
Cross-curriculum links/cross-cutting issues			
• Data on an experiment completed in a science activity or data on learners' age can be used.			
Potential misconceptions/student learning difficulties			
The facilitator/teacher can arrange to use a nearby Senior High School (SHS) ICT laboratory			

Sub-strand 3: Introduction to Electronic Spreadsheet
Content standard: B7.2.3.1. Demonstrate ability to use the Spreadsheet (editing worksheets)
Indicator(s): B7.2.3.1.2. Demonstrate ability to set the cell data type (General, Number, Currency, etc.)
Key words/vocabulary: Microsoft Excel, cell data type

Suggested activities for learning and assessment	Equipment/Resources	Learner Resource page ref.	Progression
Learners explore options in the Number group within the Home ribbon. Learners practise how to format cell with General, Number, Currency and Text data types.	Computer with Microsoft Excel, mouse or touchscreen input device, projector		Read on how to Align Text, Merge & wrap, and create Borders and Shades.

Suggested activities for learning and assessment	Equipment/Resources	Learner Resource page ref.	Progression
Main Activity (35 mins): Learners launch MS-Excel and use the autofill to enter days of the week and numbers from 1-10. Learners select numbers 1-5. Learners then click on the down arrow in the Number group. Learners select Number in the Number tab. Learners select numbers 6-10. Learners select Currency in the Number tab. Learners select the days of the week. Learners select Text in the Number tab. ***Assessment*:** Give learners sample text to practise techniques learnt.			
Plenary/Reflections (10 mins): What have we learnt today? We have learnt how to change data type in a cell. Engage learners in a think-pair-share activity on how to use other techniques to change other data types in a cell.			
Homework/project work/community engagement suggestions			
Do further reading on how to Align text, Merge & Wrap, and create Borders and Shades.			
Cross-curriculum links/cross-cutting issues			
None			
Potential misconceptions/student learning difficulties			
The facilitator/teacher can arrange to use a nearby Senior High School (SHS) ICT laboratory.			

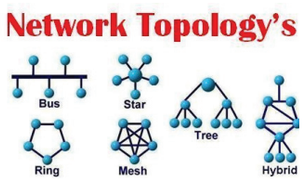
Sub-strand 3: Introduction to Electronic Spreadsheet
Content standard: B7.2.3.1. Demonstrate ability to use the Spreadsheet (Editing Worksheets)
Indicator(s): B7.2.3.1.3. Demonstrate how to Align text, Merge & wrap, and create Borders and Shades
Key words/vocabulary: Microsoft Excel, Align text, Merge & wrap, Borders and Shades

Suggested activities for learning and assessment	Equipment/Resources	Learner Re-source page ref.	Progression
Learners explore options in the Alignment group within the Home ribbon. Learners practise Align text, Merge & wrap, Borders and Shades.	Computer with Microsoft Excel, mouse or touchscreen input device, projector		Read on how to adjust margins and set page orientation.

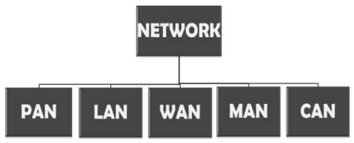
Suggested activities for learning and assessment	Equipment/Resources	Learner Resource page ref.	Progression
Main Activity (35 mins): Learners launch MS-Excel and use the autofill to enter days of the week and numbers from 1-10. Learners explore the functions of the icons in the Alignment group (i.e. Top align, Middle align, Bottom align, Align left, Centre, Align right, Orientation, Word Wrap, Merge and Centre). Learners click the down arrow in the Alignment group. Learners click on the Alignment tab. Learners explore the options in the Alignment tab. Learners click the down arrow in the Alignment group. Learner click on the Border tab. Learners explore the options in the Border tab. ***Assessment*:** Give learners sample text to practise techniques learnt.			
Plenary/Reflections (10 mins): What have we learnt today? We have learnt how to Align text, Merge & wrap, and create Borders and Shades. Engage learners in a think-pair-share activity on how to use other techniques to Align text, Merge & wrap, and create Borders and Shades in a cell.			
Homework/project work/community engagement suggestions			
Do further reading on how to adjust margins and set page orientation.			
Cross-curriculum links/cross-cutting issues			
None			
Potential misconceptions/student learning difficulties			
The facilitator/teacher can arrange to use a nearby Senior High School (SHS) ICT laboratory.			

Strand 3: Communication Networks

Sub-strand 1: Computer Networks
Content Standard - B7.3.1.1. Identify the concept of computer networking for global communications.
Indicator(s): B7.3.1.1.1 Draw diagrams to illustrate features of the network topologies (Bus, Star, Ring, Mesh)
Key words/vocabulary: Bus, star, ring, point-to-point, mesh, hub, nodes, client

Suggested activities for learning and assessment	Equipment/Resources	Learner Resource page ref.	Progression
Display pictures or show a video of people communicating using phones, text messaging, video conferencing, etc. Help learners understand how they are all connected to each other.	Pictures of network topologies, sketch diagram, projector		**1.** Identifying the various media through which people communicate. **2.** Identifying major components that help computers to communicate. **3.** Identifying the types of network topologies.
Deliver a lesson to explain the benefits of networking in a social community, and compare with the benefits of computer networking. Learners must know the key hardware for computer networking and the purpose or function of each (e.g. server, client, hub, switch, cable, etc.). Show learners diagrams of various set-ups to explain network topologies. Allow learners to sketch the topologies to deepen their understanding. ***Assessment***: Learners are to work in groups to design well-elaborated network topologies and present them in class.	 Network Topologies Sketch diagram of a network topology		
Plenary/Reflections **What have we learnt today?** We have learnt about networks and clients. We have learnt about various network topologies.			
Homework/project work/community engagement suggestions			
Using play dough and sticks, form/design the types of network topologies.			
Cross-curriculum links/cross-cutting issues			
None			
Potential misconceptions/student learning difficulties Learners being unable to identify the higher topologies. The facilitator/teacher can arrange a field trip to explore the organisations that operate these network topologies.			

Sub-strand 1: Computer Networks
Content Standard - B7.3.1.1. Identify the concept of computer networking for global communications.
Indicator(s): B7.3.1.1.2 Describe the types of networks (LAN, MAN, WAN)
Key words/vocabulary: Bus, star, ring, point-to-point, mesh, hub, nodes, client

Suggested activities for learning and assessment	Equipment/Resources	Learner Resource page ref.	Progression
Display pictures or show a video of people communicating using phones, text, letters and video conferencing. Help learners understand how they are all connected to each other.	Pictures of network topologies, sketch diagram, projector		**1.** What are some of the media through which people communicate? **2.** Outline the types of computer networks
Learners to explore the types of networks using real life situations (i.e. family networks, friends' networks, etc.). Learners are to describe the types of networks from the examples given above. **Assessment:** Learners are to work in groups to design well-elaborated network topologies and present them in class.			
Plenary/Reflections **What have we learnt today?** We have learnt the different types of networks. We have learnt the various network topologies. We have learnt the various components on a motherboard.			
Homework/project work/community engagement suggestions			
Describe the types of networks and relate them to real-life situations.			
Cross-curriculum links/cross-cutting issues			
None			
Potential misconceptions/student learning difficulties			
Learners may have difficulty identifying the higher topologies. The facilitator/teacher can arrange a field trip to explore the organisations that operate these network topologies.			

Sub-strand 1: Computer Networks
Content Standard: B7.3.1.1. Identify the concept of computer networking for global communications.
Indicator(s): B7.3.1.1.3 Discuss the entrepreneurship opportunities in networking computing devices.
Key words/vocabulary: Bus, star, ring, point-to-point, mesh, hub, nodes, client

Suggested activities for learning and assessment	Equipment/Resources	Learner Resource page ref.	Progression
Display pictures or show a video of people communicating using phones, text messaging, video conferencing, etc. Help learners understand how they are all connected to each other.	Pictures of network topologies, sketch diagram, projector		**1.** Understanding the features of the various networking topologies. **2.** Identifying major components on the motherboard.
Learners to discuss the benefits of using networking facilities in their institution and other places (school, business, health, etc.). Identify the business prospects of networking and how it can be turned into a lucrative business. ***Assessment***: Present in groups benefits of computer networking.			
Plenary/Reflections What have we learnt today? We have learnt the benefits of networks. We have learnt how to use networks in institutions like schools, hospitals, businesses.			
Homework/project work/community engagement suggestions			
List five (5) benefits of networking in an organisation.			
Cross-curriculum links/cross-cutting issues			
None			
Potential misconceptions/student learning difficulties			
Learners' inability to link business enterprises to networking topologies. The facilitator/teacher can arrange to use a nearby business institution to further explain the concept.			

Sub-strand 2: Internet and Social media
Content Standard: B7.3.2.1 Demonstrate understanding and use of Social Networking and Electronic Mail.
Indicator(s): B7.3.2.1.1 Identify the various types and uses of social media sites such as social networking (Facebook, LinkedIn), microblogging (Twitter, Tumblr), WhatsApp, etc.
Key words/vocabulary: **Facebook, LinkedIn, microblogging (Twitter, Tumblr), WhatsApp.**

Suggested activities for learning and assessment	Equipment/Resources	Learner Resource page ref.	Progression
Show images of the various social media interfaces and guide learners to observe them.	Computer, projector, modem, internet		**1.** What are the means of communication? **2.** List the technological means of communication.
Learners to describe and differentiate the various social media interfaces and illustrate the workings of social networking sites such as Facebook, LinkedIn, WhatsApp, etc. Guide them to use a hard copy template to sketch their profiles. ***Assessment***: Install X-Ray Google browser to enable learners set up mock accounts without them going live to create any social media account.			

