SCIENCE – BASIC 9

THIRD TERM SCHEME OF LEARNING

WEEKS	STRAND	SUB STRAND	INDICATORS	RESOURCES
1	Systems	**Farming Systems** ● B9.3.4.1 Demonstrate knowledge and skills in the preparation of different types of manure from animal and plant waste	B9.3.4.1.1 List and explain the different plant and animal waste used in preparing different types of manure	Charts & Pictures
2	Systems	**Farming Systems** ● B9.3.4.1 Demonstrate knowledge and skills in the preparation of different types of manure from animal and plant waste	B9.3.4.1.2-3 Demonstrate the preparation of different types of manure Prepare different types of manure.	Charts & Pictures
3	Forces & Energy	**Force & Motion** ● B9.4.4.1 Demonstrate understanding of the concept of pressure and explain how pressure acts in everyday life	B9.4.4.1.1-2 Explain the concept of pressure and show how pressure relates to force; perform activities that work on the principle of pressure in the daily lives of humans. Explain the importance of Newton's Third Law of Motion in life.	Charts & Pictures
4	Forces & Energy	**Force & Motion** ● B9.4.4.2 Demonstrate an understanding of Newton's Third Law of Motion and its application in everyday life	B9.4.4.2.1 Demonstrate the application of Newton's Third Law of motion in life Explain Newton's Laws of Motion and their applications to daily life.	Charts & Pictures

5	Forces & Energy	**Agriculture Tools** ● B9.4.5.1 Demonstrate knowledge and skills in making simple agricultural tools for on-farm activities	B9.4.5.1.1-2 Identify materials used in making simple agricultural tools. Discuss and write activities involved in making simple agricultural tools.	Charts & Pictures
6	Forces & Energy	**Agriculture Tools** ● B9.4.5.1 Demonstrate knowledge and skills in making simple agricultural tools for on-farm activities	B9.4.5.1.3 Manufacture simple agricultural tools	Charts & Pictures
7	Humans & the Environment	**Science and Industry** ● B9.5.3.1 Analyze the scientific concepts, principles and processes applied in industries in and outside their community	B9.5.3.1.1 Investigate the scientific concepts, principles and processes involved in industries in their environment. B9.5.3.2.1 Explain the concept of industry and distinguish between modern and indigenous industries	Charts & Pictures
8	Humans & the Environment	**Science and Industry** ● B9.5.3.2 Demonstrate an understanding of the concept of industry, the science underpinning the processes of production in industries the technologies in indigenous industries and western industries	B9.5.3.2.2 Examine indigenous industries in their communities and show the scientific processes in the stages of production.	Charts & Pictures
9	Humans & the Environment	**Climate Change & Green Economy** ● B9.5.4.1 Demonstrate an understanding of the natural and human factors that	B9.5.4.1.1	Charts & Pictures

		influence climate change and a green economy	Examine various natural and human factors that influence climate change and green economy in their localities. B9.5.4.2.1 Assess data on climate change and green economy actions/ activities globally including Ghana and other countries.	
10	Humans & the Environment	**Understanding the Environment** ● B9.5.5.1 Demonstrate knowledge and skills in the use of plant roots, stems, leaves, flowers, and fruits for agricultural and non-agricultural purposes	B9.5.5.1.1 Show and list the uses of different plant parts for agricultural and non-agricultural purposes. .	Charts & Pictures
11	Humans & the Environment	**Understanding the Environment** B9.5.5.1 Demonstrate knowledge and skills in the use of plant roots, stems, leaves, flowers, and fruits for agricultural and non-agricultural purposes	B9.5.5.1.2 Demonstrate the use of different plant parts for agricultural and non-agricultural purposes	
12	REVISION			
13	EXAMINATION AND VACATION			

THIRD TERM
WEEKLY LESSON NOTES
WEEK 1

Week Ending:	**DAY:**	**Subject:** Science
Duration: 100mins		**Strand:** Systems
Class: B9	**Class Size:**	**Sub Strand:** Farming Systems

Content Standard: B9.3.4.1 Demonstrate knowledge and skills in the preparation of different types of manure from animal and plant waste	**Indicator:** B9.3.4.1.1 List and explain the different plant and animal waste used in preparing different types of manure	**Lesson:** 1 of 2

Performance Indicator: Learners can identify and write down the materials used in preparing manure and their sources	**Core Competencies:** Critical Thinking and Problem Solving (CP), Communication and Collaboration (CC) Digital Literacy (DL), Creativity and Innovation

References: Science Curriculum Pg. 105

Key words: Animal Manure, Green Manure, Compost, Organic Matter, Nitrogen, Carbon

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Begin the lesson by asking learners if they know what manure is and why it is important for farming. Introduce the concept of manure as organic matter used to fertilize soil and improve crop growth.	
PHASE 2: **NEW LEARNING**	Discuss various types of manure used by farmers, such as: • Animal manure: Includes cow dung, chicken droppings, and horse manure. • Green manure: Composed of plant residues like crop residues or leguminous plants. • Compost: Decomposed organic matter from kitchen waste or garden debris. Explain the materials used in preparing manure, including: • Organic matter: Kitchen waste, crop residues, grass clippings. • Nitrogen sources: Animal droppings, leguminous plants. • Carbon sources: Straw, sawdust, dried leaves.	

	Discuss the sources of these materials, such as farms, households, and garden waste. <u>Assessment</u> 1. List three types of manure used by farmers and describe their benefits for soil fertility. 2. Identify two materials used in preparing manure and explain where these materials can be sourced from. 3. Discuss the importance of using organic matter in agriculture and how it contributes to sustainable farming practices. 4. State one potential challenge or limitation of using manure as a fertilizer and suggest a solution	
PHASE 3: **REFLECTION**	Use peer discussion and effective questioning to find out from learners what they have learnt during the lesson. Take feedback from learners and summarize the lesson.	

Week Ending:	**DAY:**	**Subject:** Science	
Duration: 100mins		**Strand:** Systems	
Class: B9	**Class Size:**	**Sub Strand:** Farming Systems	
Content Standard: B9.3.4.1 Demonstrate knowledge and skills in the preparation of different types of manure from animal and plant waste	**Indicator:** B9.3.4.1.1 List and explain the different plant and animal waste used in preparing different types of manure		**Lesson:** 1 of 2
Performance Indicator: Learners can list and explain the different plant and animal waste used in preparing different types of manure		**Core Competencies:** Critical Thinking and Problem Solving (CP), Communication and Collaboration (CC) Digital Literacy (DL), Creativity and Innovation	
References: Science Curriculum Pg. 105			
Key words: Justification, Soil and Climate, Plant Wastes, Animal Wastes			

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Ask learners if they know what manure is and why it is important for farming. Introduce the concept of manure as organic matter used to fertilize soil and improve crop growth.	
PHASE 2: **NEW LEARNING**	Explain the two main categories of manure: plant wastes and animal wastes. Discuss examples of manure from plant wastes (e.g., compost, green manure) and animal wastes (e.g., poultry droppings, cow dung). In small groups, have learners compile a list of plant parts/wastes and animal parts/wastes used to prepare manure. Examples of plant parts/wastes: Leaves, waste fruits, plant shavings, crop residues. Examples of animal parts/wastes: Poultry droppings, cow dung, pig dung, animal carcasses. Discuss the factors that influence the choice of manure, such as soil type, climate, and crop requirements.	

