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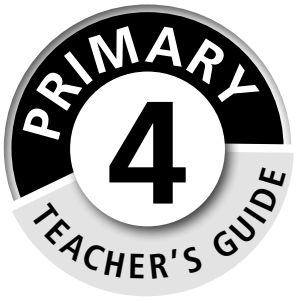

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Contents

Introduction

The purpose of the curriculum

The main objectives of the curriculum are to prepare the pupils to:

- develop an interest in science and technology
- acquire basic knowledge and skills in science and technology
- apply scientific and technological knowledge and skills to meet contemporary societal needs
- take advantage of the numerous career opportunities provided by science and technology
- become prepared for further studies in science and technology
- avoid drugs and related vices
- be safety and security conscious.

Time allocation

To cover this curriculum, the recommended weekly time allocation is 3 or more periods of 40 minutes each. Pupils need to do regular revision at home in order to cope with the content and new terminology.

The role of the teacher

One of the principal duties of a Basic Science and Technology teacher is to prepare and present good lessons to his or her pupils. The teacher has to:

- be as well informed as possible on the scheme of work of the subject
- know the aims and objectives of each Topic
- select appropriate content materials
- decide on the best methods of presentation such as PowerPoints, workstations, videos, discussion groups, worksheets, question-answer sessions, debate and experiments
- gather equipment and other resources required for the activities
- keep informed about environmental issues and other current biological news in Nigeria and the rest of the world
- arrange outings and guest speakers from time to time.

To be effective in presentation, the teacher must create a written/typed plan for each lesson. This must include aims, objectives, resources, time frames, content for the lesson, activities, homework, assessment, and ideas/additional worksheets to cater for pupils requiring extension or learning support (remedial).

Prepare each Topic in advance. Many teachers go into the classroom inadequately prepared. It is your responsibility as a Basic Science and Technology teacher to actively involve your pupils in the learning process. It is a proven fact that pupils learn far more by ***doing*** than by ***listening***.

Science involves being curious and asking questions. Wherever possible, ask questions to engage the pupils and to encourage independent thought processes. Start your lessons by asking the pupils to write down answers to questions related to your lesson (approximately five). This will settle them into the lesson. You can use different types of questions in your lessons:

- **diagnostic**, enabling you to determine prior knowledge on the Topic
- for **consolidation** of challenging concepts during the lesson
- for **stimulation** of interest in the subject
- for **concluding** the lesson. This will assist you to find out whether pupils have understood the concepts/terminology in the lesson. It will also highlight any areas that they need to revise at home or for you to revisit in the next lesson.

Teachers must ensure that they do not appear to have favourites in the class, so devise a system to ensure that you ask questions fairly, but be careful not to embarrass weak pupils if they cannot answer questions.

How to use this guide

The purpose of this Teacher's Guide is to assist you so that you may be more thoroughly prepared and your teaching will be more meaningful to your pupils. The Pupil's Book supports a hands-on approach and lays a solid foundation for Primary 4.

You need to be familiar with the key features of the Pupil's Book. The book is divided into 24 Topics. Each Topic is structured in the following way:

- performance objectives required by the curriculum (supplied in this Teacher's Guide)
- content required by the curriculum
- activities and exercises to be completed individually, with a partner or in groups.

At the end of every Theme you will find a summary of the Topics and revision questions.
A glossary of key words, the essential vocabulary for the Topics, is supplied at the back of the Pupil's Book.

How to use the scheme of work

A scheme of work is defined as the part of the curriculum that a teacher will be required to teach in any particular subject. Its primary function is to provide an outline of the subject matter and its content, and to indicate how much work a pupil should cover in any particular class. A scheme of work allows teachers to clarify their thinking about a subject, and to plan and develop particular curriculum experiences that they believe may require more time and attention when preparing lessons. The criteria all teachers should bear in mind when planning a scheme of work are continuity in learning and progression of experience. You can add your own notes to the Cambridge curriculum guide provided in the Pupil's Book pages v to xii to develop a scheme of work that is specific to your situation.

The curriculum guide is sequential. It is aligned with the contents of the Pupil's Book. Do not be tempted to jump around. Rather spend time carefully planning the term to ensure that you adhere to the sequence of the Themes and Topics.

Although the school year is divided into three terms, we have not divided the curriculum guide into terms, as the time frame may vary depending on the planning of your particular school and we were trying not to be prescriptive.

The first lesson is usually an introduction to the Topic. Make an effort to make this lesson exciting and informative. You should always explain the meaning of the Topic in this lesson, for example: What is Basic Science and Technology? What is weather? What is a tool? What is construction?

The last lesson is allocated to revision. In this lesson you can give the class a revision worksheet, a test or design a fun activity such as a game or a quiz to consolidate the Topic. Pupils can also do their own revision by answering the questions in their exercise books.

The amount of time you spend on a Topic will vary according to the ability of the pupils in your class and their prior knowledge.

Your management of the class will have an enormous influence on your ability to adhere to the time frames. Focus on effective discipline strategies. You will have fewer discipline issues if you are punctual and well prepared, follow a plan (write this on the board at the start of the lesson), keep your word (do not make empty threats), consistently adhere to rules, especially rules related to laboratory safety, and strive to make Basic Science and Technology an exciting subject.

A teacher of Basic Science and Technology is a professional instructor who facilitates, promotes and influences pupils to achieve the outcomes of the scheme of work. It is the wish of the authors that the pupils will at the end of each course in the series (Primary 1–6) attain a level of Basic Science and Technology proficiency that will equip them for future studies in this field.

THEME 1 Basic Science

Sub-theme 1 Learning about our environment

Topic 1 Changes in nature

Performance objectives

Pupils should be able to:
- state the meaning of change
- mention the changes they observe in their surroundings
- state the differences between temporary and permanent changes
- give examples of temporary and permanent changes.

Resources

Pupil's Book pages 1–8
Workbook pages 1–3

Teaching the lesson

Every day you come across many changes in your surroundings. Some changes in nature are rapid, bold and obvious, such as a change in cloud patterns and weather. Other changes are slow, subtle or delicate, such as the changing colour of the leaves on trees as autumn arrives. The texture of the ground can change over time from smooth to crunchy, mushy to hard. Water changes from liquid to ice and back. These changes may involve one or more substances.

What is a change?

An object may take on a different look, composition, colour, position, size or shape due to some factor from its external or internal environment.

The difference between living and non-living things

If you look around you, the most important differences that you will notice are those things that are alive and those that are not alive.

Exercise 1 **Observe living or non-living things** PB page 2

Pupils study the picture and identify living and non-living things. They compare their answers with a partner and discuss any differences that may exist.

Suggested answers:

2.–3. Example of answer:

Living things	Non-living things
people	bench
plants	swing

Living things	Non-living things
tree	brick walls
grass	see-saw
cat	fence
birds	gate

4. Living things are often called organisms. They can be plants or animals or any kind of micro-organism. All living things perform seven vital processes, called life processes. When any one of these life processes stop in the body of an organism, the organism dies. Non-living things do not come from living things. They come from the physical environment. Some examples of non-living things are soil, water, gases, plastics, wax, wood and metal.

Activity 1 Observe changes in nature PB page 3

Pupils walk outside and observe their surroundings for a few minutes. They can repeat these observations every day for a period of a week or longer. They make a list of ten changes they have noticed in their surroundings during this time and discuss it in the class with you and the other pupils. Here are examples of changes they might observe:

1. Cloud formation
2. Wind starts to blow or stops
3. Temperature changes during the day
4. Light and darkness – day and night
5. Animals moving around from place to place – flying, walking, some evidence will show that animals have been around, for example droppings, dead skins, new nests, holes in the ground, mole heaps
6. Plants grow bigger and taller and form more shoots
7. Some plants start to flower
8. Plants grow more leaves and old/dead leaves fall off
9. It rains and the soil becomes wet; it dries out when it is not raining
10. New plants grow from seeds under the ground
11. Animals hunt for food, for example spiders spin new webs
12. A gardener cuts the hedge around the house

Types of changes

In this section, the nature of changes in nature is studied. Broadly, we can distinguish between two types of changes in nature: reversible or temporary changes and irreversible or permanent changes.

Reversible or temporary changes

A reversible change is a change that can be undone or reversed. It might change how the material looks or feels, but it does not create a new material or produce a new substance. Another name for a reversible change is a physical change.

Activity 2 Study reversible changes PB page 3

Pupils cut a piece of paper into four square pieces. They cut each square piece further into four square pieces and lay these pieces on a table so that they take on the shape of the original piece

of paper. Discuss the changes with pupils. Obviously, you cannot join the pieces to make the original piece of paper, but is there a change in the property of the paper? You changed the shape of the paper, but you did not alter the way the paper is made.

More activities that demonstrate reversible changes are explained underneath. Test what happens to different substances when you dissolve them in water or other liquids. Can all substances be turned back to their original form after they mix with water or will they stay that way forever?

Pupils can do the following experiments by themselves, in groups or the teacher can demonstrate it to the class. Be careful when the pupils work with a burning flame.

Boiling, evaporating and condensing

Boil some water in a container. Point out the steam rising from the surface of the water. Hold an inverted pan by its handle over the steam at some distance from the boiling water. Let pupils look at the inner surface of the pan. Do they see any droplets of water there?

Droplets of water form inside the inverted pan. Let the pupils touch the water. When water starts to boil, the liquid changes into a gas. We say the water evaporates. The inside surface of the pan is cold and therefore the steam changes to a liquid again. This process is called condensation.

Melting

Heat a piece of chocolate in a pot over boiling water. The chocolate melts. If you take the pot from the heat and leave it to cool down, the melted chocolate changes back to solid chocolate.

Freezing

Use an ice cube holder and pour some orange juice (or any other fruit juice) into it. You can also pour orange juice into moulds to make ice lollies. Freeze the orange juice. Ask pupils if the ice lollies or ice cubes can be changed back into orange juice, and how.

Dissolving

Mix salt with water. Point out that the salt disappears because it dissolves in the water to make salty water. We can get the salt back again by boiling off the water. That leaves the salt behind.

The following are also examples of a reversible change:

- Sieving: Pour a sample of soil through a sieve and see what stays behind in the sieve.
- Filtering: Pour sand or ground coffee beans in a funnel lined with filter paper. Pour water over the sand or coffee. Only the water can move through the filter paper. The sand/coffee stays behind.

Irreversible or permanent changes

An irreversible change cannot be undone. An irreversible change starts with one material and ends up with one or more new ones. That means a new material is formed. The new material is completely different from the original one and sometimes useful to us. Another name for an irreversible change is a chemical change.

Pupils can do the following experiments by themselves, in groups or the teacher can demonstrate it to the class. Discuss their observations with the pupils. Be careful when the pupils work with a burning flame.

Heating and cooking

Heat a raw egg in a pan on a hot plate. Discuss what happens. The cooked egg cannot be changed back to a raw egg again. The change is irreversible.

Mixing

Mix vinegar and bicarbonate of soda. Discuss what happens. The mixture changes and lots of bubbles of carbon dioxide are made. These bubbles, and the liquid mixture left behind, cannot be turned back into vinegar and bicarbonate of soda again.

Burning

Discuss what happens when you burn wood. You get ash and smoke. You cannot change the ash and smoke back to wood.

Rusting

When iron is left outside for a long time, the oxygen in the air reacts with the iron, causing it to form a new substance called rust. This process is called oxidation. Rusting is a chemical process because rust is a new substance that is made from iron and oxygen. If the iron is left in wet or damp places, the iron will rust a lot faster. When iron rusts, reddish brown flakes form. The iron becomes weak and is easy to break.

Activity 3 Observe how things rust PB page 7

You will need:

- scraps of iron and steel
- a piece of aluminium foil
- a coin
- an old metal button
- an old screw
- an old washer
- a magnet (the back of a fridge magnet)

Method:

1. Make sure all the items you have collected contain some iron. If they do then the magnet will be attracted to them.
2. Place some of the smaller items on the foil so it will not blow away. Lay them outside in a place where they will be exposed to the weather. This experiment will take a bit of time, so make sure they will not get in the way of anyone.
3. Observe the things every day for about a month. Take note of which things rusted.

Activity 4 Make a candle PB page 7

You will need:

- pieces of white candles
- wax crayons
- a pan
- a piece of string
- a skewer
- a paper cup

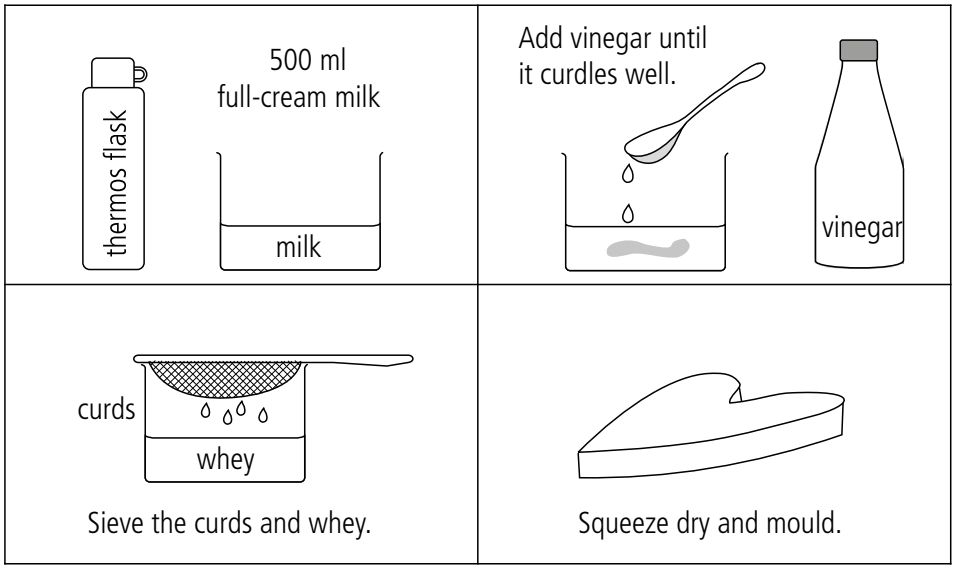
Method:

1. Put the candles and the wax crayons into a pan. Be careful when melting the wax. It can burn the skin badly. Heat it slowly over low heat. Stir gently to mix together.
2. While the wax is melting, make a small hole in the bottom of the cup with a skewer.
3. Thread a piece of string through it. Tie a knot underneath it.
4. Help the pupils to pour the wax into the cup with the piece of string dangling outside it.
5. Hang your wax candle up by the piece of string to dry.

The wax will turn hard.
Why? Wax can change from a solid to a liquid when it is heated. It will become solid again when it cools.

Workbook answers

Make plastic with milk and vinegar WB page 1



1. Irreversible
2. When the milk and the vinegar were mixed, it resulted in the formation of a new substance that may be useful.

You cannot turn this back into vinegar, milk and paint again. It's a permanent change.

Complete a table WB page 2

Food	Prediction – Draw what it will look like when heated	Say what happened	Is the change reversible? Yes or No
Margarine 	Pupils' own drawings in this column.	It melts if it is heated. It stays the same colour.	Yes

Fresh egg 		It changes its state and colour when it is cooked.	No
Crisps 		It turns brown if it is toasted.	No
Ice 		It melts and forms water.	Yes
Chocolate 		It melts and becomes liquid.	Yes
Bread 		It turns brown when toasted.	No
Water 		It turns into a vapour when it boils.	Yes

Identify reversible or irreversible changes WB page 3

1.

Change	Reversible	Irreversible
Glass breaking	Reversible	
Hammering wood together to build a house	Reversible	
A rusting bicycle		Irreversible
Separating sand and gravel	Reversible	
Mixing lemonade powder with water	Reversible	
Mowing the lawn	Reversible	
Bleaching your hair		Irreversible
Fireworks exploding		Irreversible
Squeezing oranges to make orange juice	Reversible	
Pouring milk on your oatmeal	Reversible	
Burning leaves		Irreversible
Cream being whipped	Reversible	

2. temporary or physical change
3. permanent or chemical change

Remedial guidelines

Recap on:
- the meaning of change
- the differences between temporary and permanent changes.

Topic 2 Our weather

Performance objectives

Pupils should be able to:
- state the meaning of weather
- identify the factors affecting the weather
- relate weather conditions to changes in these factors
- name the standard weather instruments
- improvise simple weather instruments
- identify and write simple weather symbols
- observe weather changes over a period of about three weeks
- use the weather symbols to keep records of weather changes
- prepare a weather chart.

Resources

Pupil's Book pages 9–19
Workbook pages 4–10

Teaching the lesson

The meaning of weather

- Brainstorm with the class to find descriptive words for weather. Accept words such as partly cloudy, sunny, rainy, stormy, thunderstorm, and lightning.
- Explain the definition of weather.
- Explain the different layers of the atmosphere using the illustration.
- Ensure that pupils grasp the concept of a protective layer of air/gases.

Factors affecting the weather

- Explain the factors affecting weather by referring to the pictures. Ask leading questions such as: What were the weather conditions this morning when you woke up? Is it any different now? What do you think it will be like this evening, tonight or tomorrow?
- If possible, use a globe to illustrate the turning of the Earth around its axis and the Sun as well as its tilt. Show pupils where Nigeria is on the globe.

Weather instruments

- Weather instruments: Try to show the pupils physical examples of the instruments and let them touch them.
- Explain the difference between degrees Fahrenheit and degrees Celsius.

Making your own weather instruments

- Go through the examples in the Pupil's Book of how to make a rain gauge and wind meter.

Activity 1 Make your own weather instrument PB page 16

Pupils work in pairs to make their instrument. Provide assistance where required. They then use it to record the weather.

Exercise 1 Correct mistakes in sentences PB page 16

1. The atmosphere around the **Earth** is made up of different layers of gases.
2. Clouds form when the **Sun** heats up the water on the **Earth** and causes tiny drops of water to become part of the air.
3. We measure temperature with a thermometer in **degrees Celsius or degrees Fahrenheit**.
4. A wind **vane** shows us the wind direction.
5. A wind **meter** shows us the wind speed.
6. When a barometer shows that air pressure is **falling**, storms are coming.

Weather symbols

- Ask pupils to bring weather maps from the local newspaper if possible. Explain the weather symbols as indicated on the map of Nigeria.
- Ask pupils to identify their region and to report on the weather for that day. Look at the minimum and maximum temperatures indicated.
- You could also direct them to the weather website yr.no.

Activity 2 Read a weather map PB page 18

1. 25 ºC; 31 ºC
2. It is summer. There are many symbols for sunny conditions. Temperatures are quite high.
3. Kaduna, Zaria, Kano, Jos, Maiduguri

Keeping weather records

- Have a class discussion around the keeping of weather records.

Temperature

- Explain the different aspects of the temperature graph on Pupil's Book page 18.
- The *y*-axis shows temperature from 16 to 40 in degrees Celsius. The average minimum and maximum temperatures for each month are indicated in different colours. The *x*-axis shows months from January to December.
- Teach pupils how to read the charts with the help of a ruler or straight-edged paper.
- Explain how average monthly temperatures are calculated: the total of minimum or maximum temperatures for a month divided by the number of days in that month. They complete the related Workbook activity individually.