Plenary/Reflections: What have we learnt today? We have learnt about social networking. We have learnt the various interfaces of the social networking sites.			
Homework/project work/community engagement suggestions			
List three (3) additional social media tools that were not mentioned in class.			
Cross-curriculum links/cross-cutting issues			
None			
Potential misconceptions/student learning difficulties			
Learners may be unable to grasp the many social media sites and platforms. The facilitator/teacher can arrange to use a nearby Senior High School (SHS) ICT laboratory.			

Sub-strand 2: Internet and Social media			
Content Standard: B7.3.2.1 Demonstrate understanding and use of Social Networking and Electronic Mail			
Indicator (s): B7.3.2.1.2 Demonstrate the use of the following features of electronic mail: Attachment and Address book.			
Key words/vocabulary: Attachment, document, file, file size			
Suggested activities for learning and assessment	**Equipment/Resources**	**Learner Resource page ref.**	**Progression**
Display pictures or show a video of the steps to log into an email account	Computers, internet modem, mobile phones, tablets, projectors		**1.** How do we log into an email account? **2.** Identify the key steps to logging in.
Main Activity Lead learners to access their email accounts and demonstrate the steps in creating, sending and receiving emails. Show the steps in replying to and forwarding emails. Show how and when to use the email tools such as From, To, Cc, Bcc, and subject features when sending an email. Data Compressions: Generate Microsoft Word or Pdf document and use an online compression software to compress or reduce its size. Let learners understand that the benefit of data compression is minimal data usage. ***Assessment***: Let each group send an attached email to the facilitator's email. The attached document must be compressed to reduce its size.			
Plenary/Reflections: What have we learnt today? We have learnt the steps involved in sending an attached file. We have learnt the use of email tools such as *cc*, *bcc* and subject features.			
Homework/project work/community engagement suggestions			
Use the learner emails created in the school to send an attached image of a problem, typing the solutions in the subject area and send it to your teacher.			
Cross-curriculum links/cross-cutting issues			
None			
Potential misconceptions/student learning difficulties			

Learners may be unable to differentiate *cc* from *bcc*. The facilitator/teacher can arrange to use mobile phones or tablets.

Sub-strand 3: Information Security
Content Standard: B7.3.3.1. Recognise data threats and means of protection
Indicator(s): B7.3.3.1.1 Discuss the key principles of information security (confidentiality, integrity and availability).
Key words/vocabulary: Security, WikiLeaks

Suggested activities for learning and assessment	**Equipment/Resources**	**Learner Resource page ref.**	**Progression**
Display pictures or show a video or news covering leaked information e.g. WikiLeaks.	Pictures, computers, internet, mobile phones, tablets		**1.** Being able to research in pairs the key principles of information security. **2.** Being able to discuss the three (3) key principles of information security.3. Being able to research scenarios involving information security.
Main Activity: Working in pairs, research the key principles of information security. Discuss the three (3) key principles of information security. Research a scenario involving information security. ***Assessment***: Let each learner group come out with findings of information breach. Let them present as a group and discuss.			
Plenary/Reflections: What have we learnt today? We have learnt about the principles of information security. We have learnt about the key principles – confidentiality, integrity and availability.			
Homework/project work/community engagement suggestions			
• Research into situations in which people have breached information security in your school, community or country.			
Cross-curriculum links/cross-cutting issues			
• None			
Potential misconceptions/student learning difficulties			

Sub-strand 3: Information Security
Content Standard: B7.3.3.1. Recognise data threats and means of protection
Indicator(s): B7.3.3.1.2 Explore the legal provisions surrounding intellectual property rights (e.g. copyright, patent, trademark, piracy, copyright infringement).
Key words/vocabulary: Trademark, copyright, legal rights

Suggested activities for learning and assessment	**Equipment/Resources**	**Learner Resource page ref.**	**Progression**

Starter: Explore Ghana's copyright and patent rights by browsing on the internet.	Computer, projector, internet		**1.** Identifying major components on the motherboard. **2.** Exploring the parts of the system board and identifying a transistor.
Main Activity: Guide learners to **1.** Discuss issues pertaining to copyright (e.g. freeware, shareware, crippleware). **2.** Differentiate between the various legal issues mentioned above (e.g. freeware, shareware, crippleware). **3.** Discuss consequences associated with breaking copyright/patent laws. ***Assessment***: In groups of three (3), task learners to research on regulatory bodies that enforce copyright/patent laws. This should be presented in class for discussion.			
Homework/project work/community engagement suggestions			
• List the differences between freeware, shareware and cripple ware			
Cross-curriculum links/cross-cutting issues			
• None			
Potential misconceptions/student learning difficulties			
• Learners may have a challenge understanding the concepts and terminologies relating to legal matters			

Sub-strand 3: Information Security
Content Standard - B7.3.3.1. Recognise data threats and means of protection
Indicator(s): B7.3.3.1.3 Evaluate information security forensic auditing and criminal laws against offenders
Key words/vocabulary: Forensics, security, legality

Suggested activities for learning and assessment	Equipment/Resources	Learner Resource page ref.	Progression
Starter Watch a video of how offenders of data security breaches are identified.	Pictures, computer, internet, projector		State some common state/ national laws.
Main Activity: Guide learners to **1.** Discuss the laws protecting data and the relevant sanctions (Data Protection Act, 2012, Electronic Communications Act, 2008). **2.** Identify some common occurrences of data security breaches that people in the community overlook, and their corresponding sanctions. ***Assessment***: Mention three (3) ways in which offenders break the law, relating it to data security.			Identifying major patent and copyright laws.
Plenary/Reflections: What have we learnt today? We have learnt about information security. We have learnt about the various laws that are used to protect data.			
Homework/project work/community engagement suggestions			
Identify three (3) laws regarding data protection.			
Cross-curriculum links/cross-cutting issues			
None			
Potential misconceptions/student learning difficulties			
Learners may not appreciate the concepts and terminologies under security breaches.			

Strand 4: Computational Thinking

Sub-strand 1: Introduction to Programming
Content standard: B7.4.1.1. Show an understanding of the concept of programming
Indicator(s): B7.4.1.1.1 Demonstrate the use of correct terminology to describe programming concepts
Key words/vocabulary: Algorithm, source code, compiler, data type, variable, constant, conditional, array, loop, function, class

Suggested activities for learning and assessment	Equipment/Resources	Learner Resource page ref.	Progression
Task learners to **1.** List the terminologies relating to programming to aid recall. (E.g. algorithm, source code, compiler, data type, variable, constant, conditional, array, loop, function, class.) **2.** Explain each of the terminologies listed above. **3.** Develop a puzzle or any game that will aid understanding the concept of programming.	Computer/laptop, internet source		Learners should be able to **1.** List the programming terminologies in alphabetical order or grouping to aid recall. **2.** Explain each of the terminologies.
Homework/project work/community engagement suggestions			
Task learners to list and explain, with practical examples, the terminologies relating to programming in alphabetical order.			
Cross-curriculum links/cross-cutting issues			
• Mathematics - BODMAS			
Potential misconceptions/student learning difficulties			
• Learners may not easily understand the concepts and terminologies under programming.			

Sub-strand 1: Introduction to Programming
Content standard: B7.4.1.1. Show an understanding of the concept of programming
Indicator(s): B7.4.1.1.2 Demonstrate understanding in the use of data types (e.g., float, integer, string, char, etc.)
Key words/vocabulary: Float, integer, string, char

Suggested activities for learning and assessment	Equipment/Resources	Learner Resource page ref.	Progression
Guide learners to **1.** Briefly explain what data type is. **2.** Identify the various data types such as float, integer, string, char, etc. **3.** Define each data type. **4.** Develop key questions around daily activities to identify the data type. For example, the first name of your best friend is written as a string data type.	Computer/laptop, internet source		Learners should be able to **1.** Identify the various data types. **2.** Explain what data types are. **3.** Explain the function and importance of data types.
Homework/project work/community engagement suggestions			
Task learners to **1.** Develop three (3) questions based on daily activities to identify the data types.			
Cross-curriculum links/cross-cutting issues			
• Mathematics			
Potential misconceptions/student learning difficulties			
• Learners may be unable to grasp the concepts and terminologies relating to programming.			

Sub-strand 1: Introduction to Programming
Content standard: B7.4.1.1. Show an understanding of the concept of programming
Indicator(s): B7.4.1.1.3 Demonstrate the use of constants and variables in programming
Key words/vocabulary: Constants, variables

Suggested activities for learning and assessment	**Equipment/Resources**	**Learner Resource page ref.**	**Progression**
Guide learners to **1.** Discuss the use of constants as useful ingredients for defining values that are used within a function or program. **2.** Understand that in programming, constants are used to store information that is never going to change. **3.** Understand variables in programming as any characteristics, number, or quantity that can be measured or counted. E.g. age, sex, country of birth, class grades, eye colour, etc. **4.** Discuss the benefits of using variables instead of constants in a program.	Computer/laptop, internet source		Learners should be able to **1.** Discuss the use of constants and variables in programming. **2.** Discuss the benefits of using variables instead of constants in a program.
Homework/project work/community engagement suggestions			
Discuss the types of variables and state examples of each.			
Cross-curriculum links/cross-cutting issues			
• Mathematics			
Potential misconceptions/student learning difficulties			
• Learners may not easily understand the concepts and terminologies relating to programming			

Sub-strand 2: Algorithm
Content standard: B7.4.2.1. Analyse the correct step-by-step procedure in solving any real-world problem
Indicator(s): B7.4.2.1.1 Understand the use of sequence, selection and iteration in writing a computer program. Explain the meaning of the terms algorithm, decomposition and abstraction.
Key words/vocabulary: Sequence, selection, iteration, algorithm

Suggested activities for learning and assessment	**Equipment/Resources**	**Learner Resource page ref.**	**Progression**
Guide learners to **1.** Explain sequencing as the means through which the computer runs a code in order, one line at a time from the top to the bottom of a program. It starts at line 1, then executes line 2, then line 3 and so on until it reaches the last line of the program. ***(NB: This is a suggested explanation. Further reading is recommended.)*** **2.** Write down any set of numbers (e.g. 1-10) in an orderly arrangement to represent a sequence. **3.** Capture learners' itinerary for a day in a logical order (sequence). E.g. what they do before coming to school in the morning. **4.** Present a case study where there is more than one option to choose from, and still the same outcome is achieved. For example, tea with or without sugar options can still meet a beverage outcome (selection).	Computer/laptop, internet source		**Learners should be able to:** **1.** Write down any set of numbers (e.g. 1-10) in an orderly arrangement to represent a sequence. **2.** Present a case study where there is more than one option to choose from and still the same outcome is achieved. **3.** Develop a solution to a problem which uses iteration to control the flow of the program.
Homework/project work/community engagement suggestions			

Task learners to **1.** List a set of numbers (61-100) in an orderly arrangement to represent a sequence. **2.** Present a case study where there is more than one option to choose from, and yet any option selected leads to the same outcome. **The case study should be different from the one under the suggested activity above.**
Cross-curriculum links/cross-cutting issues
• Mathematics
Potential misconceptions/student learning difficulties
• Learners may not easily understand the concepts of selection, sequencing and iteration.