	Provide examples and scenarios (e.g., sandy soil, dry climate, fruit orchard) and ask learners to justify the use of specific manures for each scenario. <u>Assessment</u> 1. Categorize the following types of manure into plant wastes or animal wastes: compost, poultry droppings, cow dung, green manure. 2. Compile a list of materials used to prepare manure, including plant parts/wastes and animal parts/wastes. 3. Justify the use of cow dung in a region with clayey soil and frequent rainfall. 4. Explain why compost may be preferred over poultry droppings in a vegetable garden.	
PHASE 3: **REFLECTION**	Use peer discussion and effective questioning to find out from learners what they have learnt during the lesson. Take feedback from learners and summarize the lesson.	

THIRD TERM
WEEKLY LESSON NOTES
WEEK 2

Week Ending:	**DAY:**	**Subject:** Science	
Duration: 100mins		**Strand:** Systems	
Class: B9	**Class Size:**	**Sub Strand:** Farming Systems	
Content Standard: B9.3.4.1 Demonstrate knowledge and skills in the preparation of different types of manure from animal and plant waste	**Indicator:** B9.3.4.1.2 Demonstrate the preparation of different types of manure	**Lesson:** 1 of 2	
Performance Indicator: Learners can prepare manure from the different plant and animal wastes	**Core Competencies:** Critical Thinking and Problem Solving (CP), Communication and Collaboration (CC) Digital Literacy (DL), Creativity and Innovation		
References: Science Curriculum Pg. 106			
Key words: Pictures of different plant and animal wastes (e.g., straw, leaves, manure)			

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Show pictures of different plants and ask learners: What happens to plant waste after harvest? (e.g., leaves fall, stalks remain) Then, show pictures of animal waste. Ask: What happens to animal dung? Briefly introduce the concept of manure and its role in agriculture. Explain that manure is a natural fertilizer made from decomposed plant and animal waste.	
PHASE 2: **NEW LEARNING**	Divide learners into pairs or small groups. Ask them to brainstorm a list of different plant and animal wastes they can think of. Encourage them to consider waste materials from their own communities. As a class, create a large chart on the board with two sections: "Plant Waste" and "Animal Waste." Learners take turns suggesting waste materials and placing them in the appropriate category.	

Facilitate a discussion about how these plant and animal wastes can be used to make manure.

Introduce the concept of composting as the process of decomposition.

Explain that manure needs time, moisture, and air to decompose properly.

Ask learners to consider the specific plant and animal wastes available in their community.

Discuss how these locally available resources can be used to prepare manure effectively.

Manure Using Animal Waste	Manure Using Plant Waste
• Gather animal manure from sources such as livestock farms, poultry farms, or stables. • Common types of animal waste used for manure include cow dung, horse manure, chicken droppings, and goat/sheep manure.	• Gather various types of plant waste such as grass clippings, leaves, pruned branches, vegetable scraps, and fruit peels. • Avoid using diseased plant materials or weeds with seeds to prevent potential issues in the compost.
• Place the collected animal waste in a compost bin or pile. • Add other organic materials such as straw, hay, leaves, or kitchen scraps to the compost pile to provide a balanced mix of carbon and nitrogen.	Shred or chop larger plant materials into smaller pieces to speed up the composting process and facilitate decomposition.
• Keep the compost pile moist but not waterlogged. Use a hose to water the pile occasionally if needed. • Turn the compost pile regularly using a pitchfork or compost turner to aerate it and promote decomposition.	• Create layers of alternating green (nitrogen-rich) and brown (carbon-rich) materials in a compost bin or pile. • Green materials include fresh plant waste, kitchen scraps, and coffee grounds. Brown materials include dried leaves, straw, and cardboard.
• Let the composting process take place over several weeks to months, depending on environmental conditions and the type of waste used. • During decomposition, microorganisms break down the organic matter into nutrient-rich compost.	• Keep the compost pile moist but not soggy. Water the pile as needed to maintain proper moisture levels. • Turn the compost pile regularly to aerate it and mix the materials, which helps speed up decomposition.
• Once the composted animal waste has turned into dark, crumbly material with an earthy smell, it is ready to use as manure. • Spread the composted manure over garden beds, fields, or plant containers	• Let the composting process occur over several weeks to months, depending on factors like temperature and the size of the compost pile.

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<tr><td>to improve soil fertility and provide essential nutrients for plant growth.</td><td>● As the plant waste decomposes, it transforms into nutrient-rich compost suitable for use as manure.</td></tr>
<tr><td></td><td>● Once the composted plant waste has broken down into a dark, crumbly texture with an earthy smell, it is ready to use.
● Spread the composted plant waste over garden beds, around trees and shrubs, or in vegetable patches to enrich the soil and promote healthy plant growth.</td></tr>
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Assessment
1. List 3 examples each of plant and animal waste that can be used to make manure.
2. Describe two benefits of using manure in agriculture</td>
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<td>PHASE 3:
REFLECTION</td>
<td>Use peer discussion and effective questioning to find out from learners what they have learnt during the lesson.

Take feedback from learners and summarize the lesson.</td>
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Week Ending:	**DAY:**	**Subject:** Science
Duration: 100mins		**Strand:** Systems
Class: B9	**Class Size:**	**Sub Strand:** Farming Systems

Content Standard: B9.3.4.1 Demonstrate knowledge and skills in the preparation of different types of manure from animal and plant waste	**Indicator:** B9.3.4.1.3 Prepare different types of manure.	**Lesson:** 1 of 2

Performance Indicator: Learners can participate in the cleaning, sorting, and composting process for manure creation	**Core Competencies:** Critical Thinking and Problem Solving (CP), Communication and Collaboration (CC) Digital Literacy (DL), Creativity and Innovation