Rainfall

- Explain the different aspects of the rainfall chart for Lagos on page 19 of the Pupil's Book. The *y*-axis shows rainfall in millimetres (not millilitres!)
- Pupils must have a clear understanding of precipitation. Have a class discussion on the wettest and driest months for Lagos. Let them do accurate readings from the chart by using

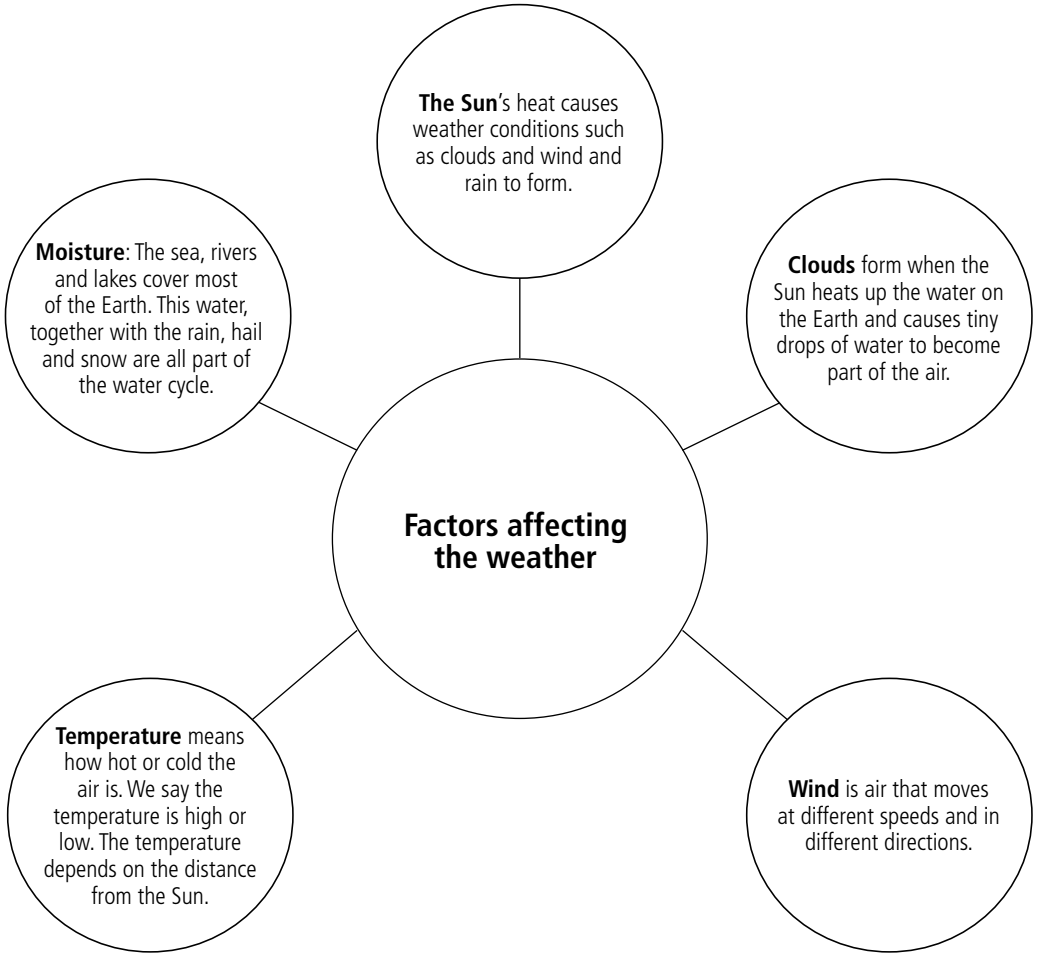
a ruler or straight-edged paper. Pupils must be able to estimate the amount of millimetres where it falls between two numbers on the *y*-axis. Let pupils complete the related Workbook activity individually.

Activity 3 Complete a weather chart PB page 19

Explain the weather forecast chart on Pupil's Book page 19. Make a copy for each pupil or help them to draw their own. Pupils are required to do this activity individually over the course of a week. Pupils complete the chart based on the weather conditions in their town. Encourage them to be diligent. Charts could be displayed in the classroom after completion.

Workbook answers

Draw a mind map to show the factors affecting weather WB page 4



Complete sentences about weather WB page 5

1. weather
2. atmosphere
3. summer
4. wind
5. temperature
6. heat

7. troposphere

Say what weather instruments are used for WB page 6

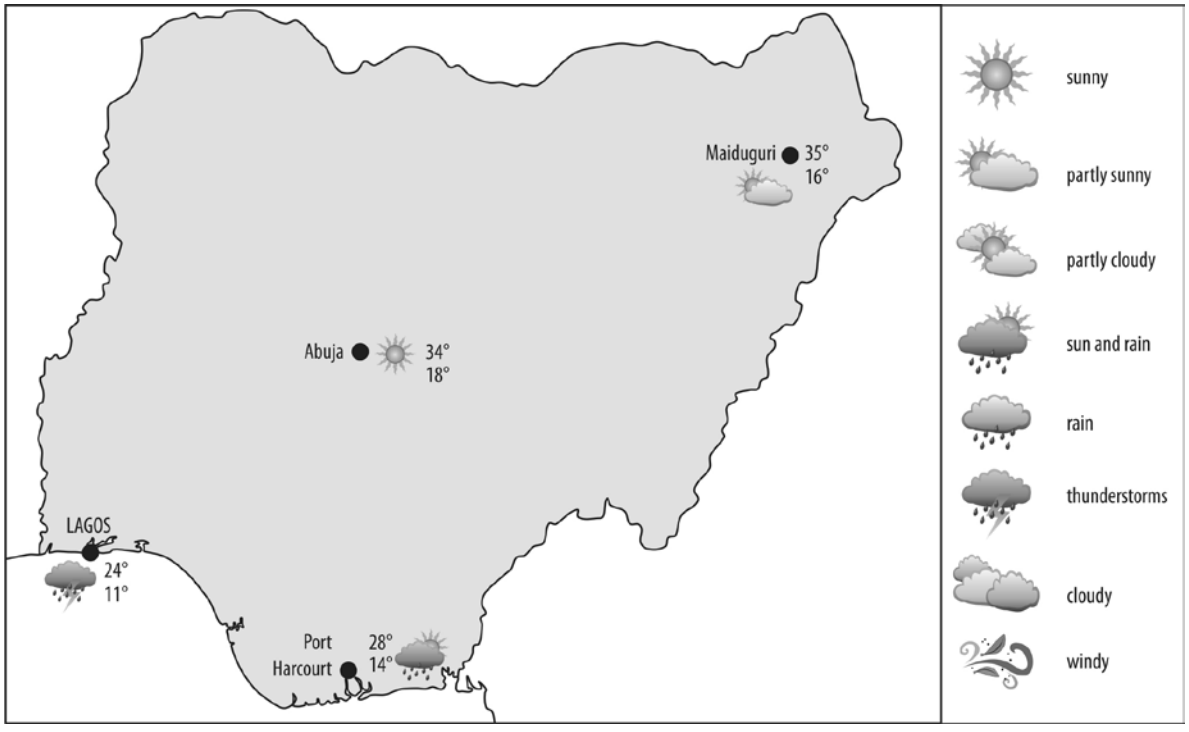
1. barometer – indicates air pressure or the weight of the air pressing down on Earth
2. wind vane – indicates the direction in which the wind is blowing
3. thermometer – indicates the temperature of the air
4. rain gauge – measures the amount of rain that falls in a specific period

Read a weather report WB page 7

1. Maiduguri
2. Lagos
3. Abuja
4. Abuja

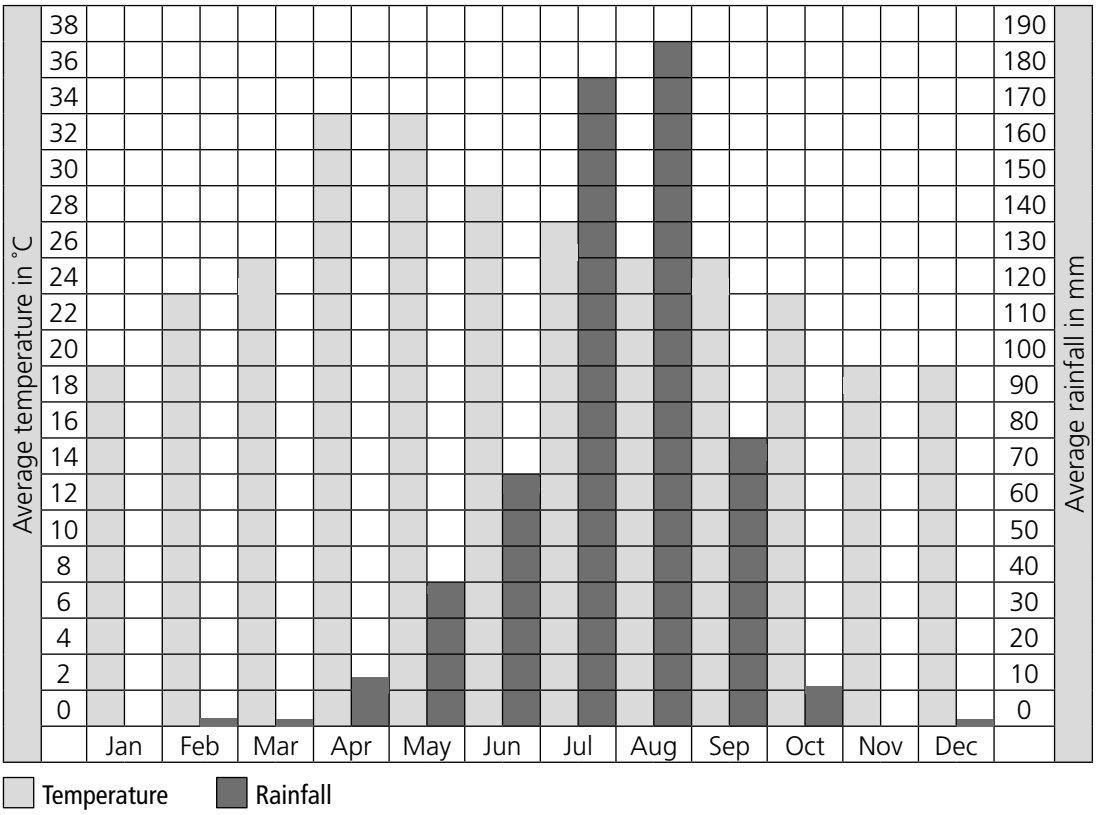
Complete a weather map WB page 8

1. Pupils fill in the correct symbols on the weather map.



Draw a bar graph WB page 9

a) millimetre
b) August
c) January and November (both 0)
d) February, March and December
e) degrees Celsius
f) April and May



Remedial guidelines

Have a class quiz on the content taught.
Recap on:

- the meaning of weather
- the factors affecting weather
- how weather conditions relate to changes in these factors
- names of the standard weather instruments.

Topic 3 Safety in our environment

Performance objectives

Pupils should be able to:

- state the meaning of safety and "right to life"
- list ways of keeping safe at:
  - home
  - school
  - on the road
- list simple safety devices
- state the advantages of road safety.

Resources

Pupil's Book pages 20–29
Workbook pages 11–23

Teaching the lesson

- Read through the information on safety, highlighting, in particular, the reasons why it is necessary to stay safe and the reasons why we need safety rules. Also discuss the concept of dangers which include:
  - dangerous objects
  - dangerous places
  - dangerous situations.
- By the end of this topic, pupils must be able to recognise whether they are safe or not and whether they are acting in a way that will keep them safe.

The meaning of safety and "right to life"

- Discuss what it means to be safe with the pupils and that the "right to life" means that all human beings have the right to live and not be killed by another human being.

Ways of keeping safe

- Explain the concept of an accident. An accident is a sudden event (such as a crash) that is not planned or intended and that causes damage or injury to people and things.
- In most cases, accidents can be prevented.

Activity 1 Talk about a dangerous situation PB page 21

1. Pupils can brainstorm various scenarios and describe them to the class.

Activity 2 Discuss the causes of accidents PB page 23

1. The causes of accidents will vary, depending on where the pupils live. Discuss as a class. Examples: cars/playing in the road, hot stoves, sharp knives, etc.
2. a)–c) Picture 1: The boy has had an accident on his bicycle and knocked the stall owner's fruit/vegetable basket over. Prevention: He should look where he is going.
   Picture 2: The boy has been playing on the roof and has slipped and fallen off the roof. He will probably break either his arm or leg. Prevention: Do not play on the roof.
   Picture 3: The baby is placing his or her fingers in the plug socket and could be electrocuted. Prevention: Keep plug points out of the reach of babies/children.
   Picture 4: The girl has picked the hot pot up with no protection on her hands, so is about to spill the hot contents on herself. Prevention: Use oven gloves or thick cloth to protect hands.

Safety at home

The pupils must look at the comic strip pictures on page 24 of the Pupil's Book where dangerous objects have been used incorrectly and discuss what the object is and how it has been used incorrectly.

- Frame 1: The girl used the knife to cut a carrot and was careless and cut her finger. She needs to be very careful when using a knife and perhaps ask an adult to do it.
- Frame 2: The boy thought he was old enough to shave himself with a razor and cut his face in three places. He should use a safety razor or an electric razor.
- Frame 3: The boy put his finger in an electrical outlet and got a shock.
- Frame 4: The boy has been using the hammer to knock in a nail and hit his finger by accident. The father used the jigsaw when he was little and almost cut off his finger as he was not careful.

- Frame 5: There was an accident in the house (like a pan left on the stove or a burning candle fell over) and something caught alight and started a fire which can burn you and cause death.
- Frame 6: The little girl has set a cracker alight and still has it in her hand. It will explode and hurt her.

Exercise 1 Make a list of rules about safety at home PB page 25

1.–2. Look at the rules to prevent accidents at home on pages 22–23 of the Pupil's Book. Pupils make up a list of five rules that you need to obey at home. They then illustrate each rule. Then they look at pictures and describe what is happening and why it is dangerous.

3. The baby is about to reach out and grab the handle of the pan on the stove and this will cause the contents to spill over him or her causing serious burns.
The boy has dislodged a roof tile and is about to slip off the roof.

Safety at school

- Impress on the pupils that they always need to think of their own safety, as well as that of others, when in the classroom or playing outside.
- If pupils do not behave appropriately in the classroom or are rough or negligent outside, they can get hurt. Worse still, they can hurt others.
- Discuss the playground rules.
- Explain to pupils that people who are concerned about health and safety issues have designed equipment in order to keep us safe. This equipment includes clothing.
- It is essential that you wear safety clothing when using equipment or tools when you are in the Technology classroom or the workshop.

Exercise 2 Identify safety rules in the Technology classroom PB page 26

Pupils work in pairs to discuss what the children are doing wrong. Some possible examples:

- The one child is using scissors incorrectly, she could get electrocuted.
- Water and electricity are a dangerous combination and the child spilling water on the computer will get an electric shock.
- There should be no bags on the floor.
- The cracked TV screen needs to be reported.

Safety on the road

- Discuss the diagram of safety when crossing the road. Also discuss any other rules of the road suggested by the pupils.
- The pupils can work on their own or in groups to make a list of their own safety rules for "on the way to school". They can illustrate each rule.

Exercise 3 Road safety on the way to school PB page 27

The answers are as follows:
"Before I cross the road I look left then right then left again. When there are no cars I can safely cross the road. I cross at a traffic light or at a crossing."

Activity 3 Talk about road safety PB page 27

Encourage pupils to ask questions about road safety.

Activity 4 The advantages of road safety PB page 29

Divide the pupils into groups and talk about poems and rap songs. Ask them to write a song or rap song about the advantages of road safety. Allow each group to perform their item which the class can evaluate giving reasons. Remind the pupils to be fair and objective when assessing work. They can use the following criteria to evaluate:

- Was the rap song/poem creative?
- Could you hear everyone easily?
- Did the group work well together?
- Was the rap song/poem on topic?

Workbook answers

Write and talk about safety WB page 11–12

1. Safety means to be free from harm or danger. Wherever we are, whether it is at home, school or on the road, we need to keep ourselves safe.
   This means that we must try not to get hurt or physically injure ourselves in any way. Sometimes this is not always possible, as it may be other people who are responsible in some way for hurting us.

2.–3. Pupils' answers will vary. Examples might include situations with: fires, sharp objects, swimming pool, playground equipment, a road accident etc.

4. Allow the pupils to walk around the school to identify and record places where accidents could happen. They must give reasons for their choices – a variety of answers can be provided as long as the reasons are valid.

Identify dangerous situations at home WB page 13

1. These family members are busy preparing food around the stove top. There are too many of them in one area. They are working on top of one another which is dangerous and could cause accidents. One of them could get burnt by hot food or oil splashing from the pan. They should be wearing some protective clothing, for example, an apron, so that their clothes do not get caught up in anything. The woman is using a knife which is far too big for what she is cutting. Their work surface should be cleaned once they use something. For example, the egg shells should be thrown in the dirt bin and the spilt liquid should be cleaned up.
2. Check pupils' drawings to see that they understand the accidents that could occur in the home.

Identify dangerous situations at school WB page 15

1. The pupils look at the diagram in the Workbook and identify the dangerous situations.
2. The following safety rules should have a tick:
   4. Handle tools and equipment with care and pack them away.
   6. Walk when carrying a sharp pointed object, knife or pair of scissors.
   8. Always use the correct tool for the job.
   14. Make sure no clothing can get caught in tools or equipment.

Write safety rules for the Technology classroom WB page 17

Some possible answers:
1. Make sure the floor area is free of bags, clothes and rubbish.
2. Wear protective clothing when necessary.
3. Make sure no item of clothing can get caught up in tools or equipment.
4. Remove jewellery.
5. Tie back long hair.
6. Behave sensibly in the classroom.
7. A first-aid kit must be easily accessible.
8. Handle tools and equipment with care and put them back where they belong.
9. Always use the correct tool for the job.
10. Report any accidents to your teacher.

Classify safety rules WB page 18

To and from school	At home	At school and on the playground
7; 9; 17; 20	2; 3; 5; 10; 13; 15; 16; 19	1; 4; 6; 8; 11; 12; 14; 18

List reasons for wearing safety gear WB page 19

Pupils look at the diagram on page 19 and explain reasons why it is a good idea to wear safety gear.

Answers

1. Aprons: to protect their clothing
2. Gloves: to protect their hands from heat and chemicals
3. Face mask: so that they do not inhale fumes from chemicals
4. Goggles: to protect their eyes and face from splinters and chemicals
5. Hairbands: their hair should be tied back

Safety rap song WB page 20

- Divide the pupils into groups and talk about poems and rap songs. Ask them to write a song or rap song to teach five important safety rules for home, school, the workshop or on the roads.
- Allow each group to perform their item which the class can evaluate giving reasons. Remind the pupils to be fair and objective when assessing work. They can use the following criteria to evaluate:
  - Was the rap song/poem creative?
  - Could you hear everyone easily?
  - Did the group work well together?
  - Was the rap song/poem on topic?

Write safety rules WB page 21

Ask pupils to make up safety rules for use during Technology lessons/in the workshop.
Use the worksheet on page 21 of the Workbook.

How to use a fire extinguisher WB page 22

Look at the fire extinguisher at school and get the pupils to write simple instructions on how to use it. They can add illustrations for each step. Use the worksheet on page 22 of the Workbook.

Safety devices WB page 23

- Discuss what a safety device is and why it is important.
- Read through the list of safety devices on page 28 of the Pupil's Book.
- Check to see if your school is equipped with fire extinguishers and have a fire drill procedure. Discuss their importance with the pupils.

Sub-theme 2 Living and non-living things

Topic 4 Changes in plants and animals

Performance objectives

Pupils should be able to:
- observe and describe changes in plants
- record the changes observed
- observe and describe changes in different animals
- mention the names of the young ones of different animals
- state the major reasons for the observed changes
- draw and label the life cycle of some common animals.

Resources

Pupil's Book pages 30–39
Workbook pages 24–30

Teaching the lesson

Most plants and animals live in areas with very specific climate conditions, such as temperature and rainfall patterns, that enable them to thrive. Any change in the climate of an area can affect the plants and animals living there. Let's look at some changes in plants when the conditions that they are adapted to, change.

How plants adapt to change

Plants have found many different ways to get through the harsh days of winter.

Annuals, biennials and perennials

Some plants, including many garden flowers, are called *annuals*, which means they complete their life cycle in one growing season. They die when winter comes, but their seeds remain, ready to sprout again in the spring. Examples of annuals are maize, cowpea, sorghum, peas, corn, wheat, rice, lettuce and watermelon.

Biennials are plants that take two years to go through their life cycle. They grow from a seed and then rest over winter. In spring, they produce flowers and seeds and die. New plants grow from the seeds. Examples of biennials are onions, beet, broccoli, cauliflower, celery, cabbage, parsley and carrot.

