

# Intermediate Phase Teacher's Guide

Grade

**5**

**Natural  
Sciences**



**WESTERN CAPE**  
Education Department  
Provincial Government of the Western Cape



## **Natural Sciences Intermediate Phase**

### **Work Schedule and Teacher's Guide**

The Natural Sciences Work Schedule and the Teachers' Guide provide support to teachers to implement the NCS. This is not a policy document but is a resource for teachers. The Work Schedule and the Teachers' Guide follow the same weekly plan for each grade.

#### **The Work Schedule**

- This is a broad framework that offers a selection of content (Learning Outcomes and Core Knowledge and Concepts) for each grade 4 -6.
- The Work Schedule gives a week by week outline of the content, and the assessment focus.
- It works towards all three NS Learning Outcomes.
- It covers all the Core Knowledge and Concepts in the four strands of the Natural Sciences.

#### **The Teacher's Guide**

- The teacher's guide elaborates and elucidates the outline given in the Work Schedule week by week in each grade.
- It gives a wide variety of lessons which build up to various assessment tasks related to the NS Learning Outcomes.
- It gives further detail of the concepts to be taught and methods to be used.
- It also details the integration possibilities between the NS strands as well as between the different Learning Areas.

#### **How to use the Work Schedule and Teacher's Guide**

##### **We recommend that:**

- Teachers use these documents to support their own plans and incorporate what they find useful.
- Teachers adapt the programme to the pace of their learners.
- Teachers choose what is suitable to their context and what is manageable in their classroom.
- Teachers should plan their assessment programme in advance for each term according to their own teaching pace.
- Teachers should integrate content wherever it is appropriate.
- Teachers should consult the National Curriculum Statement Policy - Document as a reference to the learning outcomes, assessment standards and prescribed content knowledge.

#### **ACKNOWLEDGEMENTS**

Sincere thanks to the teachers and curriculum advisers who have developed the work schedule for the Intermediate Phase.

Directorate Curriculum : GET

**TEACHER'S GUIDE : GRADE 5**  
**NATURAL SCIENCES**

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## PART ONE: INFORMATION

### NATIONAL POLICY DOCUMENTS

- National Curriculum Statement Grades R-9 - POLICY
- National Curriculum Statement Grades R-9 - Teacher's Guide
- National Policy on Assessment and Qualifications for schools in the GET band
- National Curriculum Statement – GET - Assessment Guidelines

### INFORMATION FOR TEACHERS:

- Scientific Literacy: Teachers should have an understanding of these concepts prior to each week's lessons. It is important to build up scientific concepts and language. *'Briefly defined concepts' are the words and concepts teachers use during the lesson. Teachers must make sure learners understand their meaning. These words must not, however, develop into learned vocabulary words without understanding the concepts. Learners must be allowed to revisit the concepts and meanings.*
- Suggestions for Implementing: These suggestions should *help* teachers on HOW to set up their own activities. Use your own experience and creativity in your planning according to your own school's needs. Also build in ways to help learners with barriers. Provide for extended learning and diversity – see policy documents. Integrate Literacy and Numeracy where applicable throughout the year while teaching, learning and assessing.
- Resources: Use resources available in your school/community.
- Integration: Address integration and make links where they naturally occur in the curriculum. Integration is possible within the knowledge strands of Natural Sciences, and across the different Learning Areas. Although the four knowledge strands are set out separately per term in the Intermediate Phase, you can still integrate the strands where appropriate to ensure that Natural Sciences is not taught in compartments. The links between the strands can be incorporated into the activities.
- Assessment: Assess a learner's performance using appropriate assessment formats guided by the assessment standards. Informal assessment is part of the monitoring process to help learners before the formal assessment tasks. Use different and appropriate forms of assessment spread out over the year. Remember to record formal assessment tasks. Examples of formal assessment tasks are given.

### GENERAL INFORMATION

- Teaching starts from what the learners already know.
- The Natural Sciences curriculum consists of 70% prescribed curriculum, as stipulated in the Work Schedule and 30% from extended and local content.
- Safety in the Natural Sciences classroom / laboratory is important. Learners should be constantly warned of any possible dangers and work safely.
- Accuracy in Science should be emphasised.
- There are examples of Scientific Investigations for each grade. These can be used as complete activities for assessment purposes. The assessment instruments can be adjusted where appropriate.