References: Science Curriculum Pg. 106

Key words: Manure, Composting, Curing

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Briefly review the concept of manure and its importance as a natural fertilizer (from previous lesson or quick discussion). Show pictures or samples of different materials used for manure preparation (plant waste, animal waste). Ask learners: How can we turn these materials into something useful for our school garden?	
PHASE 2: **NEW LEARNING**	Ensure learners understand the importance of wearing gloves and masks while handling organic waste. Discuss proper lifting techniques to avoid injury. Learners collect plant and animal waste materials designated for the project, ensuring adherence to school safety guidelines. In a designated area, learners work in pairs to clean and sort the collected waste. This may involve removing unwanted materials like plastic or metal, and breaking down larger pieces of plant material. Learners help create the compost pile in the designated bin/area. Layer the cleaned and sorted plant and animal waste materials, ensuring a good mix of brown (carbon-rich) and green (nitrogen-rich) materials for optimal decomposition. Learners add water to the compost pile to maintain a moist but not soggy environment.	Safety Gear (gloves, masks) Shovels, Rakes, Pitchforks (appropriate for the number of learners) Wheelbarrows or buckets

	If time allows, learners can participate in turning the compost pile with shovels or pitchforks every few weeks to aerate the materials and promote even decomposition. Explain that the compost pile needs time (usually several months) to decompose completely and become mature manure. Briefly discuss how the finished manure can be used in the school garden to improve soil fertility and plant growth.	
PHASE 3: **REFLECTION**	Use peer discussion and effective questioning to find out from learners what they have learnt during the lesson. Take feedback from learners and summarize the lesson.	

THIRD TERM
WEEKLY LESSON NOTES
WEEK 3

Week Ending:	**DAY:**	**Subject:** Science
Duration: 100mins		**Strand:** Forces & Energy
Class: B9	**Class Size:**	**Sub Strand:** Force & Motion

Content Standard: B9.4.4.1 Demonstrate understanding of the concept of pressure and explain how pressure acts in everyday life	**Indicator:** B9.4.4.1.1 Explain the concept of pressure and show how pressure relates to force; perform activities that work on the principle of pressure in the daily lives of humans.	**Lesson:** 1 of 2

Performance Indicator: Learners can; • Demonstrate the concept of pressure through various activities. • Describe the relationship between pressure and force. • Discuss the application of pressure in everyday life.	**Core Competencies:** Critical Thinking and Problem Solving (CP), Communication and Collaboration (CC) Digital Literacy (DL), Creativity and Innovation

References: Science Curriculum Pg. 111

Key words: Pressure, Force, Inflation, Hydraulic

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Start with a question: "Have you ever noticed how a balloon gets inflated or how water comes out with pressure from a hose?" Show pictures or videos of examples like drinking straws, balloons, and water jets to introduce the concept of pressure. Ask learners to share their observations and thoughts about how pressure works in these situations.	
PHASE 2: **NEW LEARNING**	Demonstrate how blowing through a drinking straw can create pressure to move objects (e.g., pushing a small ball). Let learners try this activity in pairs or small groups and discuss their observations. Inflate balloons to different sizes using a pump or by blowing air manually. Discuss with learners how the pressure inside the balloon causes it to expand.	Drinking straws Balloons

Describe the relationship between pressure and force

Aspect	Force	Pressure
Definition	Force is a vector quantity that causes a change in motion or state of rest.	Pressure is the amount of force exerted per unit area.
Symbol	F	P
Unit	Newtons (N)	Pascals (Pa)
Formula	N/A (Force is directly measured)	Pressure = Force / Area
Relationship with Area	Inverse relationship: Smaller area = higher pressure; Larger area = lower pressure.	N/A (Pressure depends on force and area)
Relationship with Force	Direct relationship: Increase in force = increase in pressure (when area is constant).	N/A (Pressure depends on force and area)

Divide learners into groups. Task them to discuss the application of pressure in everyday life

- *In industries and machinery, pressure is used in pneumatic systems to operate tools and equipment. Compressed air is used to create pressure that powers pneumatic cylinders, pumps, and actuators*
- *hydraulic systems use pressure but with fluids like oil instead of air. Hydraulic pressure is crucial in operating heavy machinery such as hydraulic lifts, cranes, and excavators*
- *Pressure cookers utilize high pressure to cook food quickly. The increased pressure raises the boiling point of water, allowing food to cook faster while retaining nutrients*
- *Pressure is essential in various automotive systems. In the braking system, hydraulic pressure is used to apply force to the brake pads, slowing down or stopping the vehicle.*
- *Blood pressure is a vital sign that indicates the pressure exerted by blood against the walls of arteries. Monitoring blood pressure is crucial for assessing cardiovascular health*
- *Pressure plays a role in sports equipment like balls. In sports such as soccer, basketball, and volleyball, the pressure inside the ball affects its bounce and performance*

<u>Assessment</u>

1. Explain how pressure is created using the examples of drinking straws and balloons.
2. Describe one real-life application of pressure and its importance.

	3. What is the relationship between pressure and force?	
PHASE 3: **REFLECTION**	Use peer discussion and effective questioning to find out from learners what they have learnt during the lesson. Take feedback from learners and summarize the lesson.	

Week Ending:	**DAY:**	**Subject:** Science	
Duration: 100mins		**Strand:** Forces & Energy	
Class: B9	**Class Size:**	**Sub Strand:** Force & Motion	
Content Standard: B9.4.4.1 Demonstrate understanding of the concept of pressure and explain how pressure acts in everyday life	**Indicator:** B9.4.4.1.2 Demonstrate the application of Newton's Third Law of motion in life.		**Lesson:** 1 of 2
Performance Indicator: Learners can perform an activity to justify predictions and understand Newton's Third Law of Motion		**Core Competencies:** Critical Thinking and Problem Solving (CP), Communication and Collaboration (CC) Digital Literacy (DL), Creativity and Innovation	
References: Science Curriculum Pg. 111			
Key words: Force, Reaction, Newton's Third Law, Equilibrium			

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Show a simple object like a book on a table. Ask learners: What happens if I push the book? (It will move) If I pull it? (It will move in the opposite direction) Why does the book move? (Force is being applied) Pose the question: Imagine you push a toy car. What happens to the car? Write the predictions on the board without revealing the answer.	
PHASE 2: **NEW LEARNING**	Introduce the concept of force as a push or pull that can affect the motion of an object. Explain the terms "action" (the initial force) and "reaction" (the force exerted by the object in response).	Smooth surface (tabletop, floor) Toy cars (different weights if possible)

	Briefly introduce Newton's Third Law of Motion: For every action, there is an equal and opposite reaction. Explain that this law states that whenever a force is applied, an opposite force is created in response. Divide learners into pairs or small groups. Instruct them to design a simple experiment using the provided materials to test their predictions about forces and reactions. Encourage them to consider how force applied to the toy car will cause a reaction. Activity Time: Learners conduct their experiments on the designated surface. They can push or pull the toy cars with different forces and observe the movements. After the activity, facilitate a class discussion. Ask learners to share their observations and how they relate to their initial predictions. Encourage them to explain how the force applied (action) caused a reaction in the toy car. <u>Assessment</u> 1. Describe a scenario where you applied force to an object. What was the reaction of the object? 2. Explain Newton's Third Law of Motion in your own words. 3. Why is it important to understand the relationship between force and reaction? Fill in the blanks: a. A force is a _____ or _____ on an object. b. The initial force applied to an object is called the _____. c. The opposing force exerted by the object in response is called the _____. 4. According to Newton's Third Law of Motion, for every _____, there is an equal and opposite _____. 5. Draw a simple diagram showing an action force applied to a toy car and the resulting reaction force.	