Sub-strand 2: Algorithm
Content standard: B7.4.2.1. Analyse the correct step-by-step procedure in solving any real-world problem.
Indicator(s): B7.4.2.1.2 Perform a linear search
Key words/vocabulary: Sequence, selection, iteration, algorithm

Suggested activities for learning and assessment	**Equipment/Resources**	**Learner Resource page ref.**	**Progression**
1. Guide learners to understand that **linear search**, also known as **sequential search**, is a process that checks every element in the list sequentially until the desired element is found. ***(NB: this is a suggested explanation. Further reading is recommended.)*** **2.** Demonstrate ability to locate a given value position out of a listed set of values. A suggested example is the use of the match function in MS Excel. **3.** Guide learners to list their ages, and use the list to demonstrate how they can arrange the given data in increasing and decreasing order.	Computer/laptop, internet source		Learners should be able to **1.** Locate a given value position out of a listed set of values. **2.** Arrange a given set of values or data in increasing and decreasing order.
Homework/project work/community engagement suggestions			
Task learners to list the ages of five (5) family members and arrange the ages in increasing and decreasing order.			
Cross-curriculum links/cross-cutting issues			
• Mathematics			
Potential misconceptions/student learning difficulties			
• Learners may not easily understand the concepts of linear search. • Learners may be unable to demonstrate practical understanding of arranging a given data in an increasing and decreasing manner.			

Sub-strand 3: Robotics
Content standard: B7.4.3.1 Discuss robotic intelligence concepts
Indicator(s): B7.4.3.1.1 Review the various applications of robotic machines in society
Key words/vocabulary: Robotics, drones

Suggested activities for learning and assessment	**Equipment/Resources**	**Learner Resource page ref.**	**Progression**
Guide learners to **1.** Understand what a robot is. **2.** State the applications and uses of robots in society. Relate the uses to real-life examples. E.g. drones for taking pictures, recording videos or delivering medical supplies and equipment. **3.** Explore the prospects and problems of using robots in everyday activities.	Computer/laptop, internet source		Learners should be able to **1.** State the applications and uses of robots in society. **2.** Relate the uses of robots to real-life situations. **3.** Explore the prospects and problems of using robots in everyday activities.
Homework/project work/community engagement suggestions			

Task learners to explain in detail the importance of robots in relation to health delivery, manufacturing and transportation.
Cross-curriculum links/cross-cutting issues
• none
Potential misconceptions/student learning difficulties
• Learners may have difficulty understanding and appreciating the benefits/uses of robots in society.

Sub-strand 4: Artificial Intelligence
Content standard: B7.4.4.1. Discuss artificial intelligence concepts.
Indicator(s): B7.4.4.1.1 Discuss the use and application of various areas of artificial intelligence (e.g., machine learning, artificial neural networks, virtual reality, augmented reality, gamification
Key words/vocabulary: Artificial intelligence, machine learning, neural networks, virtual reality, augmented reality, gamification

Suggested activities for learning and assessment	Equipment/Resources	Learner Resource page ref.	Progression
Pre-Task Activities/Starter: Divide the emerging technologies under artificial intelligence and show a short video (1-5 mins) or documentary on the principles of operation to generate classroom interaction.	Laptop or mobile phone to play video or show pictures		Learners should be able to Compare the key technologies such as machine learning, Artificial Neural Networks (ANN), virtual reality, augmented reality, gamification, deep learning, data mining. Discuss the uses and importance of Artificial Intelligence (AI) to society.
Main Activities: Consider each emerging technology and discuss the history, principle of operation, real-world applications, advantages and disadvantages in society.			
Assessment: Where the technology is available, allow learners to use. For example, you can engage them to write a documentary or report on specific sites explored using the virtual reality.			
Homework/project work/community engagement suggestions			
Leaners must investigate the things human intelligence can do in terms of reasoning that computer/artificial intelligence cannot do.			
Cross-curriculum links/cross-cutting issues			
None			
Potential misconceptions/student learning difficulties			
Artificial Intelligence (AI) device may not be readily available.			

APPENDICES

Appendix A: GUIDELINES FOR THE FORMATION OF PROFESSIONAL LEARNING COMMUNITIES (PLCs)

The National Council for Curriculum and Assessment (NaCCA), as part of the strategies for an effective implementation of the Common Core Programme Curriculum for Basic 7 (JHS1) – Basic 10 (SHS1) has come out with guidelines for the formation of Professional Learning Communities (PLCs).

FORMATION OF PROFESSIONAL LEARNING COMMUNITIES (PLCs)

The focus of education in recent times has been on *transformation.* Currently, most countries are shifting from block scheduling to tele-collaborative projects, from discovery learning to authentic assessment, etc. In realising these transformation agenda, new ideas for efficient education delivery and best performance attainment levels come and fade away or metamorphose into other models. One of these is the concept of Professional Learning Communities (PLCs). This has taken the central stage in most advanced countries in their quest for making education delivery robust and responsive in meeting their developmental needs. Ghana is no exception.

An article published by *Glossary of Education Reform* describes the professional learning community (PLC), as a group of educators that meets regularly, shares expertise, and works collaboratively to improve teaching skills and the academic performance of learners." According to Hord (1997b), "professional learning community is seen as a powerful staff-development approach and a potent strategy for school change and improvement." A PLC is a learning approach where teachers are activated as learning resources.

Generally, PLCs are considered as collegial groups of administrators and school staff who are united and committed to learners' learning. They function as an effective strategy for building school capacity around core issues of teaching and learning (Darling-Hammond, 1995). They serve as a mechanism to transform school culture. In other words, PLCs connect teachers with information, strategies, and best practices.

How is PLC formed?

- The head-teacher through consultation with his/her teachers and the major stakeholders (PTA, SMC, school improvement support officer (SISO), the education directorate, etc.) puts a committee in place.
- The committee is headed by a ***curriculum lead*** who must be a staff of the school.

What are the terms of reference of the committee?

The PLC in consultation with the entire membership and other stakeholders:

- agrees on the PLC session (or meeting) schedules for the term;
- identifies for PLC sessions, individual challenges in effective lesson delivery and innovative practices in teaching;
- creates common platform for members to share ideas, skills, knowledge and experiences;
- Identifies and invites facilitators for each session;
- Ensures that the focus of the school is changed from teaching to learning;
- Sets SMART goals for best practices in the school to meet expected performance outcomes and targets;

- collates data on all issues that relate to teaching and learning in the school for informed decisions;
- keeps records of attendance of members during PLC meetings;
- considers ways of changing the school's climate positively;
- plans and shares best practice lessons and integrated cross-curricular projects to all staff;
- creates a database on learner achievement scores that guides decisions for interventions;
- reviews and reflects on school data to plan instruction across the school curricular;
- considers extra-curricular experiences for learners.

What are some Characteristics of an Effective PLC?

- Shares values and norms.
- Creates time for collaborative work.
- Focuses collectively on learner's learning.
- Encourages collaborative work by creating common work spaces using proximity.
- Ensures leadership support for all PLC activities – school heads must be supportive.
- Respects and trusts one another.

What are the Guidelines for PLC's Activities?

- PLCs should be conducted once every week.
- The session should be for a minimum of one hour and should be set as the last hour of the day.
- The head of school will take the lead role.
- Roles should be assigned to encourage participation.
- The activities must focus on the Common Core Programme (CCP) Subjects-Curricula.
- The agenda for the next meeting should be developed at the end of each meeting for participants to prepare adequately for effective participation.

The minutes for each meeting should be made available after each session and sent to the regional PLC platform for headquarters' validation. The platform will be made up of the following officers from the Metropolitan, Municipal, District and Regional level:

- Training Officers
- Supervision and Monitoring (S&M) Officers
- Basic School Coordinators
- Heads of School
- School Improvement Support Officers (SISOs)
- Curriculum Leads

NB: PLC sessions should be conducted from the second week of the term through to revision week.

Who are the Key Actors in the PLC?

- District Education Oversight Committee (DEOC)
- MMD Director of Education
- MMD Head of Monitoring and Supervision,
- School Improvement Support Officer (SISO)
- Head of School
- Curriculum Lead
- JHS and SHS subject teachers

MMD Education Oversight Committee

- Validates the PLC programmes
- Develops guidelines for the effective implementation of all PLC programmes in the MMD
- Provides a supervisory role for the MMD Education Office in the performance of duties relating to PLC programmes and activities.

MMD Director of Education

- Approves the calendar for the integration of PLC activities into MMD plan
- Provides overall leadership and supervision of all PLC activities in the MMD and assigns targeted roles and responsibilities to subordinates.

MMD Supervision and Monitoring Officer

- Develops, in collaboration with DDE and School Improvement Support Officers

(SISOs), a plan for monitoring Fidelity of Implementation (FOI) initiative and the overall evaluation of the success of the PLC initiative.