## **PART TWO : SUGGESTIONS FOR IMPLEMENTING THE WORK SCHEDULE**

### **NATURAL SCIENCES**

#### **INTERMEDIATE PHASE: GRADE 5**

REVISED ASSESSMENT PROGRAM: Formal assessment tasks

**Term 1** Assessment Task 1: Week 10

**Term 2** Assessment Task 2: Week 20  
Assessment Task 3: Week 21

**Term 3** Assessment Task 4: Week 28

**Term 4** Assessment Task 5: Week 31  
Assessment Task 6: Week 40

#### **LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATIONS**

- 5.1.1 Plans investigations: Lists with support, what is known about familiar situations and materials, and suggests questions for investigations
- 5.1.2 Conducts investigation and collects data: Carries out instructions and procedures involving a small number of steps
- 5.1.3 Evaluates data and communicates findings: Reports on the group's procedure and the results obtained

#### **LEARNING OUTCOME 2: CONSTRUCTING SCIENCE KNOWLEDGE**

- 5.2.1 Recall meaningful information: At the minimum, uses own fluent language to name, and describe features and properties of objects, materials and organisms
- 5.2.2.1 Categorize information: Create own categories and explain own rule for categorizing

#### **LEARNING OUTCOME 3: SCIENCE, SOCIETY AND THE ENVIRONMENT**

- 5.3.1 Understand science and technology in the context of history and indigenous knowledge: Identifies ways in which products and technologies have been adapted from other times and cultures
- 5.3.2 Understands the impact of science and technology: Identifies the positive and negative effects of scientific developments or technological products on the quality of people's lives and /or the environment
- 5.3.3 Recognize bias in science and technology: Describe the impact that lack of access to technological products and services has on people.

# NATURAL SCIENCES : GRADE 5

## TEACHER'S GUIDE

### TERM 1: ENERGY AND CHANGE

WEEK 1	BASELINE ASSESSMENT on Energy and Change (Grade 4)								
<p>NOTES on HOW</p> <p>LO 1 - 3</p>	<p>Step 1 Ask learners to tell you about science they experienced or learnt during the holidays. (e.g. started a garden at home, went on a nature walk, built a toy and used a circuit etc)</p> <p>Step 2 Complete the <u>Baseline Assessment of Energy and Change</u>. Draw a mind map on energy on the chalk board with learners. Using the examples below, match the source of energy to the action.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start; margin: 10px 0;"> <div style="border: 1px solid black; padding: 5px; margin: 5px;">Hitting a ball</div> <div style="border: 1px solid black; padding: 5px; margin: 5px;">paraffin</div> <div style="border: 1px solid black; padding: 5px; margin: 5px;">burning lamp</div> <div style="border: 1px solid black; padding: 5px; margin: 5px;">torch</div> <div style="border: 1px solid black; padding: 5px; margin: 5px;">batteries</div> <div style="border: 1px solid black; padding: 5px; margin: 5px;">food</div> </div> <p>Complete the table below by referring to a cell phone.</p> <table border="1" style="margin: 10px auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="padding: 5px;">Name energy system</th> <th style="padding: 5px;">Energy source</th> <th style="padding: 5px;">Form of energy that we get from it</th> <th style="padding: 5px;">Describe how it works</th> </tr> </thead> <tbody> <tr> <td style="height: 20px;"> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> <p>Name the main source of energy in any food chain. Write and draw how energy is transferred in a food chain.</p>	Name energy system	Energy source	Form of energy that we get from it	Describe how it works				
Name energy system	Energy source	Form of energy that we get from it	Describe how it works						
METHODOLOGY	Class discussion								
RESOURCES	Reference materials								
INTEGRATION	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; padding: 5px; text-align: center;">NS strands</td> <td style="padding: 5px;">Energy &amp; Change – energy systems and sources Life &amp; Living – transfer of food energy in a food chain</td> </tr> <tr> <td style="padding: 5px; text-align: center;">Learning Areas</td> <td style="padding: 5px;">Social Sciences – renewable and non-renewable resources and energy resources Technology – systems and control</td> </tr> </table>	NS strands	Energy & Change – energy systems and sources Life & Living – transfer of food energy in a food chain	Learning Areas	Social Sciences – renewable and non-renewable resources and energy resources Technology – systems and control				
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WEEK 2	ENERGY SOURCES: Sun, food, falling water, fuels, wind, animal muscle
SCIENTIFIC LITERACY	<p>Briefly define concepts:</p> <ul style="list-style-type: none"> <li>Energy: energy is needed to make everything work or move or live.</li> <li>Substance: man-made or natural matter</li> <li>Source of energy: energy that is stored waiting to be used, or energy that is needed to make something happen</li> <li>Fuels: sources of energy (we usually need to burn them to produce heat energy).</li> <li>Renewable sources of energy: sources of energy that can be replenished (e.g. wood)</li> <li>Non-renewable sources of energy: sources of energy that cannot be replenished once used.</li> </ul>