PHASE 3: **REFLECTION**	Use peer discussion and effective questioning to find out from learners what they have learnt during the lesson. Take feedback from learners and summarize the lesson.	

THIRD TERM
WEEKLY LESSON NOTES
WEEK 4

Week Ending:	**DAY:**	**Subject:** Science
Duration: 100mins		**Strand:** Forces & Energy
Class: B9	**Class Size:**	**Sub Strand:** Force & Motion

Content Standard: B9.4.4.2 Demonstrate an understanding of Newton's Third Law of Motion and its application in everyday life	**Indicator:** B9.4.4.2.1 Explain the importance of Newton's Third Law of Motion in life.	**Lesson:** 1 of 2

Performance Indicator: Learners can discuss Newton's Third Law of Motion and show its importance to life	**Core Competencies:** Critical Thinking and Problem Solving (CP), Communication and Collaboration (CC) Digital Literacy (DL), Creativity and Innovation

References: Science Curriculum Pg. 111

Key words: Action, Reaction, Force Pair, Equal and Opposite

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Begin by asking learners if they have heard of Isaac Newton and what they know about his contributions to science. Introduce the concept of motion and mention that Newton was a scientist who made important discoveries about how objects move.	
PHASE 2: **NEW LEARNING**	Show a simple demonstration with two objects, like a balloon and a straw. When air is blown out of the balloon, the balloon moves in the opposite direction due to the action of the air moving out. Explain Newton's Third Law using everyday examples. For instance, when you walk, your foot pushes backward on the ground (action), and the ground pushes forward on your foot (reaction), causing you to move forward. Divide learners into groups. Provide them with various scenarios (e.g., pushing a chair, kicking a ball) and ask them to predict the action and reaction forces. Then, let them test their predictions and discuss the results. State Newton's Third Law of Motion: "For every action, there is an equal and opposite reaction." Explain the meaning of the law using simple examples, such as pushing against a wall or jumping off a boat. Discuss the importance of the law in everyday life and various applications, such as:	Pictures and charts

	1. Understanding how rockets and jet engines work by pushing gases backward to move forward. 2. Explaining the recoil of firearms when fired due to the backward force of the bullet. 3. Demonstrating how swimming strokes like breaststroke and butterfly rely on pushing water backward to move forward. Conduct simple demonstrations or activities to illustrate Newton's Third Law, such as: • Using a balloon filled with air to show how releasing air propels the balloon forward. • Demonstrating how a toy car moves forward when a balloon attached to it is deflated	
PHASE 3: **REFLECTION**	Use peer discussion and effective questioning to find out from learners what they have learnt during the lesson. Take feedback from learners and summarize the lesson.	

Week Ending:	**DAY:**	**Subject:** Science
Duration: 100mins		**Strand:** Forces & Energy
Class: B9	**Class Size:**	**Sub Strand:** Force & Motion

Content Standard: B9.4.4.2 Demonstrate an understanding of Newton's Third Law of Motion and its application in everyday life	**Indicator:** B9.4.4.2.1 Explain the importance of Newton's Third Law of Motion in life.	**Lesson:** 1 of 2

Performance Indicator: Learners can discuss Newton's Third Law of Motion and show its importance to life	**Core Competencies:** Critical Thinking and Problem Solving (CP), Communication and Collaboration (CC) Digital Literacy (DL), Creativity and Innovation

References: Science Curriculum Pg. 111

Key words: Action, Reaction, Equal and Opposite, Real-life Applications

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Perform a simple demonstration like pushing a book on a table. Ask learners: What happened when I pushed the book? (It moved) Why did it move? (Force was applied) Introduce the concept of "action" as a push or pull on an object and "reaction" as the response from the object. Pose the question: When you push something, does it just stand still? Why or why not? (Encourage discussion about the object pushing back)	
PHASE 2: **NEW LEARNING**	Show pictures or videos depicting action-reaction forces (e.g., swimmer pushing water back while moving forward, rocket launching with fire pushing downwards). Ask learners to describe what they see and identify the action force and the resulting reaction force. Formally introduce Newton's Third Law of Motion: For every action, there is an equal and opposite reaction. Explain that whenever a force is applied, an opposite force is created in response, and these forces have the same strength but act in opposite directions. Divide learners into pairs or small groups. Challenge them to brainstorm a list of everyday situations where action-reaction forces are involved. Encourage them to think beyond obvious examples like walking or swimming.	Pictures or videos depicting action-reaction forces (e.g., swimmer, rocket launch)

	Facilitate a class discussion where each group shares their examples. Write the examples on the board, categorizing them if necessary (e.g., sports, transportation, nature). <u>Assessment</u> 1. Define the following terms: Action: Reaction: 2. Briefly explain Newton's Third Law of Motion in your own words. 3. Draw a diagram and label an example of action and reaction forces in everyday life. 4. How does understanding Newton's Third Law of Motion benefit us in everyday life or technology? (Give one example)	
PHASE 3: **REFLECTION**	Use peer discussion and effective questioning to find out from learners what they have learnt during the lesson. Take feedback from learners and summarize the lesson.	

THIRD TERM
WEEKLY LESSON NOTES
WEEK 5

Week Ending:	**DAY:**	**Subject:** Science
Duration: 100mins		**Strand:** Forces & Energy
Class: B9	**Class Size:**	**Sub Strand:** Agriculture Tools

Content Standard: B9.4.5.1 Demonstrate knowledge and skills in making simple agricultural tools for on-farm activities	**Indicator:** B9.4.5.1.1 Identify materials used in making simple agricultural tools	**Lesson:** 1 of 2

Performance Indicator: Learners can describe simple agricultural tools assembled from their environment	**Core Competencies:** Critical Thinking and Problem Solving (CP), Communication and Collaboration (CC) Digital Literacy (DL), Creativity and Innovation

References: Science Curriculum Pg. 113

Key words: Agriculture, Farm Tools, Resourceful, Sustainable

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Show pictures of different agricultural tools. Ask learners: What are these tools used for? (digging, planting, harvesting) Why are these tools important for farmers? (make tasks easier, improve efficiency) Pose the question: Imagine a situation where you need to perform a farm task but don't have access to manufactured tools. How could you use things found in nature to improvise?	
PHASE 2: **NEW LEARNING**	Briefly discuss the functions of various agricultural tools (e.g., shovel for digging, hoe for weeding, rake for gathering). Explain how these tools help farmers prepare soil, plant seeds, and harvest crops. Divide learners into pairs or small groups. Using the provided natural materials, challenge them to design and create a simple farm tool for a specific task (digging, planting, weeding, etc.). Encourage them to be resourceful and think about how the natural materials can be shaped and combined to achieve the desired function. Learners work on constructing their tools using the natural materials. Provide guidance and adult supervision for using any sharp tools for shaping wood. Allow learners to refine their designs as needed.	Pictures or actual samples of simple agricultural tools (hoes, spades, sickles, etc.) Local materials used for making tools (wood, metal, ropes, etc.)