- Reviews (with support from SISOs) monitoring, evaluation & fidelity of implementation data for each term and implement needed changes. In consultation with the DDE, select/recruit curriculum leads for the PLC for each school.

School Improvement Support Officer (SISO)

- Participates in the selection/recruitment of curriculum leads for the schools.
- Collects, collates, and submits to the MMDEO M&E and FOI data (nature of data and regularity of collection and reporting to be determined by GES in consultation with NaCCA).
- Identifies the training needs of the heads of schools and subject-teachers in partnership with the MMD Training Officer.
- Trains the heads of schools and curriculum leads and refers matters relating to attitudes and behaviours that are detrimental or advantageous to the intervention to the MMD Head of Monitoring and Supervision for moderation, share/promote the experiences of the various interventions among schools under his supervision.

Head of School

- Attends initial training on PLC programme
- Ensures the support of the School-based Management Committee (SMC), Parents-Teacher Association (PTA) and other stakeholders for the PLC programmes.
- Ensures the active participation of all teachers during PLC Sessions, as well as the implementation of innovative lesson-delivery strategies and best practices discussed at PLC meetings.
- Identifies and puts in place measures to acknowledge teachers who make an effort to implement best practices discussed at PLC meetings.
- Puts in place measures to monitor and report on learners' progress concerning performance indicators and established national performance standards.
- Adopts the FOI of learning for accountability.

JHS and SHS Subject Teachers

- Participate actively in all PLC Sessions (activities and programmes).
- Follow the revised CCP Curriculum, prepare scheme of learning and lesson plans/notes according to specification and keep track of challenges or difficulties encountered.
- Try out new teaching activities, strategies and practices discussed during PLC Sessions.
- Share challenges and successes with teaching colleagues in future PLC meetings.

How Do We Conduct an Effective PLC Session?

Pre-Discussion

- Register and introduce participants and key facilitators if any.
- Nominate a PLC secretary to take note of discussion points.
- Identify and discuss challenging themes, i.e. themes evolving from the CCP Curriculum training and implementation.
- Identify and invite an expert or colleague with in-depth knowledge of the theme identified to facilitate a PLC session or lead the discussions.
- Assign specific themes to different teachers (members of the PLC) to research and lead future PLC sessions.
- Encourage mutual discussions and contributions by all members.

Discussion stage (action)

- The lead facilitator takes participants through the content and demonstration lessons (where applicable) associated with the theme.
- Facilitation should be participatory, engaging and interactive.

Post-Discussion Stage

- At this stage participants evaluate the content and demonstration lesson learnt and assess the extent of improvement through reflection and debriefing.

- The agenda for the next meeting should be developed (or agreed upon) at the end of each meeting for participants and the PLC lead to prepare adequately for effective participation.
- Participants are expected to improve on their daily teaching skills through leading questions.
- Participants are encouraged to use group platforms strictly dedicated to PLC for professional learning and providing colleagues with useful professional materials.

Who Monitors the Activities of PLC?

- The Ghana Education Service (GES)
  - Headteacher
  - Circuit Supervisor
  - MMD Monitoring Officers
  - Regional Monitoring Officer
- National Inspectorate Board (NIB)
- National Teaching Council (NTC)
- National Council for Curriculum and Assessment (NaCCA)

http://www.allthingsplc.info/
http://www.sedl.org/pubs/change34/2.html
http://www.inspiringteachers.com

CONTINUOUS PROFESSIONAL DEVELOPMENT DAY (CPDD) FOR JHS BEGINNING 2020/21 ACADEMIC YEAR

Teachers in the Public JHS shall observe a Continuous Professional Development Day beginning 2020/21 Academic Year.

The observation of the CPDD shall help the teachers (facilitators) develop and/or adopt new strategies for teaching which will help them overcome identified challenges in their day to day activities as teachers (facilitators). Continuous Professional Development is in two folds:

1. **Professional Learning Communities (PLCs)**

   PLC, as explained earlier, is a group of educators and other stakeholders who meet regularly to share expert knowledge, skills and experiences for the improvement in the performance of learners, through effective lesson delivery and assessment. PLCs serve as an innovative mechanism for transforming the learning culture and social environment of the school. It connects and equips teachers from not only the same school, but from other schools within or outside the geographical location with information, learning and teaching strategies and best practices.

   About 50 minutes (one period of co-curricular activities) has been assigned to PLC activities every week on the school's timetable. It can be organised at the cluster or circuit level as well as subject-based. On PLC days, learners will close and go home while teachers meet at PLC sessions to learn and share ideas, concepts, skills, knowledge, and experiences to upgrade and improve themselves.

2. **Continuous Professional Development Days (CPDDs)**

   This will be organised once every quarter – 4 times a year. On these days, learners will be given a holiday to stay at home. Teachers will have a full training day to update their content knowledge, sharpen their lesson delivery and pedagogical skills, as well as share experiences and best practices – leadership for learning, conducive social environment, sustainable learning concepts, etc.

Appendix B: DESIGNING SCHOOL-BASED TIMETABLES

A **school timetable** is a table for regulating and coordinating activities of the learners, teacher and school. Timetables are cyclical. These activities recur every week or every fortnight (in cases of shift schools).

The timetable for the Common Core Programme (CCP) Curriculum to be rolled out in the 2020/21 academic year has the following characteristics.

1. Proposed Contact Hours (Time on Task)

Number of periods per day:	8 periods
Number of periods per week:	40 periods (8 periods × 5days)
Duration per period:	50 minutes

2. Length of School Day

Time on Task:	400 minutes (50 minutes x 8 periods)
Break Time	60 minutes (two breaks at 30 minutes each)
Extra-curricular activities	50 minutes per day
Total length of school day	510 minutes (8.5 hours)

3. Proposed options for Length of School Day

S/No	Lessons Start	Lessons Close	Extra-Curricula
1	7.00am	2.40pm	2.40pm – 3.30pm
2	7.30am	3.10pm	3.10pm – 4.00pm
3	8.00am	3.40pm	3.40pm – 4.30pm

4. Proposed Co-Curricular Activities

- Life and Psychosocial Skills:
  - *Sports and Games*
  - *Tourism, Arts and Culture Club*
  - *STEM Club*
  - *Creative Writers/Debaters Club*
  - *Human Rights Club*
  - *Friends of the Earth Club*
  - *NGO Activities: Talks and Sensitisation etc.*
- Research, Science, Agriculture (Gardening) and Community Project
- Entrepreneurship Development, Guidance and Counselling.
- Library, Sustainable Learning and Study Skills
- Professional Learning Community (PLC), CPD and School/Cluster-based INSET

5. Period Allocations for Subjects

Subject	**No. of Periods**
Mathematics	4
English	4
Ghanaian Languages	3
French/Arabic	3
Science	4
Computing	3
Social Studies	3
Religious and Moral Education	3
Career Technology	4
Creative Arts and Design	4
Physical Education	3
Worship and Library Studies	2
TOTAL	**40**

Timetable Template

	30m	1 50m	2 50m	**B1** 30m	3 50m	4 50m	5 50m	6 50m	**B2** 30m	7 50m	8 50m	Co-Curricular
M	**ASSEMBLY&REG**			**BREAK**					**BREAK**			
T												
W												
T												
F												

- **Things to consider when populating the Timetable**

  In populating the template to develop a school-based community friendly timetable, the officer should consider the following:

  - Local dynamics – average walking distance from home to school.
  - Socio-cultural and economic activities etc. within the community.
  - If possible, the periods for Mathematics and the languages should be completed before lunch.
  - Activity-based lessons such as Computing, Career Technology, and Creative Arts and Design can be organised after lunch.
  - PLC should be allocated one of the 5 slots for co-curricular activities.

For further inquiries contact
National Council for Curriculum and Assessment (NaCCA)
Tel. No. +233 302 909 071
Email: info@nacca.gov.gh
Website: www.nacca.org.gh

Appendix C: Assessment in the CCP Curriculum

The ultimate goal of Assessment is to improve Learner's learning

[This document was prepared by the Assessment Unit of NaCCA led by Antwi Aning]

Introduction: What is Assessment?

Assessment is the process of collecting information or evidence of learning and achievements and using it to improve teaching and learning. It is about getting to know our learners and the quality of their learning. It is an ongoing process for gathering evidence of learning and using it to enhance learners' learning.

Why assess learners in our classrooms?

Assessment is the bridge between teaching and learning and the central process in effective instruction.

Generally, we assess to find out:

- what learners know
- what learners can do, and how well they can do it
- improve learners' learning
- gather evidence of learning
- inform instruction
- yield information about areas of weakness and problems of teaching and learning
- show the strength and weaknesses of learners
- identify individual differences and achievement gaps among learners
- assist teachers in the process of remediation.
- determine whether expected outcomes have been met

The CCP curriculum will be assessed both formatively and summatively but the outcome of both assessments will be used to move learning forward.

Formative Assessment

Formative Assessment is a concept which covers various approaches for using assessment to improve learners' learning. Two of such approaches are assessment **for** learning and assessment **as** learning**.** Formative assessment deals with finding out on day-to-day basis, information about learners' progress and difficulties so that immediate measures can be taken.

Any instructional activity that allows teachers to uncover the way learners think about what is being taught and which can be used to promote improvements in learners' learning can serve a formative purpose. Formative Assessment supports learning during the learning process.

Characteristics of Effective Formative Assessment

- Clarifying, understanding, and sharing learning goals and criteria for success with learners.
- Creating effective classroom discussions, questions, activities, and tasks that offer the right type of evidence of how learners are progressing to the agreed learning goals.
- Providing feedback that moves learners forward.
- Activating learners as learning resources for one another.
- Activating learners as owners of their own learning.
- Using varied instructional methods to meet diverse learner's needs.
- Using varied approaches to assessing learner's understanding.