<p>NOTES on HOW</p> <p>LO 5.2.1 – 5.2.2</p>	<p>Step 1 Name as many energy sources as possible. (coal, petrol, batteries, candles, paraffin, electricity (secondary source) etc)</p> <p>Step 2 Explain about renewable and non-renewable sources. Sort the energy sources into these two categories. Draw and write to describe what each energy source is used for.</p> <p>Step 3 Discuss advantages and disadvantages of energy sources and make a table of comparison:</p> <table border="1" data-bbox="504 658 1348 797"> <thead> <tr> <th data-bbox="504 658 740 763">Energy source</th> <th data-bbox="740 658 1043 763">Advantages when using this energy source</th> <th data-bbox="1043 658 1348 763">Disadvantages when using this energy source</th> </tr> </thead> <tbody> <tr> <td data-bbox="504 763 740 797">e.g. coal</td> <td data-bbox="740 763 1043 797"></td> <td data-bbox="1043 763 1348 797"></td> </tr> </tbody> </table> <p>Step 4 Discuss dangers of the above mentioned energy sources. (Dangers of high voltage electricity, pollution from burning coal, fires accidentally started from candles or paraffin stoves.) Learners draw and write about one dangerous energy source in their home environment.</p> <p>Step 5 Sort energy sources into two groups and learners can explain own rule for categorizing. (e.g. sources we have to burn and sources we don't need to burn)</p> <p>Step 6 Check the learners' knowledge. Can learners:</p> <ul data-bbox="408 1279 1412 1554" style="list-style-type: none"> <li>• Name different sources of energy?</li> <li>• Describe (using suitable vocabulary) what the different sources of energy are used for?</li> <li>• Sort the energy sources into renewable and non-renewable sources?</li> <li>• Understand the advantages and disadvantages of using the different sources of energy?</li> <li>• Draw and write about one dangerous energy source in their neighbourhood?</li> </ul>	Energy source	Advantages when using this energy source	Disadvantages when using this energy source	e.g. coal		
Energy source	Advantages when using this energy source	Disadvantages when using this energy source					
e.g. coal							
<p>METHODOLOGY</p>	<p>Discussion and research</p>						
<p>RESOURCES</p>	<p>Text books, posters, pictures and things around them</p>						
<p>INTEGRATION</p>	<table border="1"> <tr> <td data-bbox="395 1657 584 1760"> <p>NS strands</p> </td> <td data-bbox="584 1657 1455 1760"> <p>Matter &amp; Materials – properties and uses of different materials Planet Earth &amp; Beyond – pollution of air, water and soil Life &amp; Living – effects of pollution on plants and animals</p> </td> </tr> <tr> <td data-bbox="395 1760 584 1823"> <p>Learning Areas</p> </td> <td data-bbox="584 1760 1455 1823"> <p>Social Sciences – people, resources and the environment Technology – society and the environment</p> </td> </tr> </table>	<p>NS strands</p>	<p>Matter &amp; Materials – properties and uses of different materials Planet Earth &amp; Beyond – pollution of air, water and soil Life &amp; Living – effects of pollution on plants and animals</p>	<p>Learning Areas</p>	<p>Social Sciences – people, resources and the environment Technology – society and the environment</p>		
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<b>ASSESSMENT</b> <i>Reminder :</i> Record learner performance on Formal Assessment Tasks	Self assessment <input type="checkbox"/> Peer assessment <input type="checkbox"/> Group assessment <input type="checkbox"/> Teacher assessment <input type="checkbox"/>		
	Investigation activities <input type="checkbox"/>	Case studies <input type="checkbox"/>	Mind mapping <input type="checkbox"/>
	Projects <input type="checkbox"/>	Simulations <input type="checkbox"/>	Concept mapping <input type="checkbox"/>
	Research √	Role-play <input type="checkbox"/>	Brainstorming tasks <input type="checkbox"/>
	Assignment <input type="checkbox"/>	Translation task <input type="checkbox"/>	Functional writing √
	Performance based assess. <input type="checkbox"/>	Interviews <input type="checkbox"/>	Presentations <input type="checkbox"/>
	Practical demonstration <input type="checkbox"/>	Questionnaires <input type="checkbox"/>	Other: Drawing
	Test <input type="checkbox"/>	Structured questions <input type="checkbox"/>	Other:

<b>WEEK 3 SAFETY RULES ON ENERGY SOURCES - gas, petrol, paraffin, electricity</b>	
<b>SCIENTIFIC LITERACY</b>	Briefly define concepts: <ul style="list-style-type: none"> <li>• Petrol: Stored energy source for motor cars. When petrol catches fire accidentally, its flames are very hot and difficult to control</li> <li>• Paraffin: energy stored in a household liquid used to cook food. When paraffin catches fire accidentally, its flames are very hot and difficult to control</li> <li>• Electricity: Is a secondary energy source (it is produced from another source such as coal), and is used as a source for electrical appliances</li> <li>• Warning signs / hazard symbols: signs indicating danger or risky areas</li> <li>• Safety measures: rules and regulations to ensure safety.</li> </ul>
<b>NOTES on HOW</b>  LO 5.3.2	<b>Safety rules on energy sources ( petrol, paraffin, gas, electricity, and fire)</b>  Step 1 Describe the fire triangle (fire needs fuel, heat and air (oxygen) to burn). Learners draw and label the fire triangle. Explain that in order to put out a fire we need to remove the fuel, the heat or the air. Discuss different ways to do this. Explain the STOP, DROP & ROLL method to put out the flames when a person's clothes are on fire.  Step 2 Learners do role plays to practice: <ul style="list-style-type: none"> <li>• STOP, DROP &amp; ROLL method</li> <li>• How to get out of their home in a fire (crawl along the floor, to nearest exit away from source of heat, etc.)</li> <li>• How to alert other people to the danger of fire (shout, bang on a box, make lots of noise, shake people to wake them)</li> <li>• How to contact the fire brigade and ambulance and give directions to the fire whilst remaining calm</li> <li>• How to put out a fire - different ways to remove the fuel (e.g. kick it out of the way); different ways to remove the heat (e.g. douse the flames with water); different ways to remove the air (e.g. put the lid on the burning oil pan).</li> </ul>



Step 3  
Identify positive and negative effects on the quality of people's lives when using paraffin, petrol and / or electricity and open fires in houses. Make a table:

Fuel	Why do we use it?	When is it a danger to us?	How do we make it safe to use?
e.g. paraffin			

Discuss safe ways of working with paraffin stoves and candles etc.  
Discuss the consequences of not working safely with fuels. (e.g. burns, homes catch alight etc.)

Step 4  
Show learners pictures of various hazard signs and explain what they mean. Learners draw safety / hazard signs and write to explain what they mean, and how they should respond to them.  
Learners write their own safety rules when using stoves and fires etc, safely at home.  
They do a survey at home to see how things could be made safer and they try to rectify any unsafe appliances and practices.

*Extended learning: Find out about safety measures when working at a factory, petrol station, in a kitchen etc. Learners make a safety brochure, leaflet, presentations informing the community on safety measures when using a) candles, b) paraffin.*

*Invite representatives from a local fire station or police to explain to learners how to be helpful in a crisis.*

Step 5  
Check the learners' knowledge. Can learners:

- Draw and explain the fire triangle?
- Describe (using suitable vocabulary) how to put out a fire?
- Practice and role play how to react appropriately during a fire?
- Understand about the uses and dangers of fuels and electricity?
- Correctly recognise hazard signs, i.e. know what they mean and how to respond to them?
- Draw and write their own safety rules for using appliances at home? (Rules must be useful and correct).