	Each group presents their creation to the class, explaining the chosen task, the tool's design, and how it utilizes the natural materials. Encourage constructive criticism and suggestions for improvement. <u>Assessment</u> 1. Name three simple agricultural tools and describe their uses. 2. List the materials used to make a specific tool and explain how they are connected. 3. Explain why using locally available materials is important in tool making. 4. Match the following agricultural tasks to the tools typically used: • Digging - Rake • Planting - Shovel • Weeding - Hoe • Harvesting - Basket 5. Draw a diagram of the simple farm tool you created and label the natural materials used. Briefly explain how this tool would be used for a specific agricultural task.	
PHASE 3: **REFLECTION**	Use peer discussion and effective questioning to find out from learners what they have learnt during the lesson. Take feedback from learners and summarize the lesson.	

Week Ending:	**DAY:**	**Subject:** Science
Duration: 100mins		**Strand:** Forces & Energy
Class: B9	**Class Size:**	**Sub Strand:** Agriculture Tools

Content Standard: B9.4.5.1 Demonstrate knowledge and skills in making simple agricultural tools for on-farm activities	**Indicator:** B9.4.5.1.1 Identify materials used in making simple agricultural tools	**Lesson:** 1 of 2

Performance Indicator: Learners can identify the materials used in simple agricultural tools.	**Core Competencies:** Critical Thinking and Problem Solving (CP), Communication and Collaboration (CC) Digital Literacy (DL), Creativity and Innovation

References: Science Curriculum Pg. 113

Key words: Agriculture, Farm Tools, Resourceful, Sustainable

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Display the simple agricultural tools made from natural materials (from exemplar 1 or similar activity). Briefly review the different tasks these tools are designed for. Ask learners: Can you tell what materials these tools are made of? Encourage them to closely observe the tools and identify the natural elements used (sticks, leaves, etc.).	
PHASE 2: **NEW LEARNING**	Divide learners into pairs or small groups. Provide each group with a tool to examine. Challenge them to identify the different components or parts that make up the tool (e.g., handle, digging end for a shovel). Connection Analysis: Using hand lenses if available, learners closely examine how the different components are connected. Encourage them to identify the methods used for attaching parts (e.g., tying with vines, shaping wood to fit together). Facilitate a class discussion about the effectiveness of the tools. Ask questions like: • How do the materials used affect the tool's function? (e.g., sturdy wood for digging, flexible vines for tying) • Are the connection methods strong enough for the intended task? • How could the design be improved for better performance or durability? Task learners to create labeled diagrams of the tools, highlighting the different components and connection methods. They can also write a short explanation of how the tool works based on its design.	Pictures or actual samples of simple agricultural tools (hoes, spades, sickles, etc.) Local materials used for making tools (wood, metal, ropes, etc.)

	<u>Assessment</u> 1. List the different materials used in the simple agricultural tool you examined. 2. Describe two different ways the components of the tool are connected. 3. Explain how the materials and connection methods used in the tool might affect its effectiveness for the intended task. (Give one example for each) 4. Imagine you need to improve the effectiveness of this tool. Describe one change you would make to the materials or connections, and why you think it would be beneficial.	
PHASE 3: **REFLECTION**	Use peer discussion and effective questioning to find out from learners what they have learnt during the lesson. Take feedback from learners and summarize the lesson.	

THIRD TERM
WEEKLY LESSON NOTES
WEEK 6

Week Ending:	**DAY:**	**Subject:** Science
Duration: 100mins		**Strand:** Forces & Energy
Class: B9	**Class Size:**	**Sub Strand:** Agriculture Tools

Content Standard: B9.4.5.1 Demonstrate knowledge and skills in making simple agricultural tools for on-farm activities	**Indicator:** B9.4.5.1.3 Manufacture simple agricultural tools.	**Lesson:** 1 of 2

Performance Indicator: Learners can produce simple farm tools using materials from the environment and understand the importance of using local materials for sustainability	**Core Competencies:** Critical Thinking and Problem Solving (CP), Communication and Collaboration (CC) Digital Literacy (DL), Creativity and Innovation

References: Science Curriculum Pg. 113

Key words: Sustainability, Resourcefulness, Adaptation, Eco-friendly

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Show pictures of different agricultural tools. Ask learners: What are these tools used for? (digging, planting, harvesting) Why are these tools important for farmers? (make tasks easier, improve efficiency) Pose the question: Imagine a situation where you need to perform a farm task but don't have access to manufactured tools. How could you use things found in nature to improvise?	
PHASE 2: **NEW LEARNING**	Briefly discuss the functions of various agricultural tools (e.g., shovel for digging, hoe for weeding, rake for gathering). Explain how these tools help farmers prepare soil, plant seeds, and harvest crops. Divide learners into pairs or small groups. Using the provided natural materials, challenge them to design and create a simple farm tool for a specific task (digging, planting, weeding, etc.). Encourage them to be resourceful and think about how the natural materials can be shaped and combined to achieve the desired function. Learners work on constructing their tools using the natural materials. Provide guidance and adult supervision for using any sharp tools for shaping wood. Allow learners to refine their designs as needed. Each group presents their creation to the class, explaining the chosen task, the tool's design, and how it utilizes the natural materials. Encourage constructive criticism and suggestions for improvement.	Natural materials such as wood, bamboo, vines, or animal bones Tools for cutting and shaping (e.g., knives, saws) Rope, twine, or vine for binding

	<u>Assessment</u> 1. List three benefits of using farm tools made from local materials. 2. Describe the process of creating a farm tool using natural materials. 3. Explain why sustainability is important in agriculture. 4. Draw a diagram of the simple farm tool you created and label the natural materials used. Briefly explain how this tool would be used for a specific agricultural task. 5. Describe one challenge you faced while building your tool, and how you addressed it. 6. Why might it be important to consider both functionality and durability when creating a tool?	
PHASE 3: **REFLECTION**	Use peer discussion and effective questioning to find out from learners what they have learnt during the lesson. Take feedback from learners and summarize the lesson.	