(Thompson & William, 2007)

Summative Assessment

It is an assessment which is generally taken by learners at the end of a unit, a term or semester, end of year or a course to demonstrate the "**sum**" of what they have or have not learned.

- Usually, it is called Assessment of Learning
- It compares learners' knowledge or skills against standards or benchmarks.
- It evaluates mastery of learning and offers information on what learners know and do not know.
- It provides educators with the metrics to know what's working and what's not.

- Usually, it is high stakes, for example when used for promotion, admission, certification, selection, accountability, etc.
- Can also be used formatively if it provides feedback to inform teaching and learning.
- Does not provide teachers with vital information to use in crafting remedial instruction.
- Plays a pivotal role in education by troubleshooting weaknesses in the system despite its shortcomings.
- Provides educators with valuable information to determine the effectiveness of instruction for a particular unit of study, to make high-stakes decisions and to evaluate the effectiveness of schoolwide interventions.
- Works to improve overall instruction.
    - by providing feedback on progress measured against benchmarks,
    - by helping teachers to improve, and
    - as an accountability instrument for continuous improvement of systems (Hart et al., 2015).

Formative Assessment Approaches

1. Assessment for learning (AfL)

Assessment for Learning (AfL) is an approach, integrated into teaching and learning, which creates feedback for learners to improve learning. i.e. occurs when assessment and learning are integrated.

AfL is not a means of evaluating schools, teachers or learners, rather it is a feedback mechanism.

It provides learners with rich, meaningful and timely feedback on their learning and progress throughout a programme of study. Assessment for Learning is an ongoing part of teaching & learning in which both teachers and learners share the responsibility for learning. It can take many forms, and may be either formal or informal (Yorke 2003). With AfL, teachers can understand better how their learners are learning and use this to plan what they will do next with a class or individual learners. AfL helps the learner to see what they are aiming for and understand what they need to do to achieve those aims. AfL therefore focuses on the teacher and the learners' understanding.

Why is AfL important?

Assessment for learning is a key pedagogical tool for:

- establishing where the learners are in their learning
- establishing where they are going
- working out how to get them there

(William, 2009)

2. Assessment as learning (AaL)

In this approach, learners are their own assessors. They monitor their own learning, ask questions and use a range of strategies to decide what they know and can do, and how to use assessment for new learning. AaL helps learners to take more responsibility for their own learning and monitoring future directions. Learners are able to learn about themselves as learners and become aware of how they learn. They reflect on their work on a regular basis, usually through self and peer assessment and decide what their next learning will be.

The teacher's role in assessment *as* learning is to:

- model and teach the skills of self-assessment
- guide learners in setting their own goals, and monitoring their progress towards them
- provide examples and models of good practice and quality work that reflect curriculum outcomes
- work with learners to develop clear criteria of good practice

Feedback in Assessment

Feedback is an important component of the formative assessment process. Formative assessment gives information to teachers and learners about how learners are doing relative to learning goals. Giving good feedback is one of the skills teachers need to master as part of good formative assessment. *(Ref: Susan M. Brookhart)*

For feedback to be effective for learners, they need the following:

- an understanding of the desired learning goal;
- evidence about their present position in relation to that goal;
- guidance on the way to close the gap between the two.

Effective feedback should:

- focus on what is being learned (learning outcomes) and how learners should go about it (success criteria)
- occur as the learners are doing the learning, i.e. be given at a time when the response will help the learner improve their learning
- provide information on how and why the learner has or has not met the criteria
- be phrased so the learner can understand how he/she should respond and;
- provide strategies or act as guidance showing how the learner can improve; and
- encourage a dialogue (where appropriate), so the learner can probe for clarification on next steps needed to progress their learning.

Success Criteria

It is important in the learning cycle that the learners and teacher are all aware of what will show that learning has taken place.

Why Are Success Criteria Important?

- Improve understanding
- Empower learners
- Encourage independent learning
- Enable accurate feedback
- Enhance quality assessment which is totally dependent on the use of success criteria

What Are Success Criteria?

'… success criteria summarise the key steps or ingredients the learner needs in order to fulfil the learning goal – the main things to do, include or focus on.' (Shirley Clarke)

Effective Success Criteria

- are **linked** to the learning intention;
- are specific to an activity;
- are measurable;
- are **discussed and agreed** with learners prior to undertaking the activity;
- provide a **scaffold** and focus for learners while engaged in the activity; and
- are used as the basis for **feedback** and peer-/self-assessment

Sample success criteria

B 2.1.2.3.1 Describe a solid-solid mixture and explain how to separate the components	Low	Medium	High
	I can correctly identify and give an example of a solid- solid mixture	I can form and describe a solid-solid mixture	I can separate a solid-solid mixture into its components

Assessment for Learning Strategies

The following are samples of activities that you can try in your classroom. These can be adapted to be applied to all subjects and stages of education.

Shared Learning Goals

Promote learner's autonomy over their learning progression by sharing with them the learning goals, and most importantly the success criteria.

Learners write or ask questions

For example –

- About what they would like to know on a new topic;
- To ask the teacher or other learners in order to assess their learning;
- To demonstrate their learning/misconceptions/areas they would like to further explore.

Lesson Target Setting

- Make the lesson more purposeful for learners by setting targets at the beginning about what you and the class are going to do;
- These can be referred to through the lesson and/or revisited in the plenary;
- Learners could then show how they have met targets in the plenary and/or set targets for next lesson.

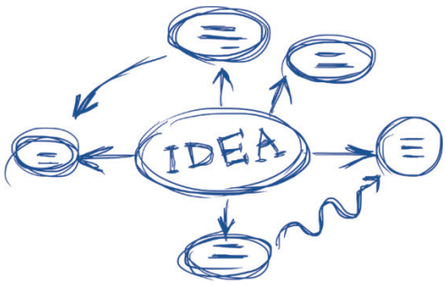
Making Learning Goals Clear

- Put lesson goals on the board at the beginning of the lesson;

- Talk to learners about why they are studying what they are studying;
- Contextualise short-term goals in long-term goals and make real life application clear (e.g. understanding the nature of things in the environment – living and non-living will contribute to our wider understanding of the world around us) and;
- Check with learners whether they understand the goals of the lesson.

Brainstorming

- Brainstorming is a technique used to determine what a learner may already know about a particular topic. Learners often feel free to participate because there is no criticism or judgment.
- Follow this with a clear description of what concepts to be covered in the lesson (to consolidate and clarify understandings)



Devising Questions

Devise questions that –

- Challenge common mistaken beliefs about a topic (misconceptions)
- Create conflict that requires discussion
- Explore ambiguity and encourage discussion and clarification

Wait time

- Wait time allows learners time to think and therefore to produce answers. Also, not everyone in the class thinks at the same speed or in the same way – waiting allows learners to build their thoughts and explore what has been asked.
- 2 types of wait time –
  - Teacher speaks and then waits before taking learners' responses.
  - Learner response ends and then teacher waits before responding. This gives the learner space to elaborate or continue – or for another learner to respond.

Observations

Teacher observations can be made in the course of delivery, during times of questioning and feedback and when learners are engaged in activities, either alone or with peers or groups. Look out for the look of confusion, nod or spark of understanding etc. We observe to be responsive and adjust to keep the learning going or notice when it is time to stop or recap a concept.

Tell your neighbour

- Learners 'tell their neighbour' as a means of articulating their thoughts.
- Ask a question, give thinking time and then ask learners to tell their neighbour their thoughts.
- This can either prepare whole class for 'hands down' questioning (where teacher asks randomly selected learner to contribute) or can precede a whole class discussion.

Think–Pair–Share

Give learners the opportunity to articulate their thinking before answering:

- Allow 30 seconds – 1-minute silent thinking before any answers
- Ask learners to write some thoughts down before answering
- Ask learners to brainstorm in pairs first for 2-3 minutes
- Then, get learners ready to talk about their own ideas or their group's ideas in a whole class discussion

Think–Pair–Square

- Think-Pair-Square is the same as Think-Pair-Share except that learners share their answers with another pair instead of the whole class.

Debates

- Debates enable the teacher to informally evaluate learners' oral work by assessing their oral presentation skills in terms of their ability to understand concepts and present them to others in an orderly fashion.

Post-It /Slate/ Mini-whiteboard/ Rough-workbook

Use post-it notes (or the other materials above) to evaluate learning. Groups, pairs or individuals can answer:

- Did I meet the success criteria?
- What should be done to improve next time?

Or:

- What have I learnt?
- What have I found easy?
- What have I found difficult?
- What do I want to know now?

K – W – L

- At the beginning of a topic let learners create a grid with three columns –

What They Know	What They Want To Know	What They Have Learnt

- They begin by brainstorming and filling in the first two columns and then return to the third at the end of the unit (or refer throughout).
- Variation – extra column 'How Will I Learn?'

Response Partners

- Paired or partnership oral marking. Learners invite a partner or a group to discuss or comment on their work. For it to be effective, learners should be aware of the learning goals and success criteria. They should also appreciate the role of a response partner – to offer positive and constructive feedback around the learning goals.
- Learners could be given prompt questions to ask the person who has done the work.

Exemplar Work

- When setting learners a piece of work, show them examples that make it clear what it is they are being asked to do – and what they need to do in order to meet the assessment criteria.
- Learners could mark exemplar work using the assessment criteria. This will help model what is being asked for and how it relates to the process of assessment.

2 Stars and a Wish

For peer assessment, ask learners to give two stars and a wish.

- Two stars = 2 things that are good about the piece of work.
- A wish = something they can improve to make it even better.

Traffic Lights

Use traffic lights as a visual means of showing understanding. Coloured card or paper could be used.

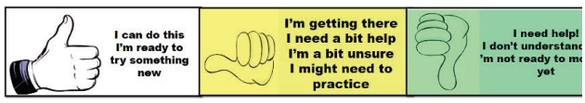
- Variation – Using smiley faces

  Where coloured card is unavailable, simple face emojis can be used to communicate learners' understanding.