METHODOLOGY	Class discussion, research	
RESOURCES	Flip charts on safety rules, pictures of hazard signs, references	
INTEGRATION	NS strands	Matter & Materials – properties and uses of different materials
	Learning Areas	Arts & Culture – visual arts (poster making) Life Orientation – personal and social development, safety measures

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	Test <input type="checkbox"/>	Structured questions <input type="checkbox"/>	Other:

WEEK 4		SCIENTIFIC INVESTIGATION – combustion of fuels
SCIENTIFIC LITERACY	Briefly define concepts: <ul style="list-style-type: none"> <li>Combustion: the process of burning which involves oxygen, a fuel and heat</li> <li>Energy sources: where energy is stored and waiting to be used.</li> </ul>	
NOTES on HOW  LO 5.1.1 – 5.1.3	<p><b>Scientific investigation - compare the burning of different liquid fuels e.g. methylated spirits, paraffin</b>  NB: Do not burn petrol – it is too dangerous.</p> <p>Step 1 PLAN  List questions about these energy sources above and how they burn.  Identify one good question to investigate. E.g.  <b>Do methylated spirits and paraffin both burn?</b>  <b>Do methylated spirits and paraffin both give off smoke?</b>  <b>Do methylated spirits and paraffin both have the same colour / size of flames?</b>  <b>Which fuel will heat the same amount of water the quickest - methylated spirits or paraffin?</b></p> <p>Step 2 CONDUCT</p> <ul style="list-style-type: none"> <li>Carry out instructions to test the fuels. Each group can investigate a different question.</li> <li>They set up two spirit burners; one with methylated spirits and one with paraffin. They burn the fuel. <i>Note:</i> take necessary safety precautions.</li> <li>To find out which one will boil the water the quickest - set up spirit burners, tripods and gauze mats. Use the fuels to heat equal amounts of water. Time how long it takes for each to boil.</li> <li>Learners draw, label, and write to record their observations.</li> </ul> <p>Step 3 EVALUATE  Learners tell what they have learnt about the fuels, teacher writes the ideas on board.</p>	

	<p>Step 4 Check the learners' knowledge. Can learners:</p> <ul style="list-style-type: none"> <li>• Help to formulate appropriate questions for investigating different fuels?</li> <li>• Set up activities correctly to investigate the fuels?</li> <li>• Make appropriate and accurate observations?</li> <li>• Record their observations accurately?</li> </ul> <p><b>Refer to the example of a format for Scientific Investigations and Assessment in Appendix B</b></p>		
METHODOLOGY	Class discussion, investigation		
RESOURCES	Text books, pictures, paraffin, lamp oil and spirits, reference materials		
INTEGRATION	NS strands	Matter & Materials – properties and uses of materials	
	Learning Areas	Social Sciences – renewable and non-renewable resources Life Orientation – adhering to safety rules Technology – products and processes	
ASSESSMENT <i>Reminder :</i> Record learner performance on Formal Assessment Tasks	Self assessment <input type="checkbox"/> Peer assessment <input type="checkbox"/> Group assessment <input type="checkbox"/> Teacher assessment <input type="checkbox"/>		
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WEEK 5		ECOSYSTEMS ARE ENERGY TRANSFER SYSTEMS	
SCIENTIFIC LITERACY	<p>Briefly define concepts:</p> <ul style="list-style-type: none"> <li>• Ecosystems: a community of plants, animals and micro-organisms living together in an environment</li> <li>• Energy transfer: the movement of energy through a system (e.g. through an ecosystem, through an electric circuit, etc.)</li> <li>• Inter-dependence: plants and animals depend on each other for survival. They provide food, shelter, etc for each other.</li> </ul>		
NOTES on HOW	<p>Step 1 Learners explain what they understand about ecosystems in their own words (<i>after the lesson they will rewrite their explanation</i>).</p> <p>Step 2 Explain that the energy source for an ecosystem is the sunlight. The sunlight provides energy for plants to photosynthesise (to make glucose which is stored as starch in their leaves). The starch is the main food source for all the animals in an ecosystem. We say the plants are the <i>producers</i> of food. Explain that the plants and animals depend on each other in an ecosystem. One of the ways they are inter-dependent is through feeding.</p>		
LO 5.2.1			