Week Ending:	**DAY:**	**Subject:** Science
Duration: 100mins		**Strand:** Forces & Energy
Class: B9	**Class Size:**	**Sub Strand:** Agriculture Tools

Content Standard: B9.4.5.1 Demonstrate knowledge and skills in making simple agricultural tools for on-farm activities	**Indicator:** B9.4.5.1.3 Manufacture simple agricultural tools.	**Lesson:** 1 of 2

Performance Indicator: Learners can produce simple farm tools using materials from the environment and understand the importance of using local materials for sustainability	**Core Competencies:** Critical Thinking and Problem Solving (CP), Communication and Collaboration (CC) Digital Literacy (DL), Creativity and Innovation

References: Science Curriculum Pg. 113

Key words: Sustainability, Resourcefulness, Adaptation, Eco-friendly

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Briefly review the different simple farm tools created in the previous lesson. Remind learners of the intended tasks for each tool. Ask learners: How well do you think your tools would work in a real agricultural setting? Encourage them to consider factors like ease of use, effectiveness in completing the task, and potential weaknesses.	
PHASE 2: **NEW LEARNING**	Divide learners into their previous groups with their created tools. Provide testing materials relevant to the tool's function (e.g., soil for digging tools, seeds for planting tools). Learners test their tools and observe how well they perform the intended task. After testing, each group discusses their observations. Encourage them to identify areas where their tool could be improved in terms of functionality or durability. Consider aspects like: 1. Difficulty in using the tool 2. Ineffectiveness in completing the task 3. Weak connections between components 4. Material limitations Challenge learners to use their problem-solving skills to refine their tools based on the identified weaknesses. They can use additional natural materials or suggest modifications to the existing design. Provide guidance and adult supervision if using tools for shaping wood. Learners implement their refinements and retest their tools. They compare the functionality before and after refinement, evaluating the effectiveness of their improvements.	Natural materials such as wood, bamboo, vines, or animal bones Tools for cutting and shaping (e.g., knives, saws) Rope, twine, or vine for binding

	<u>Assessment</u> 1. Describe the process of creating a farm tool using natural materials. What are the advantages of using local materials? 2. How can using locally sourced materials contribute to sustainable farming practices? 3. Discuss one example of a simple farm tool you created and explain its function. 4. Describe two weaknesses you identified in your tool's functionality after testing it. 5. Explain how you refined your tool to address one of the weaknesses. 6. Draw a diagram or describe the changes you made to your tool during the refinement process. 7. Why is it important to test and refine tools before relying on them for a task?	
PHASE 3: **REFLECTION**	Use peer discussion and effective questioning to find out from learners what they have learnt during the lesson. Take feedback from learners and summarize the lesson.	

THIRD TERM
WEEKLY LESSON NOTES
WEEK 7

Week Ending:	**DAY:**	**Subject:** Science
Duration: 100mins		**Strand:** Humans & the Environment
Class: B9	**Class Size:**	**Sub Strand:** Science and Industry

Content Standard: B9.5.3.1 Analyse the scientific concepts, principles and processes applied in industries in and outside their community	**Indicator:** B9.5.3.1.1 Investigate the scientific concepts, principles and processes involved in industries in their environment.	**Lesson:** 1 of 2

Performance Indicator: Learners can describe the process of production for common industrial products	**Core Competencies:** Critical Thinking and Problem Solving (CP), Communication and Collaboration (CC) Digital Literacy (DL), Creativity and Innovation

References: Science Curriculum Pg. 118

Key words: Production process, Industrial products, Chemical reactions, Mechanical processes

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Introduce the lesson by showing pictures or samples of industrial products. Ask learners to identify products they are familiar with and categorize them into local and imported products. Discuss the importance of industries in providing goods for everyday life.	
PHASE 2: **NEW LEARNING**	Show pictures or samples of products made within the community and those imported from outside. Discuss the industries involved in producing these products and their contributions to the economy. Use charts or diagrams to explain the production processes of common industrial products (e.g., textiles, food processing, electronics assembly). Example:	Pictures or samples of industrial products (e.g., textiles, food products, electronics) Charts or diagrams explaining production processes

Stage	Description
1. Harvesting Cocoa Beans	Cocoa pods are harvested from cocoa trees in tropical regions like Ghana.
2. Fermentation and Drying	Extracted cocoa beans undergo fermentation and drying to develop flavor and reduce moisture content.
3. Roasting	Roasted cocoa beans develop the characteristic chocolate flavor through controlled temperature.
4. Winnowing and Grinding	Beans are cracked, shells removed (winnowing), and cocoa nibs ground into chocolate liquor.
5. Refining and Conching	Chocolate liquor undergoes refining for smoothness and conching for flavor and

	texture development.
6. Tempering and Molding	Tempering stabilizes cocoa butter crystals for shiny appearance and crisp texture, then molded.
7. Packaging and Distribution	Chocolates are packaged, labeled, and distributed to retailers and consumers.

Break down each process into simple steps and discuss the role of technology and human labor.

Investigate and outline scientific concepts, principles and processes underlying the production of common everyday industrial products.

Area	**Scientific Concepts, Principles, and Processes**
Chemical Engineering	Industrial products are synthesized through chemical reactions. Catalysts play a crucial role in industrial processes by accelerating chemical reactions.
Material Science and Engineering	- Material Properties: Understanding and manipulating properties for specific applications. - Composite Materials: Engineering materials for enhanced performance.
Thermodynamics and Heat Transfer	- Heat Treatment: Modifying material properties through controlled heating and cooling. - Heat Exchangers: Efficient heat transfer in various industrial processes.
Electrical Engineering	- Circuit Design: Creating reliable and efficient electronic systems for industrial use. - Semiconductor Fabrication: Manufacturing integrated circuits using precise processes.
Fluid Dynamics and Hydraulics	- Pumps and Turbines: Designing fluid systems for efficient flow and energy transfer. - Aerodynamics: Optimizing designs for vehicles, aircraft, and turbines.
Biotechnology and Biochemistry	- Fermentation: Biochemical processes for products like ethanol, enzymes, and antibiotics. - Enzyme Catalysis: Specific reactions catalyzed by enzymes in various applications.
Environmental Science	- Green Chemistry: Sustainable practices minimizing waste and environmental impact. - Life Cycle Analysis: Assessing environmental impacts from production to disposal.

<u>Assessment</u>

1. Describe one local industrial product and its production process.
2. Explain the role of technology in modern industrial production.
3. What scientific concepts are involved in producing electronics or food products?

PHASE 3: **REFLECTION**	Use peer discussion and effective questioning to find out from learners what they have learnt during the lesson. Take feedback from learners and summarize the lesson.	