Perennials live for more than two years.

This category includes trees and shrubs, as well as herbaceous plants with soft, fleshy stems.

When winter comes, the woody parts of trees and shrubs can survive the cold. The parts above the ground of herbaceous plants (leaves, stalks) will die off, but underground parts (roots, bulbs) will remain alive. In the winter, plants rest and live off stored food until spring. Examples of perennials are apples, avocados, bananas, oranges, tomatoes, sweet potatoes, bell peppers, petunias and impatiens.

The life cycle of flowering plants

Flowering plants produce flowers so that they can reproduce. The fruit of these plants produce seeds which then grow into adult plants. Explain what the term "life cycle" means, referring to the illustration on page 33 of the Pupil's Book.

Activity 1 Grow some seeds PB page 34

Let pupils perform this activity individually.

They soak about five brown bean or maize seeds in water for a few hours. Line a petri-dish or any other dish with wet filter paper or wet cotton wool. Once the seeds germinate and grow, they are called seedlings. Water the seedlings regularly. Pupils monitor the growth of the seedlings for at least 14 days. They make drawings and write all the changes they observe in their exercise books. You could ask them to use the following table to write down their observations:

Day/Date	Observations

Fruit and seeds

In flowering plants, the ovule develops into a seed. The ovules are inside the plant, protected by the ovary. As the ovule grows, the ovary develops into a fruit.

There is a big difference between the fruits of different plants. Show pupils examples of different flowers and seeds and ask them to point out the different parts and discuss the differences between plants.

How a fruit develops from a flower

Discuss the development of a flower into a fruit, using the text and pictures on page 35 of the Pupil's Book.

Changes in animals

Once they are born, all animals grow. They get bigger and heavier as they grow into adults. In some cases, the way they look changes completely. Ask pupils to name some young animals they have seen and what they are called.

Activity 2 Study animals PB page 37

Pupils make a list of about ten different animals and their young ones. They can use magazines, brochures, the internet or any other resources to find information and pictures. Ask them to make drawings or cut out pictures of the animals and paste them in their exercise books.

Animals with simple life cycles

Most animals, including fish, mammals, reptiles and birds have simple life cycles.

Some animals, like dogs, cows and horses, grow inside their mothers' bodies, and are born alive. Others, like chickens and reptiles, hatch from eggs. Discuss with the pupils, the three stages all these animals go through.

Animals with complicated life cycles

Amphibians, such as frogs and newts, have more complicated life cycles. They undergo a big change called a metamorphosis. Make sure pupils understand what this term means.

Animals that undergo a complete metamorphosis

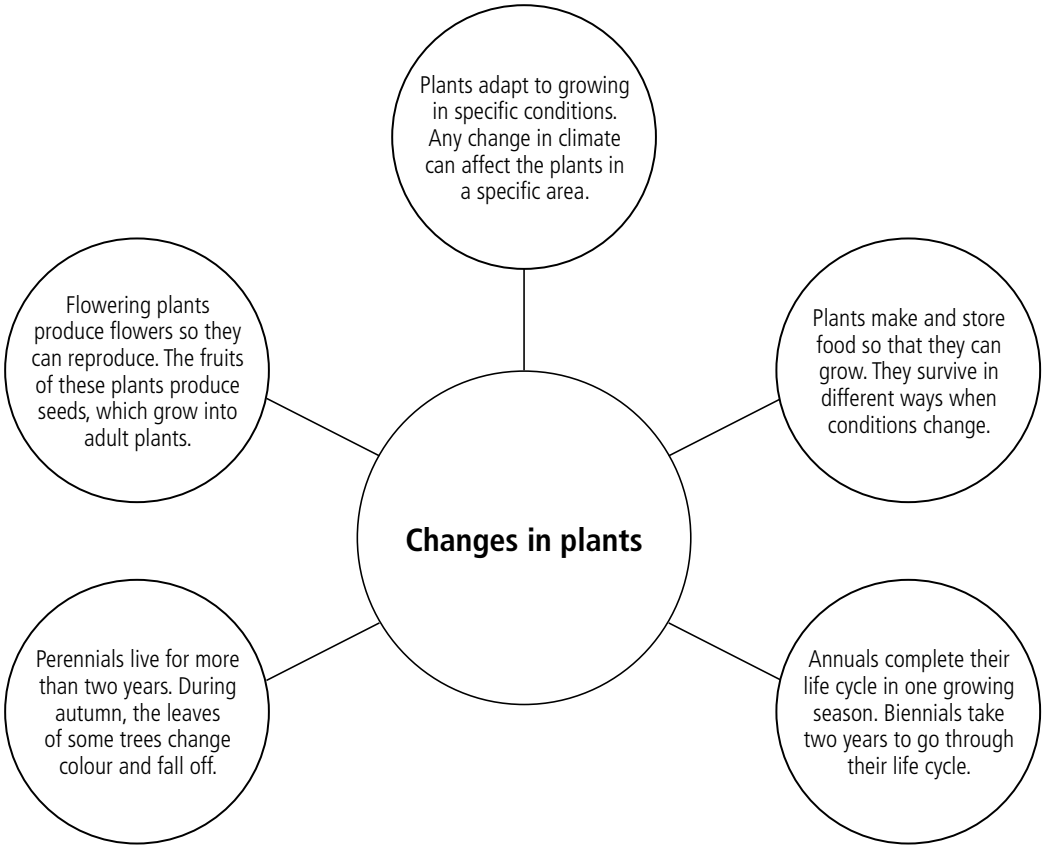
Insects, such as beetles, bees, ants, butterflies, moths, fleas and mosquitoes, have four stages in their life cycles. Explain these stages to pupils and show them picture examples of the different stages.

Animals that undergo an incomplete metamorphosis

Some insects, such as dragon flies, grasshoppers and cockroaches do not develop into pupas. They have three stages in their life cycle. Explain these stages to pupils and show them picture examples of the different stages.

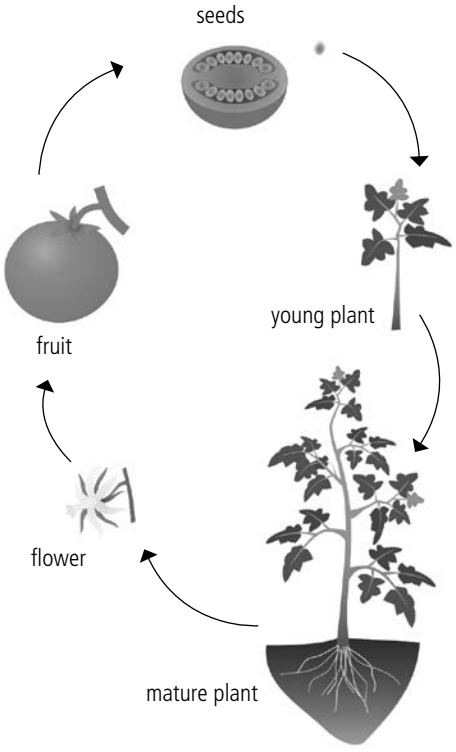
Workbook answers

Draw a mind map WB page 24



Draw the life cycle of a plant WB page 25

Refer to the diagram on page 33 of the Pupil's Book for an example.

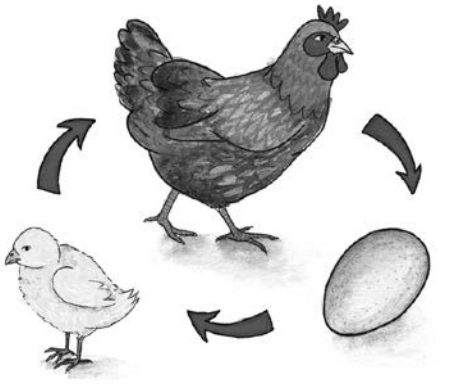


Explain the changes in the following plant WB page 26

1. A seed is germinating and growing into a plant.
2. Label as follows:
    1. seed
    2. testa splits and young root or radicle forms
    3. plumule heads for light
    4. cotyledons come above ground
    5. green leaves make food for plant
    6. cotyledons get smaller as food inside them is used up
3. sunlight and water

Draw a simple life cycle WB page 27

1. Any fish, mammal reptile or bird
2. Pupils' own examples. They could draw the life cycle of the hen on page 37 of the Pupil's Book.



Explain the differences between complete and incomplete metamorphoses WB page 28

1. Metamorphosis is a big change that an animal goes through; the process in which an insect or frog changes from a young form into an adult by going through a series of changes.

2. a) Insects that have a complete metamorphosis have four stages in their life cycle (egg, larva, pupa and adult insect). Insects that have an incomplete metamorphosis have three stages in their life cycle. They do not have a pupa stage.
   b) Examples of insects that have a complete metamorphosis: butterflies, bees, ants, moths, beetles.
   c) Examples of insects that have an incomplete metamorphosis: dragon flies, grasshoppers, cockroaches, mosquitoes.

Changes in non-living things WB page 29

Statement	True	False
A non-living thing is an organism.		✓
A living thing has life.	✓	
All living things perform seven life processes.	✓	
All non-living things also perform seven life processes.		✓
The seven life processes are moving, breathing, sleeping, growing, reproducing, feeding and drinking.		✓
The seven life processes are moving, breathing, showing sensitivity to the environment, growing, reproducing, getting rid of waste and feeding.	✓	
A wave is an example of a living thing because it can move.		✓
Living things never die.		✓
Non-living things never die but they do get old.	✓	

Spot the mistakes WB page 30

Moulding

- Moulding is a process in which a **hot** liquid is poured into a hollow container.
- As the liquid **cools down** and hardens, it takes on the shape of the container.
- **plastic** is an example of a substance that can be moulded.

Rusting

- When iron is left outside for a long time, the **oxygen** in the air reacts with the iron, causing it to form a new substance called rust.
- This process is called **oxidation**.
- Rusting is a **chemical** process because rust is a new substance that is made from iron and **oxygen**.
- If objects containing iron are left in **wet or damp** places, the iron will rust **faster**.
- When iron rusts, **reddish brown** flakes form. This makes the iron **weak** so that it is **easy** to break.

Topic 5 Human body – the mouth

Performance objectives

Pupils should be able to:
- name the types of teeth in the mouth
- locate the relative position of teeth in the mouth
- mention the uses of each type of teeth
- state the role of the tongue in feeding
- state the role of the lips in feeding.

Resources

Pupil's Book pages 40–45
Workbook pages 31–34

Teaching the lesson

Humans have two sets of teeth in their life. The first set is called the milk teeth. These start to grow through the gum, one or two at a time, when the child is about five months old.

By the age of eighteen months, most children have a set of 20 teeth. The milk teeth begin to fall out when the child is about seven years old. They are all replaced by new ones, and 12 new teeth also grow, making up the complete set of permanent teeth, which consists of 32 teeth.

Activity 1 See what saliva does PB page 41

Pupils make their own observations.

Explain that when the cracker is in your mouth, your saliva starts to break the bonds holding the cracker together as well as mix with it. This makes the cracker softer and easier to swallow. The act of chewing is the mechanical digestion as chewing helps to break the cracker into smaller pieces so that it's easier to swallow.

Activity 2 Look at your teeth PB page 43

You will need a mirror and toothpicks for this activity.

1. First ask the pupils to feel their teeth with their tongues to see if all of them are exactly alike. Discuss the differences.
2. Ask them if they have any missing teeth.
   If so, let them feel with their tongues to see if they can feel the new tooth pushing up through the gum.
3. They now use a mirror to look inside their mouth. They can use a toothpick along with the mirror to locate the teeth. Start counting from the centre front.
4. They use the diagram on Pupil's Book page 43 to determine all the teeth that they have of each kind in the diagram.
   They may not have all of the teeth in the diagram, as it shows an adult's teeth.
5. They check with a friend and an adult to see if they have the same number of teeth.
   Safety tip: Use disposable rubber gloves when you check inside someone else's mouth.

The tongue

Include a fun discussion around the use of the tongue. Ask pupils if they can roll their tongue. Some people can and others cannot.

The ability to roll your tongue is inherited genetically.

Count how many pupils in the class can roll their tongue and how many cannot roll their tongue. They can also ask their parents if they can roll their tongue or not. See if there is any correlation between the pupil and their parents.

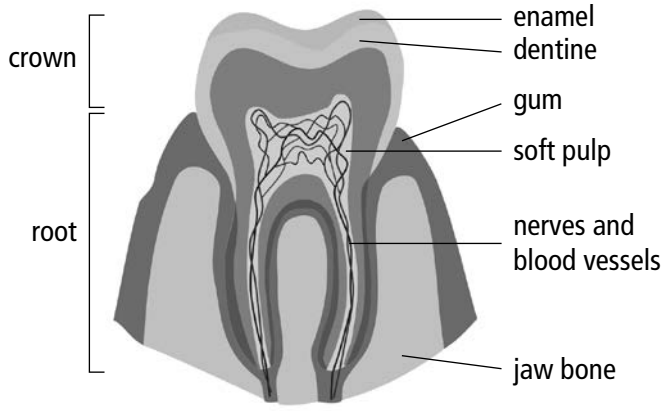
Workbook answers

Different types of teeth in the human mouth WB page 31

1. A: premolar
   B: incisor
   C: canine
   D: molar
2. incisor, canine, molar, premolar

Study a diagram of a tooth WB page 32

1.



2. a) milk teeth
   b) 20
   c) permanent teeth
   d) 32
3. a) biting off pieces of food
   b) grinding and chewing food
   c) tearing and crushing food
   d) tearing and grasping food

Study the structure and functions of the tongue WB page 33

1. The tongue is attached to the floor of the mouth. It is covered by a thin mucous membrane and helps us to sense taste.
   The upper surface of the tongue is covered with taste buds that contain taste receptors. These help us tell the difference between the five different tastes: salty, sour, bitter, sweet, and savoury.
2. The functions of the tongue in the digestion process are:
   - It keeps the food between the teeth during chewing.
   - It mixes food with saliva.
   - It moulds food into a ball that can be swallowed easily.
   - It assists in the swallowing process.

- It has tiny little taste buds which tell the difference between the five different tastes.

3. Humans also use the tongue for speech where it helps with changes in sound.

The lips WB page 34

1. skin, muscle and mucous membranes
2. Any two: A special muscle inside the lips causes the lips to open and close, allowing a person to chew and swallow with the mouth closed, to hold food and drink inside and to keep out unwanted objects. Lip suction is essential for babies to breast feed. The lips are also used to hold the ingested food or to get it in the mouth.
3. Any two: They play a big role in forming the sounds of many words and letters. Lips allow us to smile, to bare our teeth and to kiss.
4. The reddish tint of the lips comes from underlying blood vessels, which is why the lips can bleed so easily when injured.

Remedial guidelines

Recap on:
- the names of the types of teeth in the mouth
- the role of the tongue in feeding
- the role of the lips in feeding.

Topic 6 Water

Performance objectives

Pupils should be able to:
- identify pure water as a liquid with no colour, taste and odour
- observe that heated water can disappear as steam
- observe that steam can change back to water
- observe that water can change to ice (solid).

Resources

Pupil's Book pages 46–50
Workbook pages 35–36

Teaching the lesson

- Discuss the different forms/states of water: solid, liquid and gas. Explain the principle of matter and molecules. Assist pupils with the activities demonstrating evaporation and condensation. If possible, demonstrate what happens if water is boiled for a prolonged time. Explain the fluidity of liquids. Provide samples of different liquids such as vinegar, water, milk, cooldrink, etc. and have pupils examine it in groups for Activity 1 (Pupil's Book pages 46–47). Pupils answer the questions and compare their answers during a class discussion.
- Explain the new vocabulary of chemical *formula* and *molecule*, and the composition of pure water on page 47. Pupils should memorise the characteristics of liquid pure water.

Differentiating water from liquids

- Do the following activities in class while pupils observe. Ensure that they learn the correct terminology while discussing the experiment and comply with safety procedures.
- Pupils could answer the questions after each activity in writing in their exercise books.

Activity 1 Identify liquids PB page 46

1. a
2. a and c
3. b
4. a
5. No
6. vinegar, water, milk
7. It has no colour, no taste, no smell.

What happens to water when it is heated?

Activity 2 Experiment with evaporation PB page 47

1. Steam or water vapour
2. The water inside the kettle evaporates when boiling.
3. All the water inside will evaporate.

What happens to steam when it cools down?

Activity 3 Experiment with condensation PB page 48

1. Droplets of water on a cloudy mirror
2. It came from the steam released by the kettle.
3. Water vapour is invisible and a gas. When it touched the cool surface of the mirror, it condensed to become a liquid and visible again.

What happens to water when it is placed in a freezer?

- Recap on the three states of water and ensure that pupils comprehend the movement of molecules in the three states.
- Pupils could draw their own versions of the molecules in the three states in their exercise books with correct labels.

Activity 4 Experiment with freezing PB page 49

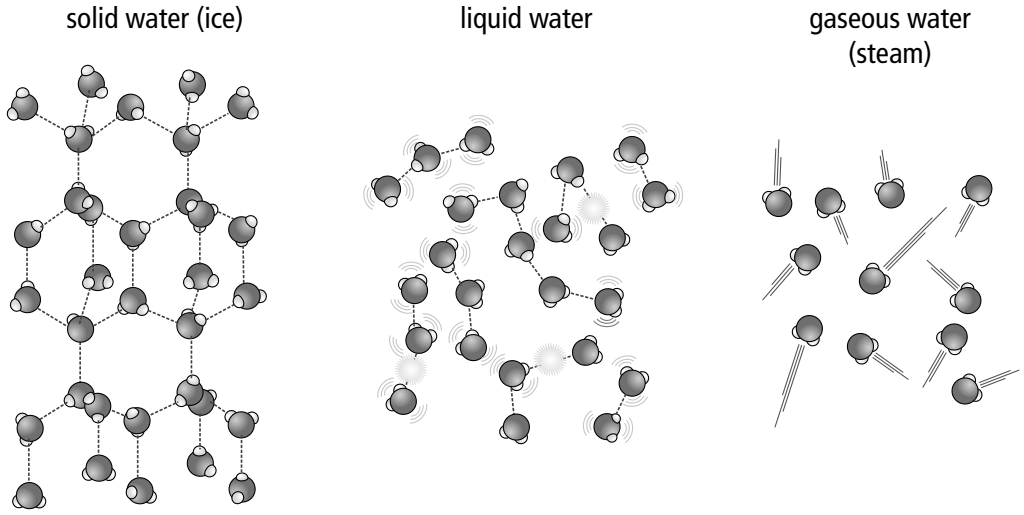
1. No, it is frozen and a solid.
2. Cold
3. It will start to melt and become a liquid again.

Workbook answers

The three states of water WB page 35

1. A) Solid state – ice
   B) Liquid state – water
   C) Gaseous state – clouds

2. The diagrams should look like this:



3. a) You can smell it. Pure water has no smell.
   You could heat the liquids and see what happens. Water changes from a liquid to a gas state when it is heated. Water boils at 100 ˚C at sea level.
   b) You can look at it. Pure water is colourless.
   You could freeze the liquids and see what happens. Water freezes at 0 ˚C at sea level.

Remedial guidelines

- Have a class quiz on content taught.
- Recap on experiments demonstrating evaporation and condensation and link with previous knowledge about the water cycle.

Extension activity

- Pupils suggest experiments they can do at home to prove that water evaporates when heated and condenses when cooled, using only solar energy.

Topic 7 Water cycle

Performance objectives

Pupils should be able to:
- make a chart of the water cycle
- state the relationships between the formation of rain and the water cycle.

Resources

Pupil's Book pages 51–53
Workbook page 37

Teaching the lesson

- Pupils should have a good grasp on the processes of evaporation and condensation.

- Refer to this knowledge when explaining the water cycle.
- Explain the water cycle as per the illustration in the Pupil's Book on page 51.
- Pupils could make a wall chart of the water cycle in groups to reinforce their knowledge.