  ☺😐☹

Hand Signals

- Hand signals range from learners raising their hands to respond to a question posed by the teacher to a group to "thumbs up/down" signal to determine learners "acknowledged" understanding of a concept or process.



When using traffic lights or hand signal techniques, it is important to ask a few follow up questions to check learners' actual level of understanding. Learners who are confident can also be used to support or explain to others who are not as confident yet.

Show and Tell

- During teaching, you can use mini-whiteboards/slates/rough-work book so that every learner can write or draw their answer and show it to you (or their peers) immediately. Follow up with questioning to check for genuine understanding or to build upon answers especially in subjects like [insert subject] where there is often one answer.

Active Learners

Key to AfL is learners being active, engaged participants in their learning. Think of ways in which content can be manipulated for these ends, rather than the other way round. If the content seems boring make the approach fun or interesting.

Learners write Questions

For example –

- About what they would like to know on a new topic
- To ask the teacher or other learners in order to assess their learning
- To demonstrate their learning/misconceptions/areas they would like to further explore

The classroom could have a question box where learners drop questions at the end of a lesson.

Or, a plenary could involve learners writing questions that the class then work on together, or forms the basis of the next lesson.

Learners ask Questions

Create opportunities for learners to ask questions. This could be of their peers, of the teacher or as a means to develop discussion.

A 'question box' for written questions offers a different means of communication for learners

Allow time for learners to ask questions about pieces of work. This helps open up assessment and eliminate ambiguity

Comment-only Marking

Comment-only marking provides learners with a focus for progression instead of a reward or punishment for their ego (as a grade does).

Comments could be made in books, in a table at the front of their books, in a learning diary or journal. The latter are helpful for teacher and learner to track the progression of comments and see improvement.

Comments should make it clear how the learner can improve.

Plan activities and work with feedback in mind – let the design assist the process.

Mid-unit Assessment

Having an assessment at the end of a unit may not provide time for you to go over areas learners have struggled with, or in which there are general misconceptions.

Timing assessment during a unit allows time to review, reflect and revisit. It also gives the teacher an opportunity to focus explicitly on areas of weak understanding supported by evidence.

Might

When questioning, insert the word 'might' to give learners greater opportunity to think and explore possible answers.

e.g.

What is meaning of democracy?

What might the meaning of democracy be?

The first infers a single answer known by the teacher whereas the second is inherently more open.

What might the Great Depression look like today?

Wait time

Wait time allows learners time to think and therefore to produce answers. Also, not everyone in the class thinks at the same speed or in the same way – waiting allows learners to build their thoughts and explore what has been asked.

2 types of wait time –

i) Teacher speaks and then waits before taking learners' responses.

ii) Learner's response ends and then teacher waits before responding. This gives the learner space to elaborate or continue – or for another learner to respond.

Open vs closed

Closed questions can be useful however they are not great at facilitating the use of abstract thinking skills, encouraging talking or eliciting much understanding. Open questions are more likely to do this and thus improve learning. E.g.

Did you go out last night? - (How can you make this question open?)

What did you do after school yesterday?

Exemplar Work

When setting learners a piece of work, show them examples that make it clear what it is they are being asked to do – and what they need to do in order to meet the assessment criteria.

Learners could mark exemplar work using the assessment criteria. This will help model what is being asked for and how it relates to the process of assessment.

Learner Marking

By taking part in the process of assessment, learners gain a deeper understanding of topics, the process of assessment and what they are doing in their own work. This helps to make them more aware of 'what learning is' and thus see their own learning in this way.

Learners could self- or peer- mark homework or assessments.

This could be done in pairs or individually with a learner-made or 'official' mark-scheme.

Lesson Target Setting

Make the lesson more purposeful for learners by setting targets at the beginning about what you and the class are going to do.

These can be referred to through the lesson and/or revisited in the plenary.

Learners could show how they have met targets in the plenary and/or set targets for next lesson.

2 Stars and a Wish

For peer assessment, ask learners to give two stars and a wish.
Two stars = 2 things that are good about the piece of work
A wish = something they can improve to make it even better

Articulate then Answer

Give learners the opportunity to articulate their thinking before answering –

- 30 seconds silent thinking before any answers
- Brainstorm in pairs first for 2-3 minutes
- Write some thoughts down before answering
- Discuss with your neighbour first

Tell your Neighbour

Learners 'tell their neighbour' as a means of articulating their thoughts.

- Ask a question, give learners time to think and then ask learners to tell their neighbour their thoughts.
- Tell learners what the new topic is and ask them to tell their neighbour everything they know about it.

Idea Thoughts

When you have received an answer to a question, open up the thinking behind it by asking what others think about the idea. E.g. "What do others think about _____'s idea?"

Devising Questions

Devise questions that –

- Challenge common misconceptions
- Create effective classroom activities, questions and tasks that prompt the right type of discussions
- Explore ambiguity and encourage discussion and clarification

Learning Journal

Create a learning journal in which learners can reflect and review their learning. It could include plenary activities, a target setting chart, aims and goals, etc.

Group Feedback

Group feedback to a teacher concerning peer-assessment of work can help make the teacher aware of learning needs in a manageable way.

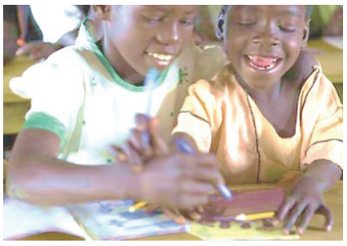
If a group feeds back then it draws more attention and presents information that has already been ordered and sorted (meaning less repetition for the teacher).

Peer Marking

Learners mark each other's' work according to assessment criteria.

Encourages reflection and thought about the learning as well as allowing learners to see model work and reason past misconceptions.

Opportunities to do this throughout individual lessons and schemes of work.



Teach Collaboration

Peer assessment requires learners to act collaboratively. Indeed, AfL is a collaborative enterprise therefore, explicitly teach skills of collaboration.

This process can be assisted by discussing collaboration with learners and making it visible as a part of the classroom.

Traffic-Light Revision

When revising a topic or subject, work through the different areas with learners and ask them to traffic light according to their grasp of each.

Subsequently, learners should be able to target their revision more carefully and engage in it actively, rather than simply reviewing everything they have done or reading passively over their entire notes.

Group Answers

Learners work in small groups to agree on answers – when tests are returned or in other situations.

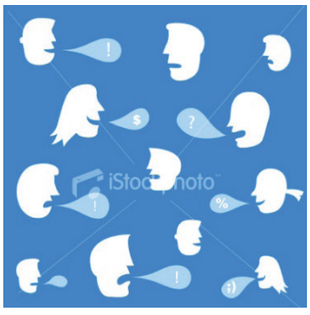
The process of agreeing should include reasoning over the validity of the consensus answer, as well as reasoned negation of misconceptions or wrong answers.

Think-through Talking

Talking allows learners to articulate their thoughts and thus to learn.

Encourage thinking through talking with –

- Discussion activities
- Structured group/pair work
- Modelling by teacher and learners (small group work increases the 'surface area' of talk in the classroom as opposed to whole class discussions)



Communication

Ask learners to communicate thinking through different mediums – not just writing; drawing, drama, maps, sculpture etc.

The medium is the message and therefore circumscribes to some extent how communication can take place. Using alternative mediums allows the teacher to 'see' learners' understanding from different angles.

Appendix D: ABRIDGED GUIDELINES FOR THE FORMATION AND MANAGEMENT OF SCHOOL-BASED CLUBS AND SOCIETIES (SCS) FOR THE IMPLEMENTATION OF THE STANDARDS-BASED AND CCP CURRICULA

Introduction

These guidelines provide tips and ideas for teachers and learners on how to establish and manage **SCSs** at the pre-tertiary level of education in Ghana. They also suggest simple activities that the clubs can carry out. However, this is only a start since the real success of the club in your school will depend on the efforts of the leadership of the clubs being creative, thinking outside the box and coming up with innovative ideas, concepts, projects and activities. The innovations are expected to motivate and elicit in members, the desire go the extra mile while having fun as they learn.

What are School-based Clubs and Societies?

School-based clubs or societies are organised groups approved by the school authorities to offer learners the opportunity to participate in activities they enjoy, learn new skills, explore their talents, meet new colleagues, share experiences and engage in healthy competitions. Learners showcase their talents and acquire functional and lifelong skills. Through SCS activities, learners experience the life that exists outside the classroom and school walls. Majority of learners enjoy club activities because they get the occasion to spend time with their friends and engage in activities they consider as fun and interesting**.** School administrators and teachers also like to see learners participate in co-curricular activities as it helps them know the learners better. The learners demonstrate sterling qualities and skills such as leadership, communicative, organisational, critical thinking, problem solving, creative, innovative, collaborative etc. Every School-based club must have a teacher to supervise the club's activities and report to the school head. Learners are to be given leadership positions such as president, vice-president, secretary and organiser.

Why School-based Clubs and Societies?

The **SCS** seeks to:

- Equip the learner with foundational, functional and lifelong skills.
- Strengthen the acquisition and application of the of the 4Rs and core competencies:
  - critical thinking and problem solving skills;
  - creative and innovative skills;
  - collaborative and communication skills;
  - global citizenship;
  - entrepreneurial skills.
- Introduce the learner to research and project-based learning, enhanced community networking and linking of schools and learners.
- Equip learners with the spirit of volunteerism and community service.

What are the suggested SCS for our Schools?

- Community Service Club
- Digital Literacy Club
- Friends of the Earth Club
- Human Rights Club
- Literary Club (Debaters, Creative Writers and Drama)
- Sports and Games
- STEAM (STEM) Club (Currently, there is what is called STEAM Club. It aims to spark the excitement of young people for Science, Technology, Engineering, Art, Mathematics and More. The challenge is that learners focus more on the Sciences and forget about the interrelatedness between Science and the Arts)
- Tourism, Arts and Culture Club

Other clubs approved by the Ghana Education Service (GES)

How Do We Establish SCS?