Week Ending:	**DAY:**	**Subject:** Science
Duration: 100mins		**Strand:** Humans & the Environment
Class: B9	**Class Size:**	**Sub Strand:** Science and Industry

Content Standard: B9.5.3.2 Demonstrate an understanding of the concept of industry, the science underpinning the processes of production in industries the technologies in indigenous industries and western industries	**Indicator:** B9.5.3.2.1 Explain the concept of industry and distinguish between modern and indigenous industries	**Lesson:** 1 of 2
Performance Indicator: Learners can describe how technology affects industry	**Core Competencies:** Critical Thinking and Problem Solving (CP), Communication and Collaboration (CC) Digital Literacy (DL), Creativity and Innovation	
References: Science Curriculum Pg. 118		
Key words: Industry, Technology, Indigenous, Modernization		

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Introduce the lesson by defining an industry as individual firms producing the same commodity. Show pictures or samples of products from different industries and ask learners to identify them. Discuss with learners examples of industries in their community (e.g., agriculture, manufacturing, services).	
PHASE 2: **NEW LEARNING**	Provide examples of industries in the community (e.g., textile industry, food processing industry, construction industry). Discuss the products and services each industry produces and their importance to the economy. *1. Cocoa Industry: Ghana is known for its cocoa production, and the cocoa industry comprises numerous firms involved in growing, harvesting, processing, and exporting cocoa beans and cocoa products. In communities across Ghana, you'll find cocoa farms and processing plants that contribute significantly to the country's economy. Examples of companies in this industry include Ghana Cocoa Board (COCOBOD) and various cocoa processing companies.* *2. Gold Mining Industry: Ghana has a rich history of gold mining, and the gold mining industry includes individual firms engaged in exploration, extraction, refining, and trading of gold and related minerals. Communities in regions like Ashanti and Western Ghana have gold mines operated by companies such as AngloGold Ashanti, Newmont Corporation, and Golden Star Resources.* *3. Oil and Gas Industry: Ghana's oil and gas industry comprises firms involved in exploration, production, refining, and distribution of petroleum products. Communities along the coast, especially in the Western Region and Greater Accra Region, host oil fields, refineries, and related infrastructure. Examples of companies in this sector include Ghana*	Pictures or samples of products from different industries

	National Petroleum Corporation (GNPC) and multinational oil companies like Tullow Oil and ExxonMobil. *4. Textile Industry: The textile industry in Ghana includes firms producing textiles, fabrics, and garments for domestic consumption and export. Communities with textile factories can be found in areas like Accra, Kumasi, and Tema. Companies like Printex Ghana, Akosombo Textiles Limited (ATL), and Tex Styles Ghana Limited operate in this industry.* *5. Fisheries Industry: Ghana's coastal communities are involved in the fisheries industry, which includes fishing, processing, and distribution of fish and seafood products. Companies such as Pioneer Food Cannery Limited and West African Fish Company operate in this sector, supporting local economies and providing employment opportunities.* Explain how technology has affected and transformed industries over time. Compare the technologies used in indigenous industries (traditional methods) and modern industries (advanced technologies). **Aspect** / **Indigenous Industries** / **Modern Industries** Technological Influence / Limited technological integration; traditional methods / High technological integration; advanced tools and methods Equipment and Machinery / Basic tools and equipment / Advanced machinery and automation systems Production Methods / Manual labour-intensive processes / Automated and streamlined production processes Productivity / Lower productivity due to manual processes / Higher productivity with automation and efficient workflows Quality Control / Relies on traditional craftsmanship and inspection methods / Uses advanced quality control systems and technology Innovation and Adaptation / Slow to adopt new technologies and innovations / Embraces innovation with rapid adaptation to new technologies Environmental Impact / Generally less impact on the environment / Efforts towards sustainable practices and green technologies Cost Efficiency / Lower cost efficiency due to manual labor and inefficiencies / Higher cost efficiency with optimized processes and systems Global Competitiveness / Limited global competitiveness / Enhanced global competitiveness through technology adoption Workforce Skills and Training / Relies on traditional skills; limited formal training / Requires skilled workforce with training in modern technolog <u>Assessment</u> Name one indigenous industry and describe its traditional production methods. Explain how modern technology has improved productivity in a specific industry. What are the advantages and disadvantages of modernizing traditional industries?	
PHASE 3: **REFLECTION**	Use peer discussion and effective questioning to find out from learners what they have learnt during the lesson. Take feedback from learners and summarize the lesson.	

THIRD TERM
WEEKLY LESSON NOTES
WEEK 8

Week Ending:	**DAY:**	**Subject:** Science
Duration: 100mins		**Strand:** Humans & the Environment
Class: B9	**Class Size:**	**Sub Strand:** Science and Industry

Content Standard: B9.5.3.2 Demonstrate an understanding of the concept of industry, the science underpinning the processes of production in industries the technologies in indigenous industries and western industries	**Indicator:** B9.5.3.2.2 Examine indigenous industries in their communities and show the scientific processes in the stages of production.	**Lesson:** 1 of 2

Performance Indicator: Learners can discuss indigenous industries in the community	**Core Competencies:** Critical Thinking and Problem Solving (CP), Communication and Collaboration (CC) Digital Literacy (DL), Creativity and Innovation
References: Science Curriculum Pg. 119	
Key words: Indigenous practices, Scientific principles, Cultural heritage, Traditional knowledge	

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Introduce the lesson by discussing the concept of indigenous industries (local traditional industries) in Ghana. Show pictures or samples of products from indigenous industries (e.g., traditional crafts, food processing, textile weaving). Ask learners to identify the industries and products and share any knowledge they have about these industries.	
PHASE 2: **NEW LEARNING**	Provide examples of indigenous industries in Ghana (e.g., kente weaving, shea butter production, pottery making). Discuss the products, materials used, and cultural significance of each industry. Break down the stages of production in one indigenous industry (e.g., kente weaving). Divide learners into small groups. Ask each group to brainstorm and list examples of indigenous industries practiced in their community (e.g., basket weaving, pottery making, herbal medicine). Explain that each group will choose one indigenous industry from their list and focus on identifying the scientific processes involved in different stages of its production. Provide examples: • Industry: Basket weaving • Production Stage: Selecting materials (Scientific Process:	Pictures or samples of products from indigenous industries

	Observing plant characteristics for strength and flexibility) Learners work in their groups to fill out the worksheet, researching or discussing the scientific concepts used in each stage of production for their chosen industry. Identify and explain the scientific processes, concepts, and principles involved in each stage (e.g., weaving techniques, dyeing processes). Encourage them to consider processes like natural dye extraction, fermentation, or tool creation using local materials. <u>Assessment</u> 1. Describe one indigenous industry in Ghana and its products. 2. Identify one scientific process involved in the production of a traditional product. 3. How does the knowledge passed down through generations contribute to the success of indigenous industries?	
PHASE 3: **REFLECTION**	Use peer discussion and effective questioning to find out from learners what they have learnt during the lesson. Take feedback from learners and summarize the lesson.	