The water cycle

- It is important that pupils understand the water cycle as a repetitive process and that they memorise the sequence of events in the cycle.
- Ask them what water sources are available in their community, such as, rainwater tanks, rivers, dams, lakes, etc.
- Show on charts, maps or a globe how much of the Earth is covered by water.

Where rain comes from

- Discuss the picture of the water cycle PB page 51.

The water cycle process

- Explain the terminology and the direction of each process. Pupils can chant the names and direction with different hand signals.
- Show videos about the water cycle.

Activity 1 Make your own water cycle PB page 53

- Divide the class into two groups where each group will experiment with one of the two methods explained in the Pupil's Book.
- Pupils keep track of their observations in their notebooks and at completion of the two week-period, make a labelled drawing to illustrate their observations.

Workbook answers

Match labels to diagrams WB page 37

A: runoff; B: evaporation; C: transpiration; D: condensation; E: precipitation; F: percolation

Remedial guidelines

- Have a class quiz on content taught.
- Recap on the sequence of the processes in the water cycle.

Extension activity

- Do independent research on the main rivers in Nigeria.

Topic 8 Measuring liquids

Performance objectives

Pupils should be able to:

- measure amounts of liquids accurately using graduated measuring cylinders, cups and jars
- state the metric units of volume
- improvise a measuring cylinder with estimated scales for volumes in the metric system.

Resources

Pupil's Book pages 54–57
Workbook pages 38–41

Teaching the lesson

- Pupils must be able to formulate a definition of volume.
- They should know that liquid takes the shape of the container it is in.
- Explain when and why graduated glass cylinders are used.
- Show a variety of measuring instruments using pictures or the physical instruments and invite pupils to participate in suggesting more examples and when they should be used.

How to correctly read the level of a liquid in a graduated cylinder

- Explain the terminology: *meniscus*, *concave*, *convex* and *parallax error* as in Pupil's Book page 55.
- Demonstrate by doing readings of different liquids such as water, vegetable oil, mercury, rubbing alcohol. Take extreme care when handling poisonous substances.
- Ask pupils to corroborate on readings.
- Pupils could draw the different liquids, meniscus and line of reading in their exercise books labelling them correctly.

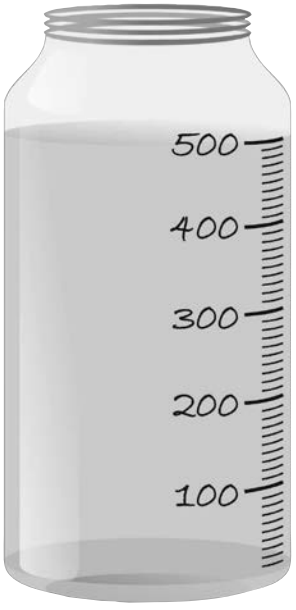
Units of measurement for liquids

- Explain the metric system's units of measurement used in Nigeria: cm^3, m^3 (ml, l, kl)
- Provide paper templates of small cubes. Pupils work in groups to cut it out, glue it, measure it and work out the volume of each. They report back to the class.
- Make a poster with the corresponding SI and millilitre units to put up in class.
- Ask the pupils to bring different sized plastic bottles and tins to school. Have them guess how much water each container holds. Fill them up and decant into a graduated beaker to test their answers.
- Briefly discuss how to estimate the volume of large amounts of water, such as in: a bath, a swimming pool, a water tank, dams and lakes.

Activity 1 Make your own measuring cylinder PB page 57

- Pupils can do this activity in class with supervision.
- Explain the process, demonstrate and then assist pupils to make their own.
- They can experiment with measuring the volume of smaller containers by filling it from their own measuring cylinder.
- Remind them how to take a reading correctly.

The finished product should look something like this:



Workbook answers

Describe a measuring instrument WB page 38

The picture is of a graduated cylinder. We use it to measure liquids. It is made of glass with lines and numbers on the side. This is to tell us how much volume the liquid takes up in the cylinder. The liquid in the cylinder is colourless and has a concave meniscus. This means the curve of the level of the liquid is lower in the middle than on the sides. We read the measurement at the lowest level of the curve if it is concave. We must read with our eyes directly opposite this level to avoid the parallax error. The volume of the liquid in this cylinder is 6.3 cm^3.

Measuring liquids WB page 39

1. a) D
   b) D
   c) B or C
   d) A

2.

	Unit	Possible quantity
a)	litre	25 l
b)	kilolitre or m^3	30 kl or 30 m^3
c)	millilitre or cm^3	330 ml or 330 cm^3
d)	kilolitre or m^3	50 million m^3 (any related figure)
e)	millilitre or cm^3	10 ml or 10 cm^3
f)	litre	50 litres
g)	millilitre or cm^3	1 litre
h)	millilitre or cm^3	50 ml
i)	millilitre or cm^3	50 ml or cm^3

Remedial guidelines

- Do a class quiz on content taught.

Recap on:

- how to measure amounts of liquids
- accurately using graduated measuring cylinders, cups and jars
- the metric units of volume
- metric units.

Extension activity

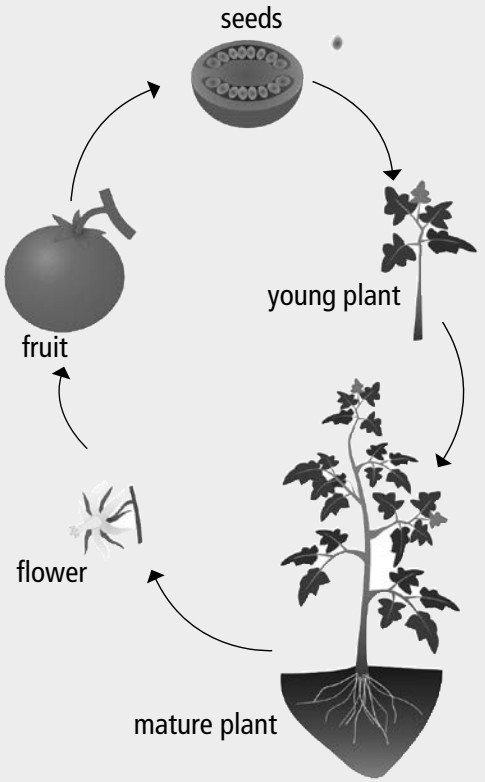
- Pupils can do the activity on page 41 in the Workbook at home.

Assessment: Answers PB pages 61–64

1. If the composition, colour, position, size or shape of an object becomes different due to some factor from its external or internal environment, then we say this object has changed. ✓✓ (2)
2. A reversible change is a change that can be undone or reversed. ✓
   An irreversible change cannot be undone, a new substance forms; chemical reaction takes place. ✓ (2)
3. a) Reversible ✓
   b) Irreversible ✓
   c) Reversible ✓
   d) Irreversible ✓
   e) Reversible ✓ (5)
4. Living things: plants, animals and humans ✓
   Non-living things: soil, water, gases, wood, metal ✓ (2)
5. Iron nail: When an iron nail is exposed to oxygen in the air, the two combine to form iron oxide or rust. ✓
   Rust is a new substance and cannot change back to iron and oxygen. ✓ (2)
6. Meteorologists keep a record of daily weather conditions from all over the world. ✓ These records tell them what the weather patterns are for every country during the different seasons. ✓ (2)
   a) They make forecasts and warn people of storms. ✓ Farmers also study the charts to get an idea of which months of the year would be best to plant their crops. ✓ (2)
   b) They use symbols on weather maps because symbols are pictures, ✓ so they are easy for people of all languages to understand. ✓ (2)
7. Accidents are mostly caused by people who create dangerous situations, ✓ use dangerous objects ✓ or go to dangerous places. ✓ (3)
8. a) Reasonable examples like: guns, knives, sharp objects etc.
   b) Reasonable examples like: roads, pools, forests, cliffs, dangerous neighbourhoods etc.
   c) Reasonable examples like: not knowing how to operate equipment, tools, speaking to strangers, being in a burning house and other unsafe situations. (6)
9. Goggles prevent things getting in your eyes, like a wood chip if you are cutting wood or fumes from chemicals. (1)
10. Reasonable examples like: boiling water on a stove with the handle turned out; a baby or toddler could grab the hande and spill the boiling water; prevent it by turning the handle inwards. (3)
11. Any four from: Tie back long hair. Handle tools and equipment with care and pack them away. Wear protective goggles when using tools. Always wait for your turn to use equipment. Do not touch broken glass or a sharp object. Make sure no clothing can get caught in tools. Wash your hands and make sure the work surface is clean before you work with tools or equipment. (4)
12. a) Goggles ✓ are safety glasses that protect your eyes. You must wear them when you are working with anything that could chip or send pieces into your eye.
    b) A fire extinguisher ✓ is used to put out or control small fires.
    c) Safety clothing ✓ refers to articles of clothing that can be worn when in a dangerous situation and you need to protect the different parts of your body. Firefighters wear protective clothing when they have to enter burning buildings.

d) A smoke alarm ✓ is a device that is often fitted into public buildings. It will sound an alarm when it senses smoke in the air. (4)

13. Any five reasonable answers, such as: Cross at pedestrian crossings or traffic lights. Never chase a ball out into the street before checking where the cars are. Look left, right and left again before crossing a road. Never play games in the street. Be alert in traffic, by watching everything that goes on around you. Be polite, by yielding the right of way to others. (5)
14. a) play
    b) Wait
    c) storm (3)
15. Examples could be: Aprons: to protect their clothing. Gloves: to protect their hands from heat and chemicals. Face mask so they do not inhale fumes from chemicals. Goggles: to protect their eyes and face from splinters and chemicals. Hair bands: to tie hair back and keep out of face and equipment. (4)
16. So that we do not cause ✓ an accident or be involved in an accident. ✓ (2)
17. a) Annuals ✓
    b) Temporary or physical change ✓
    c) Ovule ✓
    d) Deciduous ✓ (4)
18. Diagram to show the life cycle of a flowering plant.

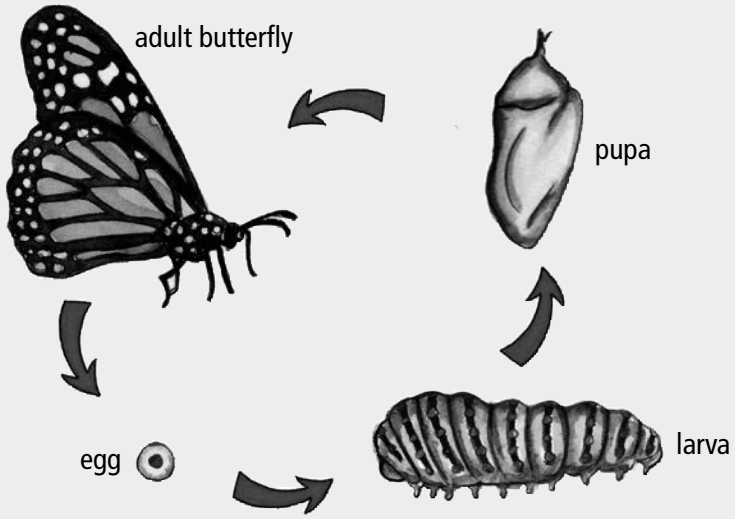


Assign marks as follows:
Large, ✓ accurate ✓ drawing done in clear/unbroken lines. ✓ All five parts ✓ are correctly labelled ✓✓✓✓ and shown in the correct order. ✓✓ (10)

19. Metamorphosis is a big change that an animal goes through. It is the process in which an insect or other animal changes from a young form into an adult form by going through a series of changes. ✓ (1)

a) butterfly ✓ (1)
b) locust ✓ (1)

20. Write labels to show the life cycle of a butterfly. (4)

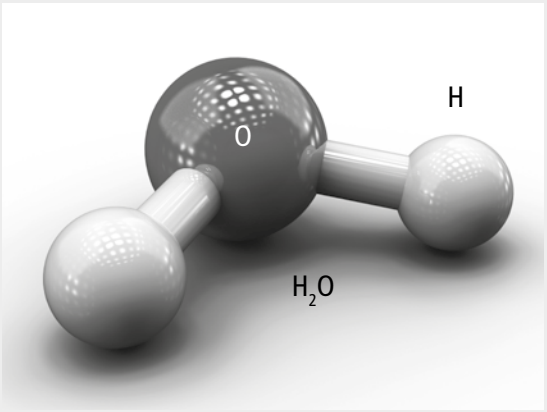


21. The insect overcomes unfavourable conditions. ✓✓ (2)
22. Humans have four different types of teeth:
    - The incisors are sharp-edged, chisel-shaped teeth at the front of the mouth. They are used for biting off pieces of food. ✓✓
    - The canines are more pointed teeth at either side of the incisors. They are used to tear and grasp food. ✓✓
    - The premolars are next to the canines and are for tearing and crushing. ✓✓
    - The molars are used for grinding and chewing food. The molars right at the back are sometimes called wisdom teeth. They do not grow until much later than the others. ✓✓

    (8)
23. The functions of the tongue in the digestion process are:
    - It keeps the food between the teeth during chewing. ✓
    - It mixes food with saliva. ✓
    - It moulds food into a ball that can be swallowed easily. ✓
    - It assists in the swallowing process. ✓
    - It has tiny little taste buds which tell the difference between the five different tastes. ✓

    (5)
24. a) They are made up of skin✓, muscle ✓ and mucous membranes. ✓ (3)
    b) The reddish tint of the lips comes from underlying blood vessels. ✓ (1)
25. Any four from: rivers, lakes, underground reservoirs/aquifers, dams, streams, swamps, plants etc. (4)
26. solid, liquid, gas (3)
27. a) evaporation, water vapour
    b) freezing point
    c) condensation
    d) frozen state (5)
28. Liquid pure water has no colour, ✓ taste ✓ or smell. ✓ Both milk and vinegar ✓ have a colour, taste and smell. They also have different boiling and freezing points to pure water. ✓ (Any 5 relevant facts) (5)

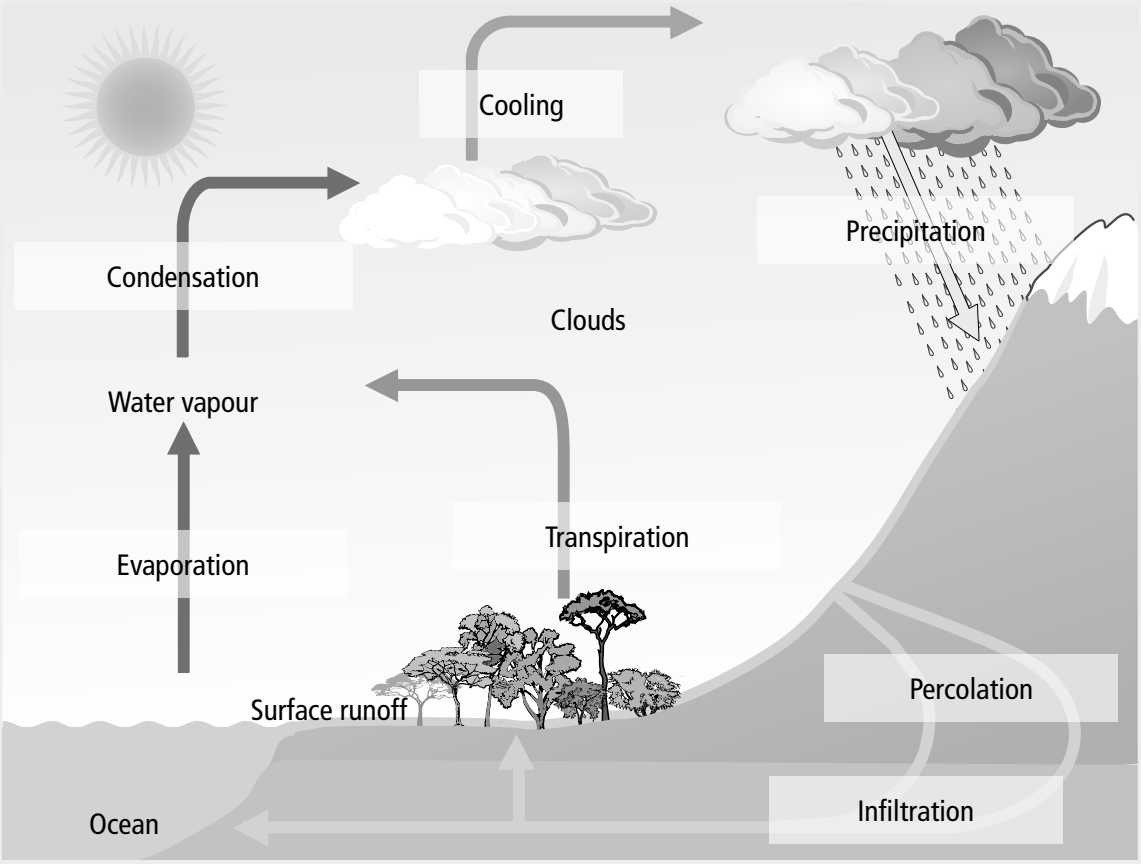
29. Drawing must include one oxygen and two hydrogen atoms bound together and clearly labelled. Pupils' drawings should look like this:



(3)

30. Pupils draw and label the water cycle. The drawing of the water cycle should look like the picture on page 51 of PB.
Pupils should show the processes as on page 52 and provide a short explanation of each. (7 × 2).

Marks for the arrow directions (4) and creativity (2).



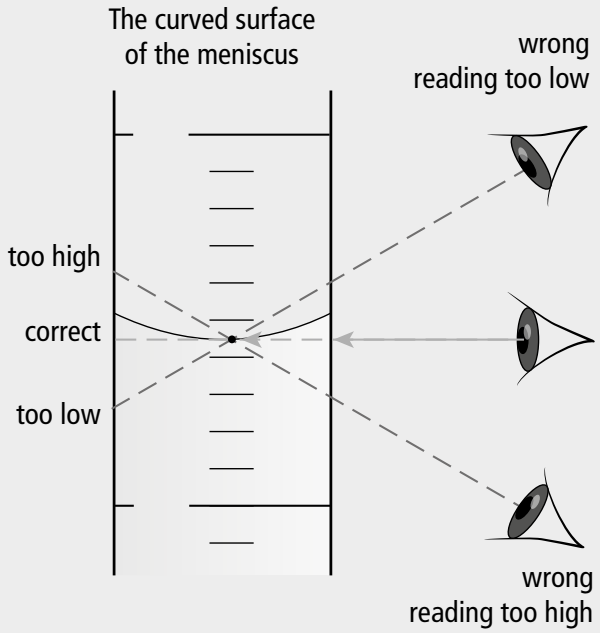
(Total 20)

31. 1. 6 cm^3 (readings should be taken at lowest point of meniscus)
2. 38 cm^3
3. 32 cm^3
4. 19 cm^3

(4)

32. A. mercury
B. water
a) concave
b) convex (4)

33. Pupils draw the following:



(2)

Total: 140

THEME 2 Basic Technology

Sub-theme 1 Understanding basic technology

Topic 1 Technology and you

Performance objectives

Pupils should be able to:
- state the meaning of technology
- list the importance of technology
- state the products of technology.

Resources

Pupil's Book pages 65–70
Workbook pages 42–53

Teaching the lesson

What is the meaning of technology?

Start the lesson by asking pupils to find things in the class that make our lives easier.
Pupils could bring a collection of interesting and unusual tools and utensils from home. Have a discussion and report-back session on why they are useful and how they make tasks easier.
Explain the difference between a tool and a resource. Tools are devices that are usually hand held and used to carry out a particular function. Resources are a supply of money, materials, staff and other things that are needed to make a product or thing.