	<p>Step 3 Draw a food chain on the board e.g. Grass→Grasshopper→Sparrow→Hawk (bird of prey). Explain that a food chain shows how food energy is transferred from one organism to another in an ecosystem. Energy from the Sun is transferred to chemical energy in the grass. The grass is eaten by the grasshopper and so some of the energy is transferred to the grasshopper. The sparrow eats the grasshopper and so some of the energy is transferred to the sparrow. The hawk eats the sparrow and it gets energy from this food. In this way the energy is transferred (moves) from the Sun to the hawk. The arrows in a food chain show the direction in which the energy is transferred.</p> <p>Step 4 Learners rewrite the explanation of the energy transfer in their own words. Learners draw more food chains and describe the energy transfer taking place.</p> <p>Step 5 Find a picture of an ecosystem showing a variety of plants and animals e.g. a garden or a pond, etc. or visit a garden or nature reserve. Let learners work out the different food chains in the ecosystem (look for what eats what). Some animals may feed on more than one plant or animal. Then you have a <b>food web</b> with many arrows connecting to more than one organism. Learners draw a food web and write to explain how the energy moves in the food web.  Learners write to describe what an ecosystem is.</p> <p>Step 6 Check the learners' knowledge. Can learners:</p> <ul style="list-style-type: none"> <li>• Describe a food chain and explain how energy is transferred through it.</li> <li>• Draw a food web in an ecosystem and correctly explain how energy moves through it.</li> <li>• Understand what an ecosystem is.</li> </ul>		
METHODODOLOGY	Discussion , drawing and writing, visit to a garden etc.		
RESOURCES	Text books, posters, pictures of ecosystems, flash cards of food chain, reference materials.		
INTEGRATION	NS strands	Life & Living – food is necessary for growth Planet Earth & Beyond – the role of Earth materials – soil, air and water	
	Learning Areas	Technology – components of a system, food energy, Life Orientation – the food we eat; a balanced diet	
ASSESSMENT <i>Reminder :</i> Record learner performance on Formal Assessment Tasks	Self assessment <input type="checkbox"/> Peer assessment <input type="checkbox"/> Group assessment <input type="checkbox"/> Teacher assessment <input type="checkbox"/>		
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	Practical demonstration <input type="checkbox"/>	Questionnaires <input type="checkbox"/>	Other: Drawing
Test <input type="checkbox"/>	Structured questions <input type="checkbox"/>	Other:	

## SCIENTIFIC LITERACY

Briefly define concepts:

- Energy transfer systems: a system is made of two or more parts that transfer energy from one place to another e.g. a food chain, an electric circuit etc.
- Energy sources: cell, stretched elastic band, wind, wood, coal
- Forms of energy: light, sound, heat, electricity, movement.

## NOTES on HOW

LO 5.2.1 – 5.2.2

Step 1

Explain that we need energy transfer systems (mechanical tools, electrical appliances, power stations etc) to get useful forms of energy from the energy source to the place where it is needed.

Learners explain what system they would need to get the energy out of the following energy sources: stretched elastic band, wind, wood, coal. For example to get the energy out of a stretched elastic band you could use a catapult. The catapult transfers the energy from the stretched elastic band to the stone.

Learners record their ideas on a table:

Source of energy	System needed to transfer the energy	Energy transferred from -----to-----	Form of energy produced
e.g. Stretched elastic band	Catapult	Elastic band to stone	Movement energy
Etc.			

Step 2

Get pictures and household examples of many energy transfer systems (e.g. windmill, oil lamp, bicycle, food mixer, garlic crusher, rural grinding stones, etc.).

Help learners to name the different parts of the systems. (In mechanical systems: wheel, axle, pivot, handle, pedal, cogs, pestle and mortar etc. In electrical systems: components such as wires, light bulbs, switches etc )

Help learners to understand how the different systems and parts work to transfer the energy.

Step 3

Learners draw and write to describe the energy systems and how they work. They must include information about the following:

- The name of the system or tool
- The different parts of the system
- The source of energy
- How the system works (what actions does it do e.g. crushes, pumps, drills etc)
- The useful form of energy produced (e.g. movement energy, heat energy, light energy, etc.)

Step 4

Make a torch from found materials. Describe the components and draw the circuit.