1) ***Planning, Consultation and Stakeholder Engagement:***

- Community engagement is key to the success of your club – this should be kept in mind as well for any community project.
- Talk to staff members, identify interests, hobbies, talents, and skills of learners, and decide with colleagues which club ideas learners will be comfortable participating in.
- Align the interest of colleagues to the interests, hobbies, talents, and skills you have all identified. Get them to commit to helping the club to develop.
- Arrange with the head of school and administration for permission to start a club or identified clubs.
- Talk to parents and other stakeholders (chief, assembly member, etc.) and seek their support.
- Speak to other volunteers in the school and community to get like-minded colleagues to help run the club with you.

2) ***Choosing Club Members***

- Choosing club members should mainly be based on the interests, hobbies, talents, and skills of the learner.
- Decide on a class, form or grade level as target group with a focus on inclusion.
- Decide on gender mix; are you targeting more boys or more girls? Why?
- Targeting a particular class or grade level allows for effective monitoring and evaluation.
- It is always helpful to have learners from different classes and programmes represented, so they can learn from one another, and provide feedback about what they learn to their other mates.
- Get enough people interested - at least 1 teacher and at least ten (10) learners.
- Guide club members to elect club officials - president, secretary, organiser, financial secretary, ladies' rep etc.
- Paste names of elected officials on notice board.
- Inform them of their roles and responsibilities through an orientation.

3) ***Branding the Club:***

- Get a name for the Club.
- Brainstorm on club's mission - What do you want to accomplish and how it can be done?
- Draw up action plan – what activities and projects will you carry out to accomplish the club's objectives?
- Make paraphernalia, souvenirs and create a Social Media presence on Facebook, Twitter, or a club web blog where you can host an online club magazine. These make learners feel special and have a sense of belonging.

4) ***Invitation to Club Members***

- Get parents, CSOs, NGOs, other schools and school heads involved.
- Explain to parents and learners what the club stands for and the benefits it will offer the learner.
- Together with some learners who have bought into the idea of the club, design a membership form.
- Publicise club activities - announce upcoming events and updates of club activities on notice boards, during assemblies and through social media, etc.
- Invite 'specially targeted' learners to the club.
- Keep records of the club's activities – minutes, attendance, projects, etc.

5) ***Launch the Club***

- Launch the Club and explain to the members the focus of the club.

- Make the club activities fun and engaging, and perhaps offer some incentives as long as these can be sustained.
- Ensure that the club activities do not become an extension of classroom learning activities.

6) ***Keeping it Simple***

- Don't feel any pressure to run complicated activities.
- Simple projects work well for new clubs.
- Meet an hour once every week as captured on the school's timetable.
- Use the club's activities to discuss effective ways of doing things - 'Dos' and 'Don'ts'
- Regularly review your projects and revise your action plan accordingly.

***NB**: Sample club activities can be downloaded from the internet.*

7) ***Selecting Club Patrons***

- Club Patrons are volunteers who voluntarily offer their human and material resources to support the activities of the club.
- Consult and select patrons who are willing to support the activities of the club.
- Patrons should be persons whose interests, skills, and hobbies align with the aims, objectives and goals of the club.

8) ***Celebrating Achievements***

- Celebrate members for actively participating in the activities and programmes of the club.
- Provide certificates and other souvenirs to members who dedicate themselves.
- These awards could be done during school assemblies and other social gatherings to help raise the profile of the club across the school and also to motivate other learners.
- A journal/diary should be designed to help learners reflect on what they do during club activities.

Community Service

Learners get motivated to practise what they learn at school when they are given the opportunity to undertake community service. They become agents of change in their communities and learn to be proactive citizens. During community service learners are guided to identify common challenges and the relationship between community resources and opportunities to an improved way of life. Some activities they can do are:

- Community projects on climate change, tree planting, clean-up exercises etc.
- Community sensitisation and awareness on emerging issues.

Excursions and Field Trips

Excursions and field trips help learners to gain more insight into socio-cultural and economic issues and offer them an opportunity to have a first-hand experience of what they only hear or read about. They learn about current situations and get informed about how they can improve their performance in other learning areas. Learners can visit:

- Historical and heritage sites;
- Industries and production units;
- Government institutions and departments;
- Botanical gardens or wildlife parks; and
- Power plants using alternative energy sources such as solar, wind, geothermal, etc.

Projects

- Robotics
- Creative Arts productions: art and craft works, theatre and musical concerts etc. to sensitise, educate and entertain
- Tree planting
- Renewable energy projects
- Essay competitions
- Climate change
- Research and surveys

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Appendix E: FIDELITY OF IMPLEMENTATION OF THE COMMON CORE PROGRAMME (CCP)

KEYS (✓ TICK AS APPLIES): **YES**: Indicates indicator has been attained

NO: Indicates that indicator has not been attained

N**OT YET:** Indicates that the indicator is yet to be initiated

NEEDS SUPPORT: Indicates indicator where a teacher needs assistance from a SISO, Head teacher, a colleague, a resource person, Curriculum lead or any DEO. A teacher can tick any of the above three and this section. Write specific area the teacher needs support in the Remarks Column. ***NB: Not applicable to all indicators***

A. TEACHERS CHECKLIST

S/N	INDICATORS	YES	NO	NOT YET	NEEDS SUPPORT	REMARKS
1.	Prepares and submits lesson notes on time					
2.	Applies differentiation and scaffolding in lesson delivery					
3.	Understands Assessment for Learning, Assessment as Learning and Assessment of Learning strategies					
4.	Frequently uses Assessment for Learning, Assessment as Learning and Assessment of Learning strategies in lessons					
5.	Gives immediate feedback to learners after assessment					
6.	Has teacher learner resource packs available for lesson planning and delivery					
7.	Understands issues of barriers to learning and takes measures to assist learners overcome them					
8.	Partakes in PLC meetings					
9.	Partakes in school clubs and societies					
10.	Assists learners as individuals with differentiated abilities, needs, achievement and learning styles					
11.	Shares learning goals and success criteria with learners before lessons					
12.	Maintains consistent and proactive discipline					
13.	Anticipates classroom challenges					
14.	Remediates where learners have learning difficulties					
15.	Assists learners to reflect and take responsibility of their own learning					
16.	Assists learners set their own goals					
17.	Works with learners to develop clear criteria of good practice					
18.	Supports school administration with assigned tasks and responsibilities effectively					

B. HEADTEACHER

S/N	INDICATORS	YES	NO	NOT YET	NEEDS SUPPORT	REMARKS
1.	Understands the Core Competencies, 4Rs, Knowledge, Skills, Values and Attitudes					
2.	Specific remedial programmes are put in place to help learners with learning needs					
3.	Conducts classroom observation (*Select One*) A. Once a week B. Twice a week C. More than once a week C. Once every two weeks D. Once a month					
4.	Provides feedback on classroom observation for teachers to improve teaching and learning					
5.	Supervises records keeping on PLC meetings					
6.	Takes part in INSETS and PLC sessions in the school this term					
7.	Has Curriculum Lead (CL) in the school					
8.	Takes measures to overcome barriers of learning in the school					
9.	Has functional clubs and societies in the school					
10.	Monitors activities of clubs and societies in the school					
11.	Teacher and Learner Resource Packs and other resources for each subject available					
12.	Teaches alongside administrative duties					
13.	Supports teachers to access additional resources for implementation of the CCP					
14.	Involves the community in the implementation of the CCP					
15.	The community provides support to the school in implementing the SBC					
16.	SISO supports the school in the implementation of the CCP					
17.	Aside the SISO, other District Education Officers come to this school to monitor facilities, teaching quality, or teacher attendance					

C. CURRICULUM LEAD

S/N	INDICATORS	YES	NO	NOT YET	NEEDS SUPPORT	REMARKS
1	Organises PLC meetings in the school *(Select One)* A. Once a week B. Twice a week C. More than once a week C. Once every two weeks D. Once a month					
2	Keeps record of PLC meetings					
3	Partakes in INSET meetings in the school					
4	Develops and initiates capacity building programmes to support efficient implementation of the CCP					
5	Involves resources person to address challenges during PLC meetings					
6	Has resources to assist during PLCs meetings					

Appendix F: COMMON CORE PROGRAMME (CCP) CONCEPT

Introduction

In the first four years of high school education, learners are expected to take a Common Core Programme (CCP) that emphasises a set of high, internationally-benchmarked career and tertiary education readiness standards. Learners need to acquire these for post-secondary education, the workplace or both. The standards articulate what learners are expected to know, understand and be able to do by focusing on their social, emotional, cognitive and physical development. The CCP runs from Basic 7 through Basic 10.

The common core attributes of the learner, which describe the essential out- comes in the three domains of learning (i.e. cognitive, psychomotor and affective), are at the centre of the CCP (see Figure 1). Inspired by the values which are important to the Ghanaian society, the CCP provides an education of the heart, mind and hands in relation to the learner's lifetime values, well-being, physical development, metacognition and problem-solving abilities. Ultimately, this will produce character-minded learners who can play active roles in dealing with the increasing challenges facing Ghana and the global society.

The features that shape the common core programme are shown in Figure1. These are:

- learning and teaching approaches – the core competencies, 4Rs and pedagogical approaches;
- learning context – engagement, service and project;
- learning areas – mathematics, science, computing, languages (English, Ghanaian Languages, French and Arabic), career technology, social studies, physical and health education, creative arts and design and religious and moral education.