Exercise 1 PB page 66

1. Statement 1
   Technology may be defined as human knowledge that uses tools, materials and systems to help make our lives easier.
   a) What knowledge was needed to make this task possible?
      - How to use a chain saw
      - How to fell a tree
      - What to do with the timber that was cut
   b) What tools were needed to make the task easier?
      - The chain saw
   c) Which materials can be made from this resource?
      - Timber that can be used to build furniture
      - Logs for firewood
      - Branches/logs for framework of buildings
      - Fences for houses/to form boundaries/for cattle kraals
      - Sawdust for compost/used to make fire logs/used in chicken pens/pet cages/horse stalls

- Paper
- Cardboard

d) What can the materials be used for?
- As above
- Accept pupils' examples

2. Statement 2
If technology is applied well, it can benefit people, but if it is incorrectly applied, it can cause harm to people.
a) Discuss how technology can be both a harm and a benefit to people by referring to the image.
Advantages of the chain saw (benefit):
- Allows for accuracy
- Quick and easy to use
- A lot of work can be done in a short time
- Uses less energy to do more work

Disadvantages (harm):
- Dangerous to use
- Causes air/noise and land pollution
- Encourages people to cut down trees because it is easy to do

3. Statement 3
a) Why do you think that the people of Lagos are not allowed to fell trees without permission?
Accept pupils' reasons:
- Too many people are destroying the environment by cutting down trees
- Causes soil erosion
- Destroys the natural habitat for animals
- Natural resources are being used for firewood to cook and keep warm

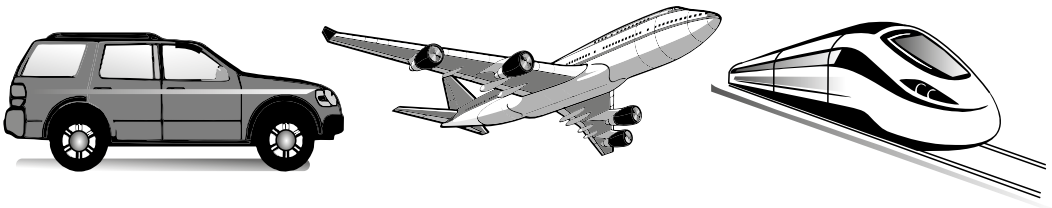
Activity 1 Identify different types of technology PB page 67

Give pupils a copy of the table on page 67 of the Pupil's Book to fill in, or ask them to copy the table into their exercise books. Pupils work individually and list as many examples as they can think of under each heading. Then they work in groups, and discuss how each type of technology makes our lives easier.

They make a poster to report their group's discussion.

Suggested answers

Transport technology	Communications technology	Information and communications
electric car	telephone	internet
wheel	printing press	mobile phone
jet engine	ballpoint pen	laptop computer
helicopter	radio	smartphones
aeroplane	television	flash drives
train	loud speaker	Playstation
boat	overhead projector	tablets



TRANSPORT TECHNOLOGY MEANS WE CAN TRAVEL QUICKLY AND COMFORTABLY.

COMMUNICATIONS TECHNOLOGY MEANS WE CAN BE IN CONTACT WITH PEOPLE ANYWHERE, ANYTIME.

INFORMATION AND COMMUNICATION TECHNOLOGY IS A CHEAP WAY TO STAY UP TO DATE WITH WHAT IS GOING ON IN THE WORLD.

The importance of technology

Discuss the importance and origins of technology. Discuss, for example, the importance of the wheel in vehicles. Remind pupils that the wheel is considered one of man's greatest inventions. You could ask pupils to think of various other objects that make use of wheels, e.g. trolleys, lawn mowers, skateboards.

Exercise 2 Think about technology PB page 70

Form of technology	What we use it for	How it improves our lives
Household appliances	Cooking e.g. microwave oven	Cooks, heats, grills, bakes, defrosts food
	Cleaning appliances e.g. washing machine, tumble dryer, vacuum cleaner Kettle for boiling water	Quick/uses less energy than doing by hand Boils water quickly

Form of technology	What we use it for	How it improves our lives
Computer, fax machines/ printers/scanners/photocopiers	Send messages, look up information, prints worksheets etc.	Pupils' own answers

Exercise 3 Fill in the missing words PB page 70

Answers in this order: tools, materials, device, natural or human-made, system, transport, communications information

Workbook answers

The meaning of technology WB page 43

1. Materials and resources: wood, metal, iron, plastic
2. Tools can include any of the following categories of tools: building tools, painting and plastering tools, electrical tools, plumbing tools, tiling tools, adhesive tools
3. Knowledge required: How to read a plan, measure, cut accurately, brick lay, plaster, tile, join wood, sand wood, stain wood
4. They got the knowledge from: technical colleges, apprenticeships, on-the-job learning, short courses, books, the internet
5. Classrooms: cement mixer, cutting saws, sanding machines, wood clamps, nail guns
   Furniture and equipment: all of the above, except cement mixer
6. An answer could be: In classroom A the seats are attached to the desks which make the moving of the seats very difficult. The seats in classroom A also take up more space. Pupils must justify their choice.

The importance of technology WB page 45

1. Five possible reasons:
   - It makes learning easily accessible.
   - Technology has allowed for the development of teaching tools and resources.
   - Technology has made the development of printing material, writing materials and communication tools available to help make learning interesting.
   - Technology has made available medical devices to help pupils with hearing and visual impairments.
   - Technology has made possible the discovery and use of electricity so that pupils can learn in comfort e.g. use of fans in classrooms, projectors, televisions, computers.
2. Classroom A
   - Chalk and Talk method, pupils write their responses or complete activities in their workbooks.

   Classroom B
   - The teacher is seen as a facilitator.
   - Discussion taking place.
   - Teaching is more interactive.
   - Media is used to help make teaching interesting and keep the interest of the pupils for longer.
3. Disadvantage of technology (harm):
   - Pupils can become too used to the use of multimedia and get bored when they have to listen to teachers.
   - Pupils find it difficult to concentrate for long periods at a time because they become used to animation/lighting and sound when learning via TV.

- No teaching and learning can happen when there is a power failure.
- Teachers become lazy and rely on the use of TV material.

Advantages:

- Teaching is interactive.
- It allows for more discussion.
- It increases pupils' attention span.
- The latest information can be obtained.
- It provides ongoing visuals to help pupils understand new things and discover new places.

The products of technology WB page 47

Across

2 he enjoyed reading and **science**
6 he was always **bottom** of his class
9 he believed that success is 1% inspiration and 99% **perspiration**
10 his **mother** taught him at home

Down

1 he was always **bottom** of his class
2 teachers felt he was troublesome and asked him to leave **school**
3 he made money by selling **newspapers**
4 one of his early experiments was to brood a goose **egg**
5 people laughed when he said he would invent a **phonograph**
7 he successfully invented the electric **lamp**
8 worked **eighteen** hours a day

Identify the uses of tools WB page 48

1. Technology is human knowledge which involves tools, materials and systems to help make our lives easier.

2.

Tool	Name	Use
	Hammer	Drive nails, join parts of wood using nails, remove nails, break up objects
	Rake	Gather leaves
	Hand drill	Is a fastening tool to secure bolts and screws Can also be used to drill holes
	Ruler Pen/pencil	Used to measure Used to write/mark off measurements/indicate a point where materials are to be joined etc.
	Cutlery	Used to eat, used to serve food

3. Pupils to give their own three examples e.g. calculator, pen, computer, mobile phone etc.

Say why technology is important WB page 49

A Eggs being sorted using a conveyer belt system
   b) Solves the problem of manually handling eggs safer system/less chance of eggs being dropped
   c) Automated conveyer belt
   d) Task was done much more accurately and in a shorter time

B Mobile phone:
   b) Makes communication easier/faster (can include discussion on other features of a mobile phone e.g. music, games, internet).
   Solves the problem of having to write a letter and taking a long time to get a reply.
   c) Mobile phone technology
   d) Communication was immediate

2. A: Task would take longer to do. Maybe less accurate (eggs may break)
   B: Could take a long time to get an answer/letter may not be delivered/important information may not be received.

Identify uses of the wheel WB page 50

1. Accept individual answers. Example: No, as the wheel is used to travel amongst other purposes. It will not be easy to travel very far. Without the wheel our work will be harder. It will be difficult to transport heavy loads. The wheel is used on cars, trains, planes, machines, and most factory and farming tools. It is also used in appliances and furniture, such as the base of fridges and beds. It is also used in toys, such as skateboards and rollerblades.
2. Pupils' own choice of pictures

Design your own perfect pen WB page 51

1. Pupils' own answers e.g. pen, overhead projector, smartboard, calculator, fan, television, computer etc.
2. Pen/pencil
   Pupils' own interesting design, could include novel features such as weather, different font styles, different colours to choose from/long-lasting/erasable ink, transform into a toy or stress ball etc.

Design your own mobile phone WB page 52

Pupils' own interesting design

Answer questions about assistive technology WB page 53

1. He is in a wheelchair/a paraplegic/unable to walk.
2. He is using a wheelchair to help him get around.
3. No. He would have to be carried around, as he is unable to use his legs.
4. Three things:
   - He is independent.
   - He can do most activities other pupils can do without having other people assist him.
   - Pupils to list all the different activities he does e.g. plays sport, takes care of himself, travels on his own.

Topic 2 Shape construction with paper, wood and metal

Performance objectives

Pupils should be able to:
- state the meaning of shape construction
- list materials used for shape construction
- identify and state tools used in shape constructions
- fold and bend metal or cardboard to form an object.

Resources

Pupil's Book pages 71–91
Workbook pages 54–57

Teaching the lesson

The concept of shape construction

- Use various examples of constructed objects to explain to pupils what construction means.
- Discuss the concept of structures and their purpose by examining examples or pictures of structures as well as their functions.
- Discuss, with the aid of pictures, how paper is made.

Exercise 1 Describe properties of different kinds of paper PB page 73

In pairs, the pupils look at the pictured objects on page 73 of the Pupil's Book and then record their answers in their exercise books. They describe the properties of the paper used to make each product. Possible answers:
- tea bag: filter paper is soft, flexible, lightweight, porous, strong
- corrugated cardboard: make of strong cardboard and is lightweight but strong, stiff, inflexible, tear resistant, cushioning material
- tissue: tissue paper is soft, pliable, easily torn, lightweight, absorbent
- egg container: lightweight cardboard, strong, protective, cushioning material, durable

Exercise 2 Measure some lengths PB page 74

- Discuss the use of the ruler, pair of scissors and a craft knife. Measure some lengths in pupils' exercise books.
- Pupils must measure these lengths accurately.

Exercise 3 and 4 Identify materials used to make objects PB pages 74–75

Object	A: What it is made of	B: What other materials are used	C: What it is used for
a) Egg box	cardboard	wood, plastic	to package eggs
b) Tin can	metal	plastic, glass	to contain substances
c) Ladder	plastic, metal	wood	to reach high places
d) Wooden chair	wood	plastic, metal	to sit on

Object	A: What it is made of	B: What other materials are used	C: What it is used for
e) House	wood, mud, reeds, grass	concrete, bricks, glass, zinc, etc	for shelter
f) Paper bag	stiff paper or cardboard	plastic	to carry objects
g) Bridge	wood, rope	concrete, metal, bricks	to cross over obstacles

Shape construction methods

- Discuss the idea of tools and why we use them, as well as safety issues when using sharp tools.
- Read through paper used in construction and shape construction methods. Discuss and demonstrate scoring.

Activity 1 Score paper PB page 76

Give each pupil a piece of cardboard and go through the steps of scoring cardboard, as explained on page 76 in the Pupil's Book.

Activity 2 Make a paper dog (origami) PB pages 77–78

Give the pupils paper with which to make the origami shapes. This could either be a class or homework activity.

Activity 3 Make shapes PB pages 79–81

- Give the pupils paper with which to make the origami shapes. Look around the classroom to identify different shapes and look at the shapes in the Pupil's Book. Give the names of the various shapes and make sure pupils know these.
- Depending on time constraints, divide the class into groups, each of which must make all four shapes or one shape each, which they can then demonstrate to the other groups.

Using nets to construct shapes

Discuss the concept of a net and examine the picture on page 82 of the Pupil's Book of a net, discussing the fold and solid lines and their purposes.

Activity 4 PB page 82–83

Give pupils each the pattern of a cardboard box, so that they can practise how to follow instructions, score the paper and make up the box.

Using wood in shape construction

Discuss the pictures on page 84 of the Pupil's Book, showing the cutting down of wood and preparation for use as furniture.

Exercise 5 Learn about wood PB page 84

1. Wood comes from trees.
2. Seven
3. Carpenter

Processing of wood

Explain that wood cannot be used straight from the trees to make things. It first needs to be processed, which means we must do things to it to change its properties. Only then can it be used for different purposes. Discuss the different kinds and how it is made.

Exercise 6 Identify different kinds of wood PB page 85

Suggested answers:

SCHOOL	SCHOOL	HOME	HOME
Classroom	**School buildings**	**Kitchen**	**Bedroom**
door	roof trusses	cupboards	cupboards
window frames	doors	floor	door
desks	floors	shelves	window frames
chairs	cupboards	window frames	shelves
rulers	tables	door	floor
teacher's table	stage	table	table

Tools used when working with wood

Look at the pictures and names of tools that can be used to work with wood (pages 86–87 in the Pupil's Book). Discuss what they are used for. Discuss how to look after tools properly.

Activity 5 Make a wooden structure PB page 88

Pupils work in groups. Give the pupils the materials to make the wooden structure. They read through the steps. It would be advisable to make an example of the gusset beforehand, as per the instructions.

Using metal in shape construction

Discuss with the class where metal comes from and what objects are made out of metal.

Tools used when working with metal

Look at the pictures and names of the tools that can be used to work with metal (pages 90–91 in the Pupil's Book) and discuss what they are used for.

Exercise 7 Identify metal objects and their uses PB page 91

Pupils look at home and in the classroom to see what objects are made from metal. Then they copy and complete the table. These answers will vary depending upon the objects selected by the pupils.

Workbook answers

Shape construction with paper WB page 54

Pupils can make a paper bag for homework using the net provided.

Identify uses of wood WB page 55

1.

Kind of wood	Uses
A. Plywood	to make doors
B. Chipboard	to make kitchen cupboards
C. Blockboard	to make furniture
D. Hardboard	to make the back of cupboards

2. c) Trees are chopped down.
   b) It is made into logs.
   f) The wood is taken to the factory.
   e) Here it is processed into different kinds of wood.
   d) It is then made into different things (fences, floorboards, furniture, Pekun's chair, etc.)
   a) Pekun sits in his chair to watch television.

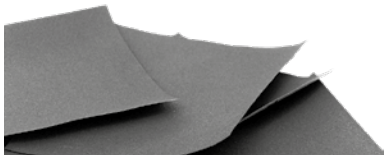
Identify tools and their uses WB page 56

Tool	Name of tool	What it is used for
	adjustable spanner	to hold metal objects firmly
	anvil	surface on which to hammer or shape object
	hacksaw	is used to cut metal
	tinsnip	is used to cut thin sheet metal
	scriber	is used to make marks in metal
	hammer	is used to knock in or pull out nails

Describe tools WB page 57

Pupils can use any four examples from the tables on pages 86–87 and 90–91of the Pupil's Book.

Name of tool	What it looks like	What it is used for
Ruler		A 300-mm steel ruler is best. It is used to make accurate measurements.
Try-square		It has a metal blade set at 90° for marking out and testing squareness.
Stanley knife		It is used for cutting materials such as cardboard.
Hammer		It is used for tapping nails into wood.
Junior hacksaw		It is used for cutting wood and is useful for fine work. Its blades can be replaced.
Brad awl		It is used for marking and making holes.
Brace		It is used for boring larger holes.
Hand drill		It is used for drilling small holes up to 8 mm in diameter.

Name of tool	What it looks like	What it is used for
G-clamp		It is used to hold work firmly against the bench while you are chiselling and gluing.
Vice		It is attached to the work table and holds work in place.
Chisel		It is a sharp object that has a blade on one end. It is used for carving or cutting a hard material such as wood, stone, or metal by hand.
Mallet		It is used to knock (drive) a chisel without damaging the handle.
Sandpaper		It is used to make the surface of the wood smooth.
Tape measure		It is a flexible ruler and used to measure distance. It consists of a ribbon of cloth, plastic, fibreglass, or metal strip with measurements in inches, mm and cm.
Screwdriver		It is a tool, manual or powered, for turning (driving or removing) screws.

Name of tool	What it looks like	What it is used for
Hammer		It is used to beat metal.
Anvil		This is used to place work on while cutting or hammering or shaping.
Scriber		It makes light scratch lines to mark metal.
Hacksaw		It is used for sawing metal.
Tinsnips		It is used to cut thin sheet metal.
Adjustable spanner		It is used to hold metal objects firmly.
Pliers		It is used for gripping objects, twisting and cutting wire.

Remedial guidelines

Recap on:

- what it means to construct an object
- what a structure is

- the materials that can be used to construct objects
- what methods can be used to construct objects
- scoring and why you need it
- what a structure is
- what a net is and why it is useful.

Extension activity

Make a paper bag as described in the Workbook page 54.

Topic 3 Vehicles

Performance objectives

Pupils should be able to:
- state what a vehicle is
- identify different types of vehicle
- identify different parts of vehicle (external parts)
- draw different types and parts of vehicle
- state the use of a vehicle
- state one disadvantage of a vehicle.

Resources

Pupil's Book pages 92–109
Workbook pages 58–68

Teaching the lesson

What is a vehicle

- Discuss with the class how they got to school that morning. Then through questioning establish what a vehicle is. Read through the brief history of cars on pages 92–93. Look carefully at the pictures and discuss the vehicles.
- Talk about the history of the vehicle and describe its progress through the ages.

Exercise 1 Vehicles PB page 94

1. A vehicle is a machine used for transporting people or goods, especially on land, such as a car, truck, or cart.

2.

Vehicle	Purpose
Car	Transports a driver and passengers and luggage
Truck	Carries different goods
Bus	Transports many people at once
Bicycle	Transports one person quite slowly
Motorcycle	Transports 1 or 2 people fairly quickly

3. They are heavy and clumsy, move slowly.
4. Henry Ford

Exercise 2 Types of vehicles PB page 94

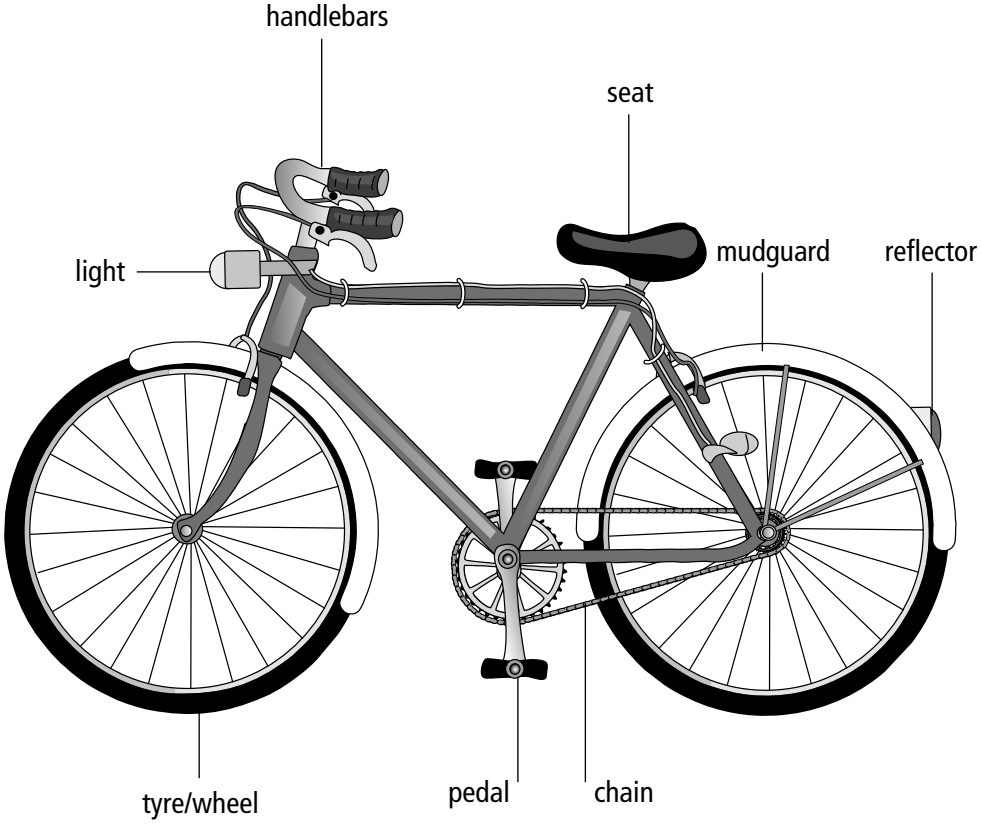
1. Car: Moves people anytime from and to anywhere. Can cause accidents.
2. Truck: Moves heavy, large goods anywhere. Pollutes the atmosphere.
3. Bicycle: Moves one person, can park in a tiny space.
4. Motorcycle: Moves one or two people easily anywhere anytime. Pollutes the atmosphere.
5. Bus: Moves lots of people. Can cause accidents, pollutes the atmosphere, may cause delays if late.
6. Truck: Transports dangerous liquids, large goods. Can cause accidents and dangerous spillage if spills chemicals or oil.
7. Trailer: Transports extra goods when loaded to a car. Can cause accidents if overloaded or wheel bursts, jack-knifes.
8. Caravan: Can be a holiday home on wheels. Can cause accidents.
9. Wagon: Transports goods on farms, pulled by oxen, horses. Very slow, wheels can break.
10. Train: Transports goods and people. Pollutes, may cause delays if late.