Week Ending:	**DAY:**	**Subject:** Science	
Duration: 100mins		**Strand:** Humans & the Environment	
Class: B9	**Class Size:**	**Sub Strand:** Science and Industry	
Content Standard: B9.5.3.2 Demonstrate an understanding of the concept of industry, the science underpinning the processes of production in industries the technologies in indigenous industries and western industries	**Indicator:** B9.5.3.2.2 Examine indigenous industries in their communities and show the scientific processes in the stages of production.		**Lesson:** 1 of 2
Performance Indicator: Learners can identify indigenous practices at home, school and the community and the science involved in the practices		**Core Competencies:** Critical Thinking and Problem Solving (CP), Communication and Collaboration (CC) Digital Literacy (DL), Creativity and Innovation	
References: Science Curriculum Pg. 119			
Key words: Indigenous practices, Scientific principles, Cultural heritage, Traditional knowledge			

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Introduce the lesson by discussing the concept of indigenous practices and their importance in daily life. Show pictures or examples of indigenous practices at home, school, and in the community. Ask learners to identify and share their experiences or knowledge of indigenous practices they observe or participate in.	
PHASE 2: **NEW LEARNING**	Discuss indigenous practices at home (e.g., traditional cooking methods, natural remedies), school (e.g., cultural events, traditional games), and in the community (e.g., rituals, ceremonies). Explore the cultural significance and purposes of these practices. Choose one indigenous practice and explain the scientific principles behind it (e.g., fermentation in traditional food preparation, medicinal properties of local plants). Discuss how scientific knowledge is applied in traditional practices without formal education. <u>Assessment</u> 1. Describe one indigenous practice you are familiar with and explain the scientific principles behind it. 2. How does traditional knowledge contribute to sustainability and resilience in communities? 3. Discuss the importance of preserving indigenous practices for	Pictures or examples of indigenous practices

	future generations.	
PHASE 3: **REFLECTION**	Use peer discussion and effective questioning to find out from learners what they have learnt during the lesson. Take feedback from learners and summarize the lesson.	

THIRD TERM
WEEKLY LESSON NOTES
WEEK 9

Week Ending:	**DAY:**	**Subject:** Science
Duration: 100mins		**Strand:** Humans & the Environment
Class: B9	**Class Size:**	**Sub Strand:** Climate Change & Green Economy

Content Standard: B9.5.4.1 Demonstrate an understanding of the natural and human factors that influence climate change and a green economy	**Indicator:** B9.5.4.1.1 Examine various natural and human factors that influence climate change and green economy in their localities.	**Lesson:** 1 of 2

Performance Indicator: Learners can examine various natural and human factors that influence climate change and green economy in their localities	**Core Competencies:** Critical Thinking and Problem Solving (CP), Communication and Collaboration (CC) Digital Literacy (DL), Creativity and Innovation

References: Science Curriculum Pg. 120

Key words: Climate Change, Greenhouse gases, natural factors, human activities, green economy

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Briefly discuss the difference between weather (daily conditions) and climate (long-term trends). Show pictures or videos of extreme weather events (e.g., floods, heatwaves). Ask learners: Have you noticed any changes in weather patterns in recent years? What might be causing these changes?	
PHASE 2: **NEW LEARNING**	Introduce the concept of climate change and natural factors that influence it (e.g., volcanic eruptions, solar activity, ocean currents). Briefly explain how these factors can cause fluctuations in temperature. Show pictures/videos of these phenomena Discuss human activities that release greenhouse gases (GHGs) into the atmosphere. (e.g., burning fossil fuels, deforestation). Explain the greenhouse effect and how GHGs trap heat, causing global warming. Divide learners into pairs or small groups. Distribute a chart with two columns: "Natural Factors" and "Human Activities" (See Assessment worksheet). Ask them to list examples under each category and discuss their impact on climate change. Encourage them to consider the speed and scale of the effects.	Pictures/Videos of natural phenomena

	Facilitate a group discussion about the completed charts. Highlight the differences between natural and human influences. Emphasize the greater control humans have over their activities. Introduce the concept of a green economy. Explain how it focuses on reducing our dependence on fossil fuels and promoting sustainable practices that minimize climate impact. Discuss examples of green technologies and industries (e.g., renewable energy, sustainable agriculture).	
PHASE 3: **REFLECTION**	Use peer discussion and effective questioning to find out from learners what they have learnt during the lesson. Take feedback from learners and summarize the lesson.	

Week Ending:	**DAY:**	**Subject:** Science
Duration: 100mins		**Strand:** Humans & the Environment
Class: B9	**Class Size:**	**Sub Strand:** Climate Change & Green Economy

Content Standard: B9.5.4.2 Evaluate the effectiveness of initiatives that address the issue of climate change and green economy in Ghana and the world at large	**Indicator:** B9.5.4.2.1 Assess data on climate change and green economy actions/ activities globally including Ghana and other countries.	**Lesson:** 1 of 2

Performance Indicator: Learners can assess data on climate change and green economy actions/ activities globally including Ghana and other countries	**Core Competencies:** Critical Thinking and Problem Solving (CP), Communication and Collaboration (CC) Digital Literacy (DL), Creativity and Innovation

References: Science Curriculum Pg. 120

Key words:

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Briefly discuss climate change and its impact on the environment. Ask learners: What are some challenges Ghana faces due to climate change? (e.g., erratic rainfall, rising sea levels) Introduce the concept of a green economy. Explain how it promotes sustainable practices to address climate change.	
PHASE 2: **NEW LEARNING**	Divide learners into groups of 3-4. Assign each group one of the following research tasks: Group 1: Research climate change and green economy initiatives in Ghana. (e.g., renewable energy projects, sustainable agriculture programs) Group 2: Research climate change and green economy initiatives in another country. (Choose a country relevant to the learners' interests or geographically close to Ghana) Learners use the internet or provided resources to find information about the assigned topic. Encourage them to focus on specific initiatives, their goals, and impacts. After research, each group prepares a short presentation (using chart paper/whiteboard or notes) highlighting: • Key initiatives in their assigned country • Similarities and differences between initiatives in Ghana and the other country Facilitate a class discussion based on group presentations. Encourage learners to compare the effectiveness of different	

	approaches and discuss factors influencing initiative success (e.g., government support, community involvement). As a class, brainstorm a list of effective initiatives from both countries based on the research findings. <u>Assessment</u> 1. List 2 climate change/green economy initiatives in this country 2. What is one best practice you identified from your research 3. How can this best practice be applied to address climate change/green economy issues in Ghana?	
PHASE 3: **REFLECTION**	Use peer discussion and effective questioning to find out from learners what they have learnt during the lesson. Take feedback from learners and summarize the lesson.	