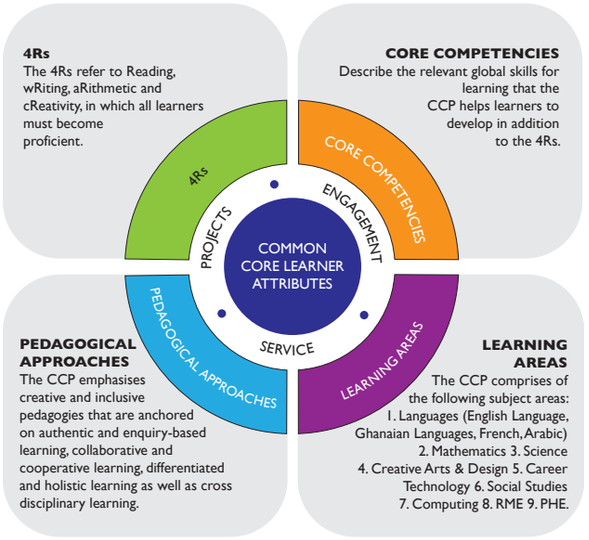

Figure 1: CCP Learner Attribute

These are elaborated subsequently:

Learning and teaching approaches

- **The core competencies***:* Describe the relevant *global skills for learning* that the CCP helps learners to develop in addition to the 4Rs. The global skills for learning 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.
- **Pedagogical approaches:** The CCP emphasises creative and inclusive pedagogies that are anchored on authentic and enquiry-based learning, collaborative and cooperative learning, differentiated learning and holistic learning as well as cross disciplinary learning.
- **The 4Rs across the Curriculum:** The 4Rs refer to Reading, wRiting, aRithmetic and cReativity, which all learners must become fluent in.

Learning context

The CCP places emphasis on engagement of learners in the classroom activities and projects (in and outside classroom).These projects can involve individual or group tasks which all learners are required to complete by the end of Basic 10. The CCP project provides learners with contexts to demonstrate creativity and inventiveness in various areas of human endeavour. Community service offers an opportunity for learners to nurture, love and care for, and solve problems in their community.

Learning Areas

The CCP comprises the following learning areas:

1. Languages (English Language, Ghanaian Languages, French, Arabic)
2. Mathematics
3. Science
4. Creative Arts and Design (CAD)
5. Career Technology
6. Social Studies
7. Computing
8. Religious and Moral Education (RME)
9. Physical and Health Education (PHE)

This document sets out the standards for learning Computing in the Common Core Programme (CCP). The standards in the document are posited in the expectation that the CCP (B7 – B10) will offer quality education for all types of learners. The design of this curriculum is based on the features of the CCP as shown in Figure 1. It emphasises a set of high internationally-benchmarked career and tertiary education readiness standards. Learners need to acquire these competencies in Computing for post-secondary education, work- place training or both. The curriculum has been designed to be user friendly because it provides a detailed preamble that covers the rationale, philosophy, aims, profile of expected learning behaviours (i.e. knowledge, skills, attitudes and values), pedagogical approaches, core competencies and the 4Rs, assessment practices and instructional expectations..

Appendix G: LEARNING SCENARIOS

Case Study 1

Consider these two lesson scenarios and then discuss and answer the questions below:

Scenario 1

When the B7 class enters the computer lab, some of the learners are shouting at each other; some were rushing for seats; some are moving around restlessly; and others took their seats quietly waiting for the lesson to begin. She claps her hands and the learners gets ready by booting their computers. The teacher asks the learners what they practiced the previous yesterday. When they tell her, she asks them to open their word processing application and begin to type out some sentences from the writing board.

While the learners type out the sentences some learners are still trying to find their word application, others are talking; some have launched on to games application. Only a few learners are paying attention to the text on the board and doing their typing. While this is happening, the teacher completes the attendance register and occasionally looks up and shouts "Hey, who has finished?" I am going to ask some questions. All of those who do not answer and apply the effects on the sentences correctly will have extra homework."

When the time allowed to do the work has elapsed, the teacher asks a few questions about the formatting and its tools. Those who did the typing and the formatting knowing the answers raise their hands and the teacher calls on them to give the answers. The teacher tells the learners to explore the next ribbon at home for their homework, and then ends the lesson.

Scenario 2

When the B7 class enters the computer lab, some of the learners are shouting at each other; some are moving around restlessly; and others took their seats quietly waiting for the lesson to begin. She spends a few minutes reciting the rules and regulations in the computer lab, encouraging them to relax, interact, and smile. She asks them to boot their pc's and launch the word processing application. The learners sees

her launching the word processor with them whiles guiding. The teacher introduces the lesson by asking questions about word processing to gain their interest. She asks questions at different levels for example:

What is a word processor''

'What are the different types of word processors?'

'What is the name the of word processor they are using?'

'Identify some of the ribbons and their groups?'

'Identify the font group and describe some of the commands?

She then projects the text on the screen, and asks the learners to start typing the text. The teacher occasionally goes round to see those having challenges to help them out.

She finds out from the learners those who were able to finish their work, she asks the learners for those having challenges also, and ask those who have confidently finished their work to guide the others complete the work.

As homework, she asks her learners to bring stories, or write an essay about themselves, to be typed and edited on their next meeting.

Discuss and answer:

1) Which of the two lessons do you think is most effective and why?
2) How does the teacher gain and maintain all learners' attention, participation and engagement?
3) What does the teacher do to accommodate all ability levels?
4) How does each teacher assess learning?
5) Can you find any missed opportunities in scenario 2 where the teacher could have used assessment for learning techniques?
6) How does the teacher use existing material and human resources in an interesting way?

Case Study 2

Consider these two lesson scenarios and then discuss and answer the questions below:

Scenario 1

The computing teacher enters the B5 class where learners were moving about in the class and talking. The teacher quickly asks the learners to take their sits and get ready for the day's lesson. He greets the students and informs them about the topic of the day which is "Introduction to programming." The teacher asks the learners about what they learned in the previous lesson.

Then, the teacher asks the learners to explain in their own language what programming means to them. Only one two of the learners raised their hands to explain the term programming. As one of the learners was explaining the meaning of programming, some learners were trying to search for their computing books to jot down the explanation, some were paying attention, and others were discussing in a low voice. The teacher yelled at the learners to pay attention to the explanation. The teacher writes a statement of code on the board and asked if any of the learners understands it.

The entire class was quiet. The teacher explains the statement of codes to the learners and asks them to write some statements of codes to perform an action as a homework. The teacher summarises the lesson and wish good luck in their homework, then the lesson ends there.

Scenario 2

Upon entering the B5 class, the computing teacher saw that learners were moving about in the class and talking. The teacher greets the learners and told them that they will be starting programming today, the lesson that they have been waiting for. Quickly, the learners took their sits and were ready to learn programming. The teacher reviews the previous lesson and then asks learners, in groups of threes to discuss how to prepare a meal of their choice. The teacher then gave the learners the opportunity topresent their procedures on the board. Some four groups presented and the teacher asks the learners if these procedures could be used in programming.

The teacher led the students through the procedures with the help of pseudocodes; what do you do first? What follows next? Does the dish requires stirring? How long is it going to be on fire? Then, the teacher asks learners to explain programming in their own words and understanding.

The teacher asks the learners to work in groups of threes to write the procedures that will help them to programme their own simple game. The teacher goes round to guide each group in developing a list of procedures in creating a game. All students were actively involved in developing the procedures. After few minutes, the teacher asks different sets of groups to present their output on the board. Together, each group came up with a name for their games and explained how the game works while the teacher helps to shape the game.

The teacher asks the learners to keep their procedures or work in the same group of threes to come up with a better version of what they have done as their assignment. Learners were also informed that each group will programme their game on the computer. The teacher summarises the lesson and tells the learners to work hard on the procedures for the next programming lesson.

Discuss and answer

1. Which of the two lessons do you think is the most efficient one and why?
2. How does the teacher gain and maintain the attention as well as interest of learners?
3. How can the teacher accommodate the different abilities of learners?
4. How is assessment done per each teacher?
5. Are there better ways that can be used in sample lesson 2 to include assessment for learning techniques?
6. How does the teacher use existing resources in an interesting way?
7. How can learning be related to everyday activities?

Case Study 3

Consider these two lesson scenarios and then discuss and answer the questions below:

Scenario 1

The computing teacher enters the JHS1 class and asks them to organise themselves and get ready for the lesson. As the class was getting ready, she was also going through her presentation of the day. She reviewed the last lesson and introduced the new lesson which is "The use of web technologies in learning." She projects the information of the meaning web technologies and asks a student to read.

The teacher asks the learners about the learning web technologies that they have come across and how to use them. Many hands were raised but after the first response, majority of the hands dropped. Only few hands were still up and the teacher called one to them after which there were no hands raised. The teacher assumes that the learners only know of two main web technologies that can be used in teaching and learning.

The teacher asks her learners to research on other web technologies that can be used for effective teaching and learning and present it as an assignment during the next computing lesson.

Scenario 2

The computing teacher enters the JHS1 class and asks the learners to stand up and quizzed them on the previous lesson learnt. After that, she asked the learners to sit in group of three and discuss about learning online. She asked them to use the computers to search for the various online learning technologies and state benefits and disadvantages that come with online learning.

After some few minutes, the teacher asks selected groups to present on the web technologies that can be used for learning while other groups presented on the benefits, and disadvantages of learning. As each group presents, the teacher solicits for more points from other groups. At the end of each presentation, the teacher summarises on what they presented to point out the major points and those that do not fall in line.

To make the learners have experience in the use of online learning experience, she asks the learners to sign up for an online topic that she has designed for them and also asked them to take one course online and presents the certificate for that course within the next four weeks. The teacher listed some important courses that could be completed within two weeks

Discuss and answer

1. Which of the two lessons do you think is the most efficient one and why?
2. How does the teacher gain and maintain the attention as well as interest of learners?
3. How can the teacher accommodate the different abilities of learners?
4. How is assessment done per each teacher?
5. Are there better ways that can be used in sample lesson 2 to include assessment for learning techniques?
6. How does the teacher use existing resources in an interesting way?
7. How can learning be related to everyday activities?

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