The parts of a bicycle

- Look at the picture of a bicycle in Exercise 3 and discuss the different parts. Discuss the history of the bicycle and how it developed.
- Discuss which pupils have bicycles and why they have them.

Exercise 3 The parts of a bicycle PB page 96

Do this as a class activity. Discuss the various parts of a bicycle and fill in the labels.



Exercise 4 Types of bicycles PB page 97

Look at the different types and label them with the class.

Answers:

1. tricycle
2. racing bike
3. penny farthing
4. BMX
5. tandem
6. motorcycle

Exercise 5 Bike rules PB page 98

Fill in the missing words with the class and discuss why each rule is important. Ask the class if they can suggest further important rules.

Answers:

1. helmet
2. steering wheel
3. signals
4. correct

Motorcycle

Discuss the external parts of a motorcycle with the pupils and the advantages and disadvantages of this form of transport.

Truck

Discuss the different kinds of trucks with the pupils and the advantages and disadvantages of this form of transport.

Exercise 6 Answer questions about trucks and motorcycles PB page 101

1. Curtain-sider – planks of wood
   Drop-sider – long metal poles
   Flatbed body – vegetables and fruit
   Box body – furniture
2. Curtain-sider – plates of glass
   Drop-sider – load of sand
   Flatbed body – cement blocks
   Box body – gas bottles
3. Curtain-sider – slide curtains to keep load in place and protected
   Drop-sider – easy to reach the load
   Flatbed body – sides can be dropped down to unload
   Box body – large storage space protects load
4. The long pole to which the wheels are attached
5. Frame of the truck
6. They can transport large, heavy goods on bad roads anywhere across the country.
7. They pollute the atmosphere and can cause accidents and are expensive to maintain and run.
8. They can travel fast and park in small spaces, they are light on fuel.

9. They are difficult to be seen by motorists, so can cause accidents, there is little protection for the rider.

Bus

- Discuss the history and development of buses and why they are useful. Discus why the bus is an important mode of transport.
- Look at the bus timetable and in pairs get the pupils to answer the questions.

Exercise 7 Work out a bus timetable PB page 103

1. 906 km
2. 6:30 am
3. From Kaduna to Onitsha
4. It is the shortest distance.
5. 305 km
6. About 8 hours

Cars

- Talk about the history of the car and the purpose of the various car parts.
- Discuss the external parts of the car. Go outside to look at the teachers' cars and ask the pupils to identify the different parts.

Exercise 8 The parts of the car PB page 106

- side-view mirror: allows the driver to see traffic approaching from the side
- head lamp: shines along the road in front to light the way, allows the driver to see the road and other vehicles
- number plate: each car has a different licence plate number to identify the owner
- indicator light: indicates in which direction the driver is going
- tyres: allows the car to move on the road, shaped to grip the road in all kinds of weather
- steering wheel: controls the direction in which the car is traveling

Activity 1 Make an elastic powered car PB page 107–108

- Pupils can do this in pairs. Ensure that the resources are available for the pupils at the start of the lesson.
- Follow the steps and pictures in order to make the car. One they have made their cars, they can race them.

Activity 2 List advantages and disadvantages PB page 109

- The pupils work in pairs to list the advantages and disadvantages of each vehicle.
- The results can be compared.

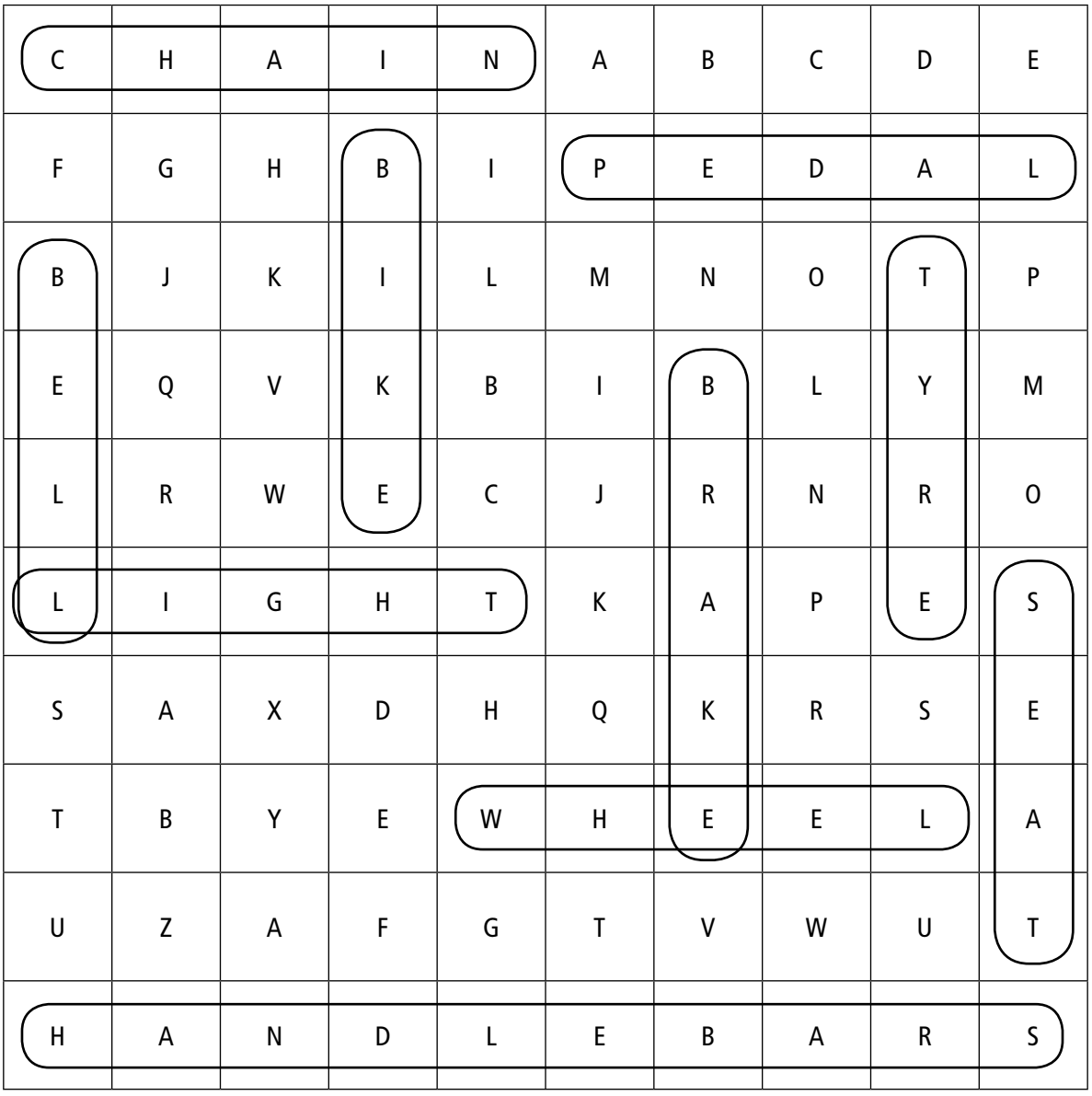
Workbook answers

Vehicles WB page 58

1. A vehicle is a machine used for transporting people or goods, especially on land, such as a car, truck, or cart.
2. Any four: bicycle, truck, car, motorcycle, bus, trailer, train, caravan etc. with their uses.

3. Heavy, clumsy, can break etc.
4. Henry Ford

Bicycles



Going to school WB page 60

1. 5
2. 7
3. By car
4. None
5. Pupils' own answers

Trucks WB page 61

1. Curtain-sider – planks of wood

Drop-sider – long metal poles
Flatbed body – vegetables and fruit
Box body – furniture

2. Curtain-sider – plates of glass
   Drop-sider – load of sand
   Flatbed body – cement blocks
   Box body – gas bottles
3. Curtain-sider – slide curtains to keep load in place and protected
   Drop-sider – easy to reach the load
   Flatbed body – sides can be dropped down to unload
   Box body – large storage space protects load
4. The long pole to which the wheels are attached
5. Frame of the truck
6. They can transport large, heavy goods on bad roads anywhere across the country.
7. They pollute the atmosphere and can cause accidents and are expensive to maintain and run.
8. They can travel fast and park in small spaces, they are light on fuel.
9. They are difficult to be seen by motorists, so can cause accidents, there is little protection for the rider.

Different types of vehicles WB page 61

- Pupils make a list of the different types of vehicles that pass the school in the morning and draw a bar graph.
- They answer the questions in the Workbook.

External parts of vehicles WB page 63

Parts of a car	Use
Rear-view mirror	See what is behind you
Brakes	Stop the car
Number plates	Identifies the car
Steering wheel	Makes the car change direction
Headlights	Light up the road ahead
Indicators	Shows drivers whether the car is turning left or right
Streamlined body	Enable the air to flow over the car so it moves fast
Tyres	Turn round and enable the car to grip the road

Count cars WB page 64–65

- Instruct half of the pupils in the class to total up the numbers of cars they see on the way to school in the morning or on their way home. They classify them according to their colours and draw a bar graph.
- The other half can count the different kinds of vehicles.

- Draw a bar graph and answer the questions in the Workbook.

True or false WB page 66–67

1. False, it was the Sumerians
2. True
3. False, they were used in town
4. True
5. False, you need no licence
6. True
7. False, they were invented by a woman
8. True

Fill in the right vehicle WB page 67

Vehicle	Advantages or disadvantages
Motorcycle, bicycle	They can move easily in and out of traffic and park in very small spaces.
Cars, trucks, motorcycles, trains, buses	They pollute the atmosphere.
Buses	They can transport many people at once.
Trucks, trains	They carry goods in quantity.
Cars, trucks, buses	They can cause bad accidents and traffic jams.
Cars, buses, trains, motorcycles, trucks	They can travel long distances.

Identify different types of vehicles WB page 68

- Police car – transports police to scenes of crime, chases criminals etc.
- Ambulance – transports sick, injured people
- Tanker – transports fuel
- Coach – transports people on holiday
- Garbage truck – picks up litter and garbage
- Container lorry – transports goods in bulk
- Minibus – transports passengers
- Utility van – transports small loads
- Refrigerated lorry – transports goods that need to be kept cold
- Roadsweeper – cleans the roads

Extension activity

- In pairs, work out a set of questions about a vehicle, what it carries, how far it can travel on a tank of petrol, how expensive it is to maintain. Is a special licence required?
- Compare results.

Sub-theme 2 You and energy

Topic 4 Forms of energy

Performance objectives

Pupils should be able to:
- state uses of energy
- identify different sources of energy.

Resources

Pupil's Book pages 110–124
Workbook pages 69–81

Teaching the lesson

The concept of energy

Discuss the concept of energy with the class referring to the pictures on page 110 of the Pupil's Book. What is energy? Everything that moves or changes possesses energy.

Exercise 1 Energy sources PB page 111

Look at the pictures and pie chart and discuss both with the class.

Answers:

1. Coal and oil
2. Water, Sun, Earth's heat
3. Fossil fuels and hydropower
4. Oil, water and some alternative sources

Different forms of energy

Look at the table on pages 112–113 of the Pupil's Book illustrating different kinds of energy and discuss this as a class. Discuss the uses of energy in the home, on farms, in mines and for transport.

Activity 1 Identify energy produced by different things PB page 113

Pupils work in pairs and identify the kind of energy produced by the object in each picture. They write their answers in their exercise books.

Suggested answers:

1. Food: stored energy used by living creatures
2. Electric pylons used to transport electricity: electric energy
3. Torch: light/electrical energy
4. Sun shining on world: provides light, heat, solar energy
5. Radio: sound/electrical energy
6. Pot for cooking: electrical/heat energy
7. Light bulb: heat/electrical/light energy
8. Windmill: wind energy/kinetic energy

9. Egg beater: kinetic energy
10. Fire: heat/light energy
11. Kicking a ball: mechanical energy
12. Ball being hit: mechanical energy

Activity 2 Make a windmill PB pages 114–115

Make sure pupils have the materials available to make the windmill. Discuss the steps carefully with the class.

Activity 3 Storing and releasing energy PB page 116

This activity demonstrates potential/stored energy and kinetic energy.

Divide into pairs to carry out the activity. Make sure pupils have the materials available to make the roller.

Answers:

The rollers **kinetic** energy changes to **potential/stored** energy in the twisted rubber band.

Uses of energy

Read through the information and discuss with pupils how we use energy in our homes, e.g. stove, fridge, light bulbs, fans, batteries, heaters, radio, TV, and in industry.

Exercise 2 Identify different forms of energy PB page 118

Pupils interpret the pie chart showing how much energy is used for the different purposes.

Suggested answers:

1. Industry
2. Any reasonable answers, such as manufacturing, food production, mines, nuclear power plants, coal power stations etc.
3. Transport
4. Cars: mechanical/chemical energy; ships: mechanical/chemical; bicycles: kinetic energy

Sources of renewable energy

- Discuss the different sources of energy with the class. What do you think are the major sources of energy used by our society? They are coal, oil, wood, gas and, recently, nuclear.
- Discuss the difference between renewable and non-renewable sources of energy.

Exercise 3 Renewable energy PB page 122

Answers:

Solar (sun), wind, hydro-electric (water)

Sources of non-renewable energy

- Discuss the damage to the environment from fossil fuels and nuclear fuel.
- Discuss how fossil fuels are formed.

Activity 4 Make a poster PB page 123

Pupils work in pairs to make a poster showing the six main sources of energy.

Exercise 4 Energy sources PB page 124

	Light from a candle is used to light up areas in the home.
	Torchlight is used anywhere to light your way at night or in the dark.
	Gas is used in the home for cooking and heating.
	Oil is used in vehicles and machinery all over the world.
	Coal is used in factories and homes to provide heating and cooking.

	Kerosene is used in the home for lighting.
	Solar panels are used in buildings for electricity and light.
	Batteries or electricity is used in radios, so we can listen to what is being broadcast.

Workbook answers

Summarise information on forms of energy WB page 69

1.

	Form of energy	Description
Aeroplane flying	Kinetic energy	This is the energy of movement.
Light bulb glowing	Light energy	This produces light.
Fire	Heat energy	This provides heat for cooking, etc.
Electrical appliance	Electrical energy	This energy is stored in charged particles.
Boy kicking a ball	Mechanical energy	An object has this energy because of its motion or position.
A child eating	Stored energy	This energy is stored in the food we eat.
Petrol being poured into a car	Chemical energy	This is the energy released in a chemical reaction.
Bird singing	Sound energy	This the energy produced due to something that vibrates.

Make a water wheel WB page 71–73

This is a practical task demonstrating the use of wind power. Ensure that all the resources are available before the lesson.

Answers:

1. The water in the funnel has **potential** energy.
2. Potential /stored energy is energy **waiting** to be used.
3. The **potential** energy in the water changes into **kinetic** energy as the water falls.

Sound energy WB page 74

1. The prongs vibrate to produce **sound** energy.
2. When you talk to other people you are making **sound** energy travel to them.

Identify different forms of energy WB page 75

Look at the picture and as a class discuss the ways electrical energy has been used:

- Kettle to boil water
- Toaster to make toast
- Stove to cook food
- Juicer to make juice/smoothie
- Pot and pan on stove to cook food
- Microwave to heat/cook food
- Coffee machine to make coffee

Identify sources of energy WB page 76

Look at the picture and identify the different sources of energy.

	Source of energy	Renewable or non-renewable
Wind farm	wind	renewable
Oil refinery	oil	non-renewable
Sun	solar	renewable
Coal plant	coal	non-renewable
Waterfall	water	renewable
Nuclear power station	nuclear	non-renewable

Identify different kinds of energy WB page 77

Look at the picture and identify the different kinds of energy:

- Oil, gas, nuclear, wind, water, geothermal, coal and solar

Different kinds of fossil fuels WB page 78–79

Divide the class into pairs and ask them to explain how fossil fuels were created and how we use the different kinds of fossil fuels. They can expand on the information below:

1. These were formed millions of years ago from plant and animal remains. They are coal, oil and gas. When they burn, heat is changed into electricity.
2. Heated coal is used in steel-making.
3. Oil is used to make petrol and diesel for vehicles.
4. Fossil fuels provide energy to heat homes and cook food. Industrial goods are made from them.
5. Fossil fuels also help to make parts of cars.
6. Gas and oil make pesticides and fertilisers.

Different uses of energy WB page 80

In groups, get the pupils to list all the uses of energy in the picture:

- Kinetic: people walking, carrying, cycling, driving
- Electrical: appliances
- Sound: radio, talking, singing
- Potential/stored: milk, food
- Light: overhead lights, traffic lights
- Mechanical: cars, trucks, buses, helicopter
- Heat: lights, running
- Gas: gas for heating and cooking
- Solar: solar panel on roof

Remedial guidelines

Recap on:

- the concept of energy
- different forms of energy
- the main uses of energy
- the different sources of energy.

Assessment: Answers PB pages 127–130

1. a) A tool is a device, ✓ like a knife, that we use to perform tasks. It has a special function (such as cutting). ✓ (2)
   b) Materials are resources ✓ that can be natural or human-made. ✓ (2)
   c) A system is a set of things that work together ✓ to get a job done. ✓ (2)
2. Three reasons from: Technology may be defined as human knowledge that uses tools, materials and systems to help make our lives easier. If technology is applied well, it can benefit humans, but if it is incorrectly applied, it can cause harm to human beings. Technology first started when humans used natural resources to make simple tools, when they learnt how to make and use fire and when they invented the wheel. Without technology the human race would not have evolved to where it is today. (3)
3. Suggested answers:

Product	Advantage	Disadvantage
Car	Moves people quickly Can transport luggage	Can cause pollution
Mobile phone	Can communicate with people wherever they are	Can cause people to become antisocial
Laptop computer	Can communicate via email Can look up information in the internet	Users can become addicted to gaming

(9)

4. Shape construction means making an object, whether it is big or small, ✓ out of any material, according to a certain shape. ✓ (2)
5. ruler, ✓ scissors, ✓ craft knife ✓ (Could also have pencil) (3)
6.

Tool	Wood or metal	Use
Measuring tape	Wood	It is a flexible ruler and used to measure distance.
Tinsnips	Metal	It is used to cut thin sheet metal.
Hammer	Wood or metal	It is used to beat metal or hammer nails.
Sandpaper	Wood	It is used to make the surface of the wood smooth.
Scriber	Metal	It makes light scratch lines to mark metal.

(15)

7. Pupils' own answers, some suggested answers:
   - Metal: coins – durable; motor car – strong, won't easily break; window frame – strong, lightweight; roof sheets – cheap, durable
   - Wood: chair – durable, strong and attractive; wooden spoon – durable, easy to clean and look after
   - Paper: eggbox – recyclable, protective thick cardboard; teabag – recyclable, permeable filter paper to let flavour through; foolscap – cheap, lightweight; paper towels – cheap, absorbent (12)
8. A vehicle is a machine used for transporting people or goods, especially on land, such as a car, truck or cart.
   Any five: car, motorcycle, bus, train, aeroplane, ship, truck, caravan, trailer, wagon etc. (6)
9. - Car: transports a driver, passengers and luggage
   - Truck: carries different goods

- Bus: transports many people at once
- Bicycle: transports one person quite slowly
- Motorcycle: transports one or two people quite quickly (5)

10. Any 10 from:
    - The steering wheel makes the car change direction.
    - The engine makes the car go.
    - Cars have brakes on all four wheels to stop them turning.
    - Tyres are shaped to grip the road in all kinds of weather.
    - The body of the car is made from sheets of steel which are pressed into shape for each panel.
    - The panels are welded together and coated with layers of paint to protect them.
    - The car's body is tested for safety.
    - The seats are shaped for comfort. The inside is carefully planned to give people room and space for luggage.
    - Each car has number plates with a different number for each car.
    - Windscreen wipers keep the windscreen free of rain so the driver can see clearly.
    - Lights on the outside of the car give messages to other drivers.
    - Indicators flash to point out which way the driver is turning.
    - Red lights come on to show when the car is braking.
    - At night bright headlights shine along the road in front to light the way. Red lights at the back of the car warn cars behind.
    - Cars are streamlined so that air flows around them smoothly so they can go faster and use less fuel. (20)
11. Any three from the list below or other reasonable answers.

Advantages	Disadvantages
They can travel very quickly, faster than walking.	They are expensive to run and repair.
They can carry goods in quantity.	Most of them pollute the atmosphere.
They can travel long distances.	Most of them use lots of petrol.
They are available night and day.	They can cause bad accidents and traffic jams.

(6)

12. A helmet ✓ to protect your head in case you are in an accident. ✓ (2)
13. We can use solar panels to trap the Sun's energy. (1)
14. On or near water like river, sea, dams or waterfalls. (1)
15. Two points from: It is formed from the remains of plant and animal matter that formed a thick layer of rotting material at the bottom of swamps. This gradually became buried under layers of silt and mud. Heat and pressure changed these layers into coal. (2)
16. Fossils fuels were formed from the remains of plants and animals. Over millions of years, these remains were buried under mud and rock. They were buried under great pressures and high temperatures, and they changed into oil, coal and gas. (5)
17. The Earth only has so many non-renewable energy sources, so countries are moving to renewable energy sources. Renewable energy is energy that will not run out. It can be used again. Examples are: the Sun, wind, water and nuclear energy. (2)
18. Bedside clock, bedside lamp, computer, camera (4)

Total: 104

THEME 3 **Physical and Health Education**

Sub-theme 1 Moving our body parts

Topic 1 Moving our body parts I

Performance objectives

Pupils should be able to:
- list the basic locomotor movements
- explain how to perform each of the movements
- demonstrate movement patterns
- practise the skills of locomotor movement.

Resources

Pupil's Book pages 131–134
Workbook pages 82–83

Teaching the lesson

Talk about the importance of exercise and what locomotor movements are. Describe and demonstrate the different locomotor movements.

Activity 1 Roll and respond PB page 133

Do this as a class activity. Divide the class into groups and give each group a dice so they can play the game.

Activity 2 Make your own move cube PB page 134

Pupils can work in pairs. Make sure they have the materials they need to make the cube.

Workbook answers

Locomotor movements WB pages 82–83

1. Using your body to travel from one point to the next (travel through space)
2. Any three from: To keep fit; reduce stress levels; as a form of relaxation; to meet new friends; develop muscles and body tone; gain social skills; interact with your friends; learn to obey rules and play by the rules; develop team spirit
3. Any five from: slide; step; walk; run; jump; gallop; hop; skip; roll; leap; glide
4.

Animal	Locomotor skill
cat	walks, runs, jumps
kangaroo	hops, jumps
horse	gallops, walks

4.

Animal	Locomotor skill
frog	leaps, jumps
rabbit	hops
grasshopper	hops
snake	slides
cow	walks
snail	glides, slides
dog	walks, jumps, rolls

Topic 2 Moving our body parts II

Performance objectives

Pupils should be able to:
- list any five non-locomotor movements
- state how to perform each of the non-locomotor activities
- perform non-locomotor movements.

Resources

Pupil's Book pages 135–136
Workbook pages 84–86

Teaching the lesson

Talk about the importance of exercise (in this case, balance and stretching) and what non-locomotor movements are. Describe and demonstrate the different non-locomotor movements.

Activity 1 Do some yoga PB page 136

Talk about the history of yoga and demonstrate some of the positions shown. The class can divide into groups and try the movements.

Workbook answers

Non-locomotor movements WB page 84

A pulling
B twisting
C bending
D stretching
E pulling
F twisting

Football warm-up exercises WB page 85–86

Exercises with locomotor movements

- Jog to cone/Jog back
- Jog to cone rotating arms forward and backwards/Jog back
- Jog three steps twist upper body to left/Jog three steps twist upper body to right/Jog back
- Jog with arms going over head/Jog back
- Jog knees up/Jog back heel taps
- Jog three steps perform right side hurdle/Jog three steps perform left side hurdle/Jog back
- Jog zig zag forward/Jog zig zag back
- Hamstring stretch to mid line then jog
- Dribble ball with a partner
- Try penalty shootout (kick)

Exercises with non-locomotor movements

- Hamstring stretch
- Quad stretch
- Twist upper body stretch
- Arms over head stretch
- Practise throw ins from the side lines (stretch)
- Control ball with outer side of the foot

Sub-theme 2 Games and sports

Topic 3 Athletics

Performance objectives

Pupils should be able to:

- list the types of middle- and long-distance races
- mention the skills in middle- and long-distance races.

Resources

Pupil's Book pages 137–143
Workbook pages 87–88

Teaching the lesson

- Familiarise the pupils with the layout of the athletic track.
- Ensure that they learn the vocabulary associated with it.
- Show pictures of grass and synthetic tracks

Middle- and long-distance running races

- Explain the difference between sprints, middle-distance and long-distance races.
- Pupils should know where the starting and finishing line is on the track for these races and how many laps must be run.
- Make a poster of an athletic track with all the markings. Print and laminate the labels separately and have pupils attach it to the poster at the correct markings.

Skills in middle-distance races

800 metre, 1,500 metre

Start, take-off, running, finish

- Discuss the different skills as outlined in the Pupil's Book.
- Practise running this race on the track, if possible, so that pupils can test their skills as mentioned in Activity 1 (Pupil's Book page 143).
- Focus on start, take-off and pacing.

3,000-metre, 5,000-metre and 3,000-metre Steeplechase

- Explain the start, take-off, running and finishing skills for the longer distances.
- The pupils should have knowledge about the process and not be required to run the race.

Activity 1 Practise athletics PB page 143

Take the class to the nearest athletic track or mark one out in the playground and demonstrate standing, take-off, running posture, arm action and finish.

Workbook answers

The track WB page 87

1. 800 m; 3,000 m, and 5,000 m
2. 200 m
3. 1,500 m
4. common finish line
5. Athletes sprint the last 50–100 metres.
6. Pupils must mark the inside lane.
7. Start: Athletes are staggered about six metres apart. They start standing up. The first command is "Set" at which they take their places with both feet behind the line. Head, neck, back in a straight line, body leaning forward, most weight on the front leg, back leg stretched out, knees slightly bent, arms bent and slightly away from body. Shortly after this the gun will go off and athletes start running. They stay in their lanes and cut in to the inside lane after the first curve.

Remedial guidelines

- Have a class quiz on content taught.
- Recap on the skills for middle- and long-distance races.

Extension activity

- Do independent research on famous Nigerian middle- and long-distance runners and present to the class.

Topic 4 Ball games

Performance objectives

Pupils should be able to:
- list the football skills
- perform the skills in football
- perform the skills in tennis
- demonstrate the position of players on the court
- perform the skills in basketball
- list the skills in volleyball
- perform the skills in volleyball and count points.

Resources

Pupil's Book pages 144–153
Workbook pages 89–96

Teaching the lesson

Talk about the ball games football, tennis, basketball and volleyball.

Activity 1 Practise your tennis skills PB page 147

Show the pupils the correct tennis grip, serve and backhand and forehand drive. Let them practise during their Physical Education lesson.

Activity 2 Practise dribbling PB page 149

This is a dribbling drill, demonstrate how to dribble around the cones.

Activity 3 Basketball drill – passing PB page 150

This is a passing drill, demonstrate how to pass and divide the class into groups of three to practise the drill.

Activity 4 Basketball drill – gaining control of the ball PB page 151

Divide pupils into groups of three to do this drill.

Activity 5 Practise shooting PB page 152

This is a shooting drill, demonstrate how to shoot correctly.

Workbook answers

Football skills WB page 89

a) throw in
b) kick
c) trap
d) shoot
e) dribble

f) head
g) pass
h) run
i) punt
j) save

Tennis skills WB page 90

a) serve
b) tennis ball
c) tennis racquet
d) tennis court
e) backhand
f) forehand
g) umpire

Connect the dots WB page 91

Pupils connect the dots correctly and colour in the picture.

Basketball skills WB page 92

Across

2. passing
4. court
8. dribbling
9. centre

Down

1. hoop
3. shooting
5. forwards
6. rebound
7. five

Volleyball skills WB page 93

Across

2. spike
5. rotation
6. serve

Down

1. block
2. setting
3. hands
4. six
5. rally

Different kinds of sports WB page 94

1. a) golf
2. a) tennis
3. b) gymnastics
4. c) skating
5. b) football
6. a) scuba diving
7. b) equestrian
8. b) swimming
9. b) running
10. a) badminton
11. a) table tennis
12. c) basketball
13. c) baseball
14. a) cycling
15. b) volleyball

Name the sports WB page 96

Answers

1. basketball
2. skiing
3. baseball
4. badminton
5. sailing
6. boxing
7. swimming
8. jogging
9. tennis
10. golf

Sub-theme 3 Health education

Topic 5 Personal hygiene

Performance objectives

Pupils should be able to:

- describe ways of taking care of the human body parts.

Resources

Pupil's Book pages 154–156
Workbook pages 97–98

Teaching the lesson

Discuss the different ways we can keep clean and why it is important.

Activity 1 Discuss taking care of your body PB page 154

Pupils work in groups and draw or collect pictures of the things we need to keep clean and demonstrate how we take care of our bodies.

Exercise 1 Describe taking care of your body PB page 154

Pupils work on their own and paste or draw pictures of ways to take care of the body with descriptions.

Workbook answers

Draw a cartoon story WB page 97–98

Pupils make up their own cartoon story about how to care for the body.

Topic 6 First aid and safety education

Performance objectives

Pupils should be able to:
- group the contents of the first-aid box into components
- state the uses of each content of the first-aid box
- list some safety measures.

Resources

Pupil's Book pages 157–160
Workbook pages 99–101

Teaching the lesson

- Explain what first aid is and the three Hs.
- Talk about what needs to go into a first-aid box.
- Discuss safety measures for sport and why safety attire is important.

Activity 1 The school first-aid box PB page 160

Show the pupils the school first-aid box. Talk about where it is kept and why it is kept there. Ask if they have a first-aid box at home. Discuss the contents and what each item is used for.

Workbook answers

Identify things to go in a first-aid box WB page 99

1. to 4. Pupils brainstorm what they would put in a first-aid box and then check their list against the list on page 100.
   a) The first-aid box should be kept where everyone knows where it is and can have access to it.
   b) An expiry date tells you when the item should no longer be used. It will be on the outer packaging of the item.

c) Put it back in the same place you found it and if you have used something up tell a teacher or parent if it is at home.

Protective gear

A Paul Kehinde
- Weight-lifting gloves: Help prevent callouses and blisters, and improve the quality of grip, and prevent heavy weights from slipping.
- Back bands and weight-lifting belts: Prevent any harm to your lower back during intense weight lifting.
- A spotter: Use a spotter (person to watch over you) during intensive weight-lifting routines and any time you do routines that involve putting any type of weight over your head.
- Food and nutrient intake: This should match your performance. For example, make sure you're getting enough protein to rebuild your muscles after tough workouts.

B Asisat Oshoala
- Basic protective wear: Shin guards and shoes
- Extra protective gear: Sliding shorts, mouth guards, protective cups, knee and elbow pads, padded soccer pants, soccer gloves, and protective head gear.
- A player must not use equipment or wear anything that is dangerous to himself or another player, including any kind of jewellery.

Topic 7 Safety education and accident prevention

Performance objectives

Pupils should be able to:
- define safety
- state the causes of accidents
- list safety rules to prevent accidents
- state the meaning of road safety
- list road safety guidelines
- distinguish between general crashes and road traffic crashes
- state the meaning of "medical vigilance"
- identify examples of adverse medicine reactions
- state steps to be taken in the event of any adverse reactions due to medicine intake.

Resources

Pupil's Book pages 161–176
Workbook pages 102–114

Teaching the lesson

Safety

- Remind pupils about what it means to be safe and how accidents happen.
- Remind them about the concept of an accident.
- An accident is a sudden event (such as a crash) that is not planned or intended and that causes damage or injury to people and things. In most cases, accidents can be prevented.

Activity 1 Discuss safety and accidents PB page 162

Pupils work in groups of three.

Possible answers:

1. Safety means being free from harm or danger. Accidents are caused when people are reckless or careless. They are not paying attention to their surroundings, or are not aware of the dangers in a situation. Accidents can be prevented if people are aware of dangers wherever they are and always behave in a sensible manner.
2. Pupils draw their own posters about how accidents can be prevented.

Road safety

Talk about the importance of road safety and traffic rules.

Activity 2 Discuss road rules PB page 162

Pupils do this activity in pairs.

They brainstorm what would happen if there were no road safety rules and why they are necessary. Accept any reasonable answers.

Activity 3 Road maintenance PB page 164

Pupils do this exercise in pairs.

Suggested answers:

1. A pothole is a large hole in the road.
2. It can cause damage to a car, a car could get stuck in it, it can cause an accident, a person could fall into it etc.
3. Cars could slide or get stuck or be damaged. This could lead to an accident.
4. Drivers will not know what to do on the road or be aware of dangers such as sharp corners or speed bumps. This could lead to an accident.
5. a) Pothole filled with water means you can't see how deep the hole is and a car could get stuck in it.
   b) Muddy conditions mean a car could get stuck.
   c) Rainy, wet and slippery conditions can cause cars to slide or get stuck.

Activity 4 Talk about road safety PB page 166

Discuss the road traffic signs with the class. The pupils can then divide into groups and pick five of the signs to draw and explain to the class, or record in their exercise books.

Suggested answers:

1. These are all warning signs: level crossing ahead, slippery road ahead, loose stones, road narrows on both sides, look out for cyclists, look out for cattle, pedestrian crossing ahead, traffic light ahead, two-way traffic ahead
2. a) The child is running after her ball, without taking notice of the cars.
   b) The child is crossing the road at a pedestrian crossing where motorists will be more aware of pedestrians.
   Weaving through traffic is dangerous.

Activity 5 Road signs PB page 168

The class can divide into three teams and study the road signs. Have a little class competition to see which team knows the most signs.

Pedestrians

- Discuss what a pedestrian is with the class and what rules apply to them as road users.
- Divide the class into pairs and record what is being done wrong in the pictures.

Exercise 1 Where should you walk? PB page 169

1. You should always walk on the pavement. So you do not get hit by a car or any other vehicle.
2. You should always walk facing the oncoming traffic, in countries that drive on the right you walk on the left and in countries that drive on the left you walk on the right.
3. You always cross at a pedestrian crossing where motorists know to expect pedestrians.
4. Before you cross, check for cars by looking left, then right, then left again and then cross the road.
5. Don't walk looking at your phone as you will not be aware of traffic and other hazards.
6. The pavement is for pedestrians.
7. The boy is "jaywalking". This means he is crossing the road in-between cars and not at the pedestrian crossing.
8. It is dangerous as cars cannot see him.
9. You should wear light, reflective clothing so that you can be seen.
10. You should step out on the side closest to the pavement so that you don't walk into traffic.

Activity 6 Being safe as a cyclist PB page 172

Pupils work with a partner to list all the things the cyclists are doing wrong.

Suggested answers:

- Riding two-up
- Riding without a helmet
- Riding on the pavement
- Holding onto cars
- Riding abreast instead of singe file
- Crossing in front of cars instead of at the traffic light
- Riding the wrong way down the road
- Riding into someone on a pedestrian crossing
- Not keeping hands on the handlebars
- Not being aware of a car door opening and riding into it

Motorcyclists

Discuss motorcycle safety with the class.

Exercise 2 Be safe as a motorcyclist PB page 173

Divide the class into pairs to discuss and record answers.

Suggested answers:

1. Motorists cannot see you or know which way you are going.
2. They are wearing helmets to protect their heads.
3. Both the motorcycle driver and passenger are not wearing helmets or closed shoes to protect them from injury.
4. You should always wear a helmet and it is advisable to wear special clothing such as padded jackets, gloves, boots and pants.
5. Lights make you more visible to other road users.

Animals

Discuss as a class the problem of animals on our roads.

The consequences of not observing safety guidelines

Talk about other kinds of accidents and crashes involving planes, ships and trains.

Exercise 3 General crashes PB page 174

1. Pupils' own answers here: They are not motor vehicle accidents, they are crashes involving large vehicles such as planes, trains and ships, they involve many people etc.
2. Pupils' own answers here: They do not happen as often as motor car crashes, drivers/pilots/captains are more cautious/more trained, less traffic on sea and in air etc.

Road crashes

Discuss the term and encourage pupils' input as they may have witnessed an accident or been involved in one.

Activity 7 Talk about motor vehicle collisions PB page 175

Pupils do this activity with a partner.

1. Pupils' own answers here:
   a) The motorist was not paying attention/braked too late/misjudged the size of the car and drove into someone else.
   b) The motorist was not paying attention/lost control of the vehicle/swerved to avoid something and drove into a pole.
   c) The motorist was driving too fast/had a tyre blowout/swerved to avoid something/hit an obstacle and rolled the vehicle.
2. In all these examples the most likely cause was the driver not paying attention or disobeying the rules of the road.

Medicine vigilance

Discuss the importance of being careful when it comes to taking medicine, reading instructions about how to take it and not using medicine prescribed for someone else.

Activity 8 Talk to someone from NAFDAC PB page 176

Arrange a visit from a local pharmacist or NAFDAC representative to talk about using medicine safely.

Workbook answers

Safety education and accident prevention WB page 102

1. It is important because otherwise accidents can happen causing injury, damage to equipment and even death.
2. Accidents happen when people are careless or do not think about the dangers in a situation, or they are tired or don't know how to use equipment.
3. Pupils' answers will vary. Examples: Accidents happen easily at school, at home, on the road, in the workshop, etc.
4. You obey the safety rules, are aware at all times of your surroundings, use equipment correctly.
5. Example: Falling off something; burning yourself; cutting yourself on something sharp.

Research about safety at school WB page 103

1.–4. Divide the pupils into groups to investigate the school's safety records. They must record their answers in the format of a bar graph or line graph or pie chart. Enlist the help of the Maths teacher.

Causes of accidents WB page 104

1. Accidents often happen when people are not thinking about what they are doing or when they are being careless or thoughtless.
2. Pupils' answers will vary. Examples: fires, sharp objects, swimming pool, playground equipment, etc.
3. Allow the pupils to walk around the school to identify and record places where accidents could happen. They must give reasons for their choices – a variety of answers can be provided as long as the reasons are valid.

Dangerous things WB page 105–106

Pupils' answers will vary. Examples:

1. Dangerous objects: razors, knives, electrical equipment, rusty equipment
2. Dangerous places: the road, swimming pool, the playground, the park
3. Dangerous situations: talking to a stranger, using tools incorrectly, getting into a car with someone who has been drinking, not knowing what to do in an emergency.

Safety at home WB page 107

1. An emergency is a serious, often unexpected and often dangerous situation needing immediate action.
2. The house is on fire/burning. The people managed to get out of the house, but the woman is unconscious, possibly from smoke inhalation, and needs urgent/immediate medical assistance and also the fire department/firefighters are needed to put the fire out before the whole house is lost.

Safety rules at school WB page 108

Allow the pupils to work in groups or pairs.

They must identify playground safety rules, giving a reason for each rule and what could happen if they are not followed. Example: Walk when carrying anything. You could hurt someone or bump into someone or spill liquid on them.

Safety rules on the way to school WB page 109

1. Discuss safety when crossing the road. Also discuss any other rules of the road suggested by the pupils.
   The pupils can work on their own or in groups to make a list of their own safety rules for "on the way to school".
2. They can illustrate each rule.

Interpret traffic signs WB page 110–111

1.–2. These are all warning signs: level crossing ahead, slippery road ahead, loose stones, road narrows on both sides, look out for cyclists, look out for cattle, pedestrian crossing ahead, traffic light ahead, two-way traffic ahead

3. Motorists expect to see pedestrians at crossings and are more likely to look out for them.
   b) It is a shorter distance. Motorists will expect you to walk in a straight line.
   c) If you run, you could fall or trip.

List road safety rules WB page 112

1. Pupils make up a list of four rules that you need to obey when walking or riding to and from school. They then illustrate each rule.

Identify more road safety rules WB page 113

1. Pupils answers will vary.
2. a) Always get into a car when it has come to a standstill.
   b) Children should sit in their own seats or if they are very small, in baby car seats.
   c) Never do anything to distract the driver while he or she is driving.
   d) No arms or legs should hang out of the windows.
   e) Always get out of the car on the pavement side, not on the side where there is passing traffic.
   f) Babies should be strapped into baby car seats.

Identify road safety dangers WB page 114

2. a) Correct. It is always safest to cross the road at a pedestrian (zebra) crossing where motorists know to expect pedestrians.
   b) Incorrect. This is a dangerous way to cross the road. Motorists won't be expecting this.
   c) Incorrect. Never run after a ball that goes into the road.

Assessment: Answers PB pages 180–183

1. Locomotor movement means using parts of your body to travel through space. ✓ It involves moving from one spot to another and includes activities such as walking, running, skipping, hopping, jumping and leaping. ✓
   Non-locomotor movement means movement that does not allow you to move from one spot to another. ✓ They are stability skills that involve moving your limbs or body parts, and sometimes your whole body. ✓ (4)

2.

Locomotor movement	Non-locomotor movement
walking	pushing
skipping	twisting
hopping	stretching

(6)

3.

Column A	Column B
Activity	**Apparatus**
running	stop watch
skipping	rope
hopping	hoops
leaping	hurdles
sliding	mat

(5)

4. a) True
   b) True
   c) False, only for the 800-m race
   d) False, two commands, "Set", and the gun
   e) True (5)
5. The inside lane is shorter, it measures 400m, the shortest distance around the track. ✓ If two athletes both start and finish at the common finish line, the athlete in the outside lane will run almost 34 metres further than the athlete in the inside lane. ✓ (2)
6. A runner's torso (chest) ✓ must cross the finish line to be awarded a place. (1)
7. a) Football: Any two from dribbling, shooting, ball control and goal keeping (2)
   b) Basketball: Any two from dribbling, shooting, passing, jump ball (2)
   c) Volleyball: Any two from serving, passing, setting, spiking, blocking, digging (2)

8.–9.
   b) cycling
   c) football
   c) tennis
   a) golf
   c) running
   b) basketball
   b) equestrian
   c) scuba diving
   c) ice skating

c) table tennis
b) badminton
a) volleyball
b) gymnastics
c) swimming
a) baseball (15)

10. To protect ✓ us against germs ✓ (2)
11. The tip ✓ of a face cloth ✓ (2)
12. To prevent ✓ sweaty smells ✓ (2)
13. Any five from: non-perishable food, water, bandages, plasters, gauze, antiseptic cleaner, hand sanitiser, antibiotic cream, medical tape, scissors, safety pins, gloves, portable light, whistle, dust mask, solar charger, multi-tool (5)
14. a) Torch: So you can see in the dark/blackout.
    b) Whistle: If you have no mobile phone or the battery is dead, a whistle can alert emergency rescue crews to your location or help locate others in hazardous conditions.
    c) Solar charger: To charge phones if there is no electricity.
    d) Multi-tool: Used for cutting and opening things.
    e) Dust mask: Used in case there are fumes or gas that can cause breathing problems. (5)
15. a) Helmet: Any one from softball, baseball and cricket. ✓ Wearing a helmet helps prevent head injuries. ✓ (2)
    b) Mouth guards: Any contact sport such as football, basketball, hockey, volleyball, martial arts, boxing, wrestling and rugby. ✓ Mouth guards are used to protect your mouth, teeth, and tongue. ✓ (2)
    c) Face guard: Any one from softball, baseball and cricket. ✓ It helps to protect the eyes and the rest of the face. ✓ (2)
16. An emergency is a serious, unexpected and often dangerous situation ✓ needing immediate action. ✓ (2)
17. Pupils' answers will vary. Any reasonable answer such as: fire, accident, choking etc. (6)
18. Accidents are caused when people are negligent, reckless or careless. ✓ They are not paying attention to their surroundings, or are not aware of the dangers in a situation. ✓ (2)
19. To be safe on our roads means we can drive and walk safely ✓ knowing that everybody using the roads is aware of the rules and will obey them. ✓ (2)
20. The traffic police and officers ✓ are there to make sure that we all obey the rules. ✓ (2)
21. Pupils' answers will vary. Any reasonable answers such as: Have stricter traffic regulations, make sure all cars are roadworthy and licenced, have lower speed limits, obey traffic lights, respect other road users, stop at the pedestrian crossing, refuse to drive against traffic, even in periods of serious traffic jams, respect the speed limits, obey traffic laws etc. (3)
22. It can be very dangerous ✓ for cars if there are potholes, or the roads are in a poor condition and are not properly marked. (Also: In order to prevent accidents and damage to vehicles) ✓ (2)
23. It is important to maintain your motor car properly so that it does not break down ✓ and leave you stranded on the road. Or so they are safe to drive and it is less expensive to do smaller repairs, maintenance earlier. ✓ (2)

24. Pupils can draw any of the following signs:

(3)

25. a) A person who walks along the road is called a **pedestrian**. (1)
    b) A motorcyclist should wear **protective clothing**, **helmet** and **gloves**. (3)
26. Pupils describe or draw a pedestrian crossing such as the one below: (2)

Total: 96

THEME 4 Information Technology

Sub-theme 1 Basic computer operations

Topic 1 Computer hardware

Performance objectives

Pupils should be able to:
- state the meaning of computer hardware components
- list the hardware components of a computer.

Resources

Pupil's Book pages 184–186
Workbook page 115

Teaching the lesson

Computer hardware

Talk about the different parts of the computer.

Exercise 1 **The parts of the computer** PB page 186

a) CPU
b) monitor
c) CD drive
d) mouse
e) flash drive/memory stick
f) CD
g) joystick for gaming

Workbook answers

Computer hardware WB page 115

Across

2. flash
4. keyboard
6. execute
7. CPU

Down

1. system
3. joystick
5. RAM

Topic 2 Computer software

Performance objectives

Pupils should be able to:
- state the meaning of software
- mention common operating systems, games and word processing software and state the uses of the software above
- list examples of each type of software
- play games software on a computer
- type text using Microsoft Word
- draw and paint simple objects using Microsoft Paint.

Resources

Pupil's Book pages 187–190
Workbook pages 116–117

Teaching the lesson

Meaning of computer software

- Talk about how computer software refers to sets of instructions given to a computer to make it function and to let it do different types of tasks.
- Discuss the different types of software.

Activity 1 Perform short tasks on different programs PB page 189

- If you have access to a computer laboratory demonstrate booting up, typing into a program such as Microsoft® Word, draw objects with a graphics package such as Microsoft® Paint, play games on the computer or mobile phone.
- Pupils then perform the different tasks themselves.

Activity 2 Research and discuss different types of computer software PB page 190

1. Pupils do their own research as homework. They can ask family and friends what software they use on their computers or mobile phones. They can look at magazine, newspaper and online advertisements for software.
2. They share their findings in a class discussion.

Exercise 1 Answer questions about computer software PB page 190

1. Computer software is made up of one or more computer programs that perform different tasks. The fixed parts that make up a computer are called computer hardware.
2. a) Operating system: An operating system controls the display on the screen, the keyboard, and so on. Examples are: Windows 7, Windows 10, Mac OS, Linux etc.
   b) Word processing application: Word processing programs such as Microsoft® Word
   c) Graphics application: Graphics packages (such as Microsoft® Paint for drawing pictures and Adobe Photoshop for working with photographs

Workbook answers

Choose the correct answers WB page 116

1. A
2. A
3. A

Write down the correct answers WB page 117

1. Pupils' own answers such as Android, iOS, Ubuntu Touch etc.
2. Pupils' own answers such as Chrome, Safari, Internet Explorer, Firefox etc.
3. Pupils' own answers such as: Microsoft Word®, you could write a letter, do a school project etc.
   b) It is easier and quicker than writing by hand.

Topic 3 Starting up the computer

Performance objectives

Pupils should be able to:
- explain the term booting
- list ways of booting
- describe the steps for booting a computer
- boot a computer.

Resources

Pupil's Book pages 191–195
Workbook pages 118–119

Teaching the lesson

Booting

Explain the concept of booting as well as the various methods.

Activity 1 **Follow these step-by-step instructions to help you boot your computer** PB page 192–193

If you have a computer laboratory, pupils can follow the step-by-step instructions. Alternatively, you can demonstrate booting to the class.

Activity 2 **Practise booting your computer** PB page 195

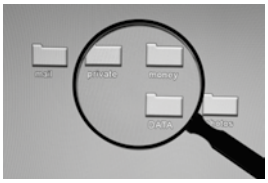
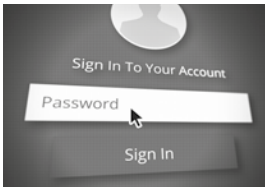
Pupils practise both warm and cold booting.

Workbook answers

Starting up the computer WB page 118

1. booting, operating system, switched on, sequence, switched on, rebooting, cold boot, shut down, warm boot

Choose the correct icon WB page 119

Icon	Function
	Email
	My documents
	Log in
	Search button
	Printer
	Home
	Delete
	Save

Topic 4 Data and information

Performance objectives

Pupils should be able to:
- state the meaning of data and information
- mention sources of data and information
- describe computer as Input – Process – Output (IPO) system
- list characters on the keyboard as data.

Resources

Pupil's Book pages 196–200
Workbook pages 120–121

Teaching the lesson

The meaning of data and information

Talk about the difference between data and information. Discuss the various sources of information.

Activity 1 Observe and make use of information devices PB page 199

1.–3. Pupils' own answers depending on what information they bring in. If they have access to devices such as mobile phones, iPads/tablets or laptops they can bring them in if they have permission.

Computers as IPO systems

Explain the concept of Input Processing Output.

Activity 2 Discuss data processing and information output; enter data PB page 199

1. Pupils' own answers
2. Pupils use the keyboard of a computer or mobile phone or iPad/tablet to enter information. Provide the data they need to input.

Exercise 1 Answer questions about data and information PB page 200

1. No, they are not the same. Data refers to unprocessed facts. It is just a collection of words, numbers or pictures that have not yet been organised in a meaningful way.
   Information refers to processed facts. The data has been organised in some way to present us with useful information.
2. Pupils' own answers. Some possible answers:
   - Magazine/newspaper: Journalists research and write a story using a word processing package such as Microsoft® Word. The story is published and the output is a magazine or newspaper.
   - Similar answers for radio, internet, mobile phone etc.

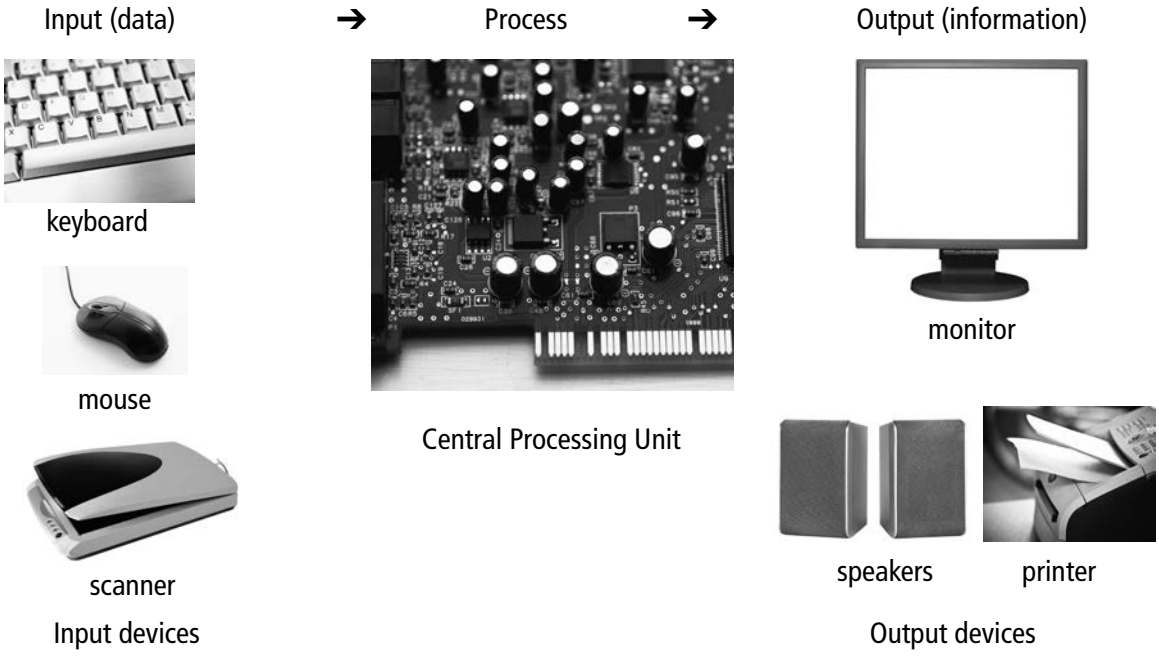
Workbook answers

Draw a picture about finding information WB page 120

Pupils' own answers

Draw a diagram of a computer as an IPO system WB page 121

Pupils must draw a diagram similar to the one below:



Sub-theme 2 Basic concepts of IT

Topic 5 Common IT gadgets

Performance objectives

Pupils should be able to:

- state what IT stands for
- identify IT gadgets
- operate common IT gadgets.

Resources

Pupil's Book pages 201–206
Workbook pages 122–124

Teaching the lesson

- Explain the concept of Information Technology (IT).
- Explain what IT gadgets are. IT gadgets include any device that people can use to communicate or entertain themselves. These devices are sometimes referred to as gadgets.

- A gadget is a small mechanical or electronic tool that helps to make work easier by doing a particular job.
- Discuss examples of IT gadgets and what they are used for.

Activity 1 Discuss mobile phone functions PB page 202

Pupils work in pairs and show one another the different functions on their phones.

Activity 2 Operate a remote control PB page 203

Show pupils how to operate a remote control for a television. Explain the purpose of the control buttons.

Exercise 1 Identify applications PB page 205

This is an individual activity. Pupils write down the names of the gadgets pictured in Pupil's Book page 205. They also say which devices would have Word, Excel and PowerPoint, and identify the storage and entertainment gadgets.

Suggested answers:

A: laptop computer
B: Xbox/Playstation/gaming console
C: iPod/MP3 player
D: memory stick/flash drive
E: video camera
F: mobile phone
G: camera
H: CD Rom
1. A and F
2. Strictly speaking they all store data but accept D and F
3. A, B, C, F and H

GSM and the GSM phone

Read through the information on GSM and GSM phones.

Exercise 2 Identify GSM phones PB page 206

Pupils look at a mobile phone and discuss the questions with a partner.

Suggested answers:

1. Most phones are GSM phones.
2. It has a removable SIM card.
3. Inside the back of the phone
4. Flat gold rectangular plastic chip with a chip on the side
5. Pupils' own answers

Activity 3 Identify the advantages of GSM phones PB page 206

Pupils discuss the advantages of using a phone with a SIM card.

Suggested answers:

- Can be used in different phones
- Has all the user's information stored on the card

Activity 4 Do some research on GSM phones PB page 206

This activity can be done as a homework or Extension activity. Pupils give personal information with regard to GSM phones.

Workbook answers

Answer questions about IT gadgets WB page 122

Gadget	Uses
	To use in presentations, lessons, lectures
	To send and receive information
	To communicate with other people
	To do sums
	To store information

The mobile phone WB page 123

1. Possible answers could be: screen, power on/off button, volume button, camera, sound on/off button, apps, antenna, keypad/buttons
2. a) You could protect it with:
    - protective glass on the cover
    - a protective case
    - a strong password so no one can use your phone
    - finger print ID to unlock your phone
    - apps can be added to your phone to locate a lost phone

   b) Charge your battery by plugging it into a power supply.
3. Make sure you have airtime and data to use apps such as WhatsApp.

Draw a remote control WB page 123

Pupils' own drawings and functions

Identifying and using IT gadgets WB page 124

1. A Playstation/Xbox/gaming console
   B mobile phone
   C USB port/flash drive/memory stick
   D calculator
   E ear phones
   F Xbox/Playstation with joystick
2. Pupils' own drawings

Remedial guidelines

Recap:
- what IT stands for
- common applications on computers.

Extension activity

Ask pupils to write down the advantages of pre-paid vouchers.

Suggested answers:
- Allows you to buy airtime according to your budget
- Teaches you to be thrifty with the use of your airtime
- Can be bought by one person and sent to another
- Easily available

Assessment: Answers PB pages 209–210

1. a) The fixed parts ✓ that make up a computer are called computer hardware. ✓
   b) Computer software refers to sets of instructions ✓ given to computers to make them function and do different tasks. ✓ (4)
2. A: computer tower
   B: monitor
   C: speaker
   D: keyboard
   E: mouse (5)
3. 1. c)
   2. e)
   3. a)
   4. c)
   5. b) (5)
4. a) Data refers to unprocessed facts, ✓ while information refers to processed facts ✓ that have been organised in some way to be useful to us. (2)
   b) Computers and another information devices link us to information on computers all over the world through the internet. ✓ We can also use the internet to send and receive email messages. ✓ Computer users can also store their own information to refer to later. ✓ (3)
   c) Computers are IPO systems that allow us to Input data, ✓ Process the data ✓ and Output information. ✓ (3)
   d) Possible answers: keyboard; mouse; scanner (1)
   e) Possible answers: monitor; speakers; printer (1)
5. The terms booting, boot up or start-up are all used to describe the process taken by the computer to load the operating system ✓ and prepare the computer system for use. ✓
6. Step 1: Find the "on" button. ✓✓
   Step 2: Push the "on" button. ✓✓
   Step 3: Log in using your password. ✓✓ (6 + 2 for listing in correct order)
7. Warm boot ✓✓, cold boot ✓✓
8. a) IT: Information technology ✓
   b) gadget: a small mechanical or electronic tool that helps to make work easier by doing a particular job ✓
   c) SIM card: Subscriber Identification Module (SIM) card. ✓ (3)
9. It uses a SIM card. ✓ The user does not have to change his or her mobile phone number every time they buy a new phone. ✓ It can be used for entertainment, work and educational purposes. ✓ (3)
10. A GSM phone is a type of mobile phone that uses the Global System for Mobile Communications to send and receive phone calls. (2)
11. The SIM card is a removable card ✓ that carries the user's information. ✓ (2)
12. Possible answers:
    - businesses that allow users to rent phones
    - businesses that allow users to buy prepaid airtime
    - businesses that sell wireless phones, mobile phone contracts, 3G and GPS. (2)

Total: 50