	<p>Step 5</p> <p>Check the learners' knowledge. Can learners:</p> <ul style="list-style-type: none"> <li>• Understand what an energy transfer system is?</li> <li>• Describe energy transfer systems (mechanical and electrical) and explain how energy is transferred through it?</li> <li>• Make a torch that works?</li> <li>• Draw the electric circuit inside the torch correctly?</li> </ul>		
METHODOLOGY	Discussion, drawing and writing, research.		
RESOURCES	Pictures, household appliances and tools, reference materials		
INTEGRATION	NS strands	Matter and Materials – properties and uses of different materials	
	Learning Areas	Life Orientation – the body as a system, transfer of energy Technology – properties of materials and processing, systems	
ASSESSMENT <i>Reminder :</i> Record learner performance on Formal Assessment Tasks	Self assessment <input type="checkbox"/> Peer assessment <input type="checkbox"/> Group assessment <input type="checkbox"/> Teacher assessment <input type="checkbox"/>		
	Investigation activities <input type="checkbox"/>	Case studies <input type="checkbox"/>	Mind mapping <input type="checkbox"/>
	Projects <input type="checkbox"/>	Simulations <input type="checkbox"/>	Concept mapping <input type="checkbox"/>
	Research √	Role-play <input type="checkbox"/>	Brainstorming tasks <input type="checkbox"/>
	Assignment <input type="checkbox"/>	Translation task √	Functional writing √
	Performance based assess. <input type="checkbox"/>	Interviews <input type="checkbox"/>	Presentations <input type="checkbox"/>
	Practical demonstration <input type="checkbox"/>	Questionnaires <input type="checkbox"/>	Other:
	Test <input type="checkbox"/>	Structured questions <input type="checkbox"/>	Other:

WEEK 7	SYSTEMS FOR STORING ENERGY		
SCIENTIFIC LITERACY	<p>Briefly define concepts:</p> <ul style="list-style-type: none"> <li>• Energy sources: e.g. electrical cell, stretched or wound up elastic band, wind, wood, coal</li> <li>• Forms of energy: e.g. light, sound, heat, electricity, movement.</li> </ul>		
NOTES on HOW  LO 5.2.2	<p>Step 1</p> <p>Explain where / how energy systems store energy.</p> <p>Electrical cell: the reactions of chemicals provide energy.</p> <p>Wound up elastic band: as the elastic band gets wound up, energy is transferred to the elastic band and stored.</p> <p>Wind: caused by differences in air pressure of the atmosphere which produces movement energy.</p> <p>Wood: the Sun's energy is stored during photosynthesis in the wood of a tree.</p> <p>Coal: wood which became fossilised. It contains all the energy that was originally in the wood from photosynthesis.</p> <p>Step 2</p> <p>Learners find different types of cells and batteries that are used in electrical appliances at home e.g. in cell phones, radios, clocks, TV remote etc. They research in books, internet (Eskom website etc) and ask in electrical shops to find out what chemicals the cells contain.</p>		

	<p>Learners draw each cell or battery and list its contents (if possible) and say what appliances it is used in.</p> <p>Step 3 Learners sort the batteries into different categories using own rules and explain categories (e.g. Rechargeable/ non-rechargeable).</p> <p>Step 4 Explain to learners that energy cannot be created or destroyed. It is either stored somewhere or it changes from one form to another. We use energy transfer systems to change stored energy into a form of energy that is useful to us. Learners write a short paragraph to explain why cells and batteries are useful to us.</p> <p>Step 5 Check the learners' knowledge. Can learners:</p> <ul style="list-style-type: none"> <li>• Find a range of different batteries and provide correct information about them?</li> <li>• Sort the different batteries into logical categories?</li> <li>• Describe why cells and batteries are very useful?</li> </ul>		
METHODOLOGY	Discussion, demonstration and research		
RESOURCES	Text books, posters and information of adults, cells and batteries, elastic band		
INTEGRATION	NS strands	Matter and Materials – properties and uses of materials Life and Living – ecosystems, transfer of energy in a system	
	Learning Areas	Social Sciences – energy resources Technology – properties of materials and product development	
ASSESSMENT <i>Reminder :</i> Record learner performance on Formal Assessment Tasks	Self assessment <input type="checkbox"/> Peer assessment <input type="checkbox"/> Group assessment <input type="checkbox"/> Teacher assessment <input type="checkbox"/>		
	Investigation activities <input type="checkbox"/>	Case studies <input type="checkbox"/>	Mind mapping <input type="checkbox"/>
	Projects <input type="checkbox"/>	Simulations <input type="checkbox"/>	Concept mapping <input type="checkbox"/>
	Research √	Role-play <input type="checkbox"/>	Brainstorming tasks <input type="checkbox"/>
	Assignment <input type="checkbox"/>	Translation task <input type="checkbox"/>	Functional writing √
	Performance based assess. <input type="checkbox"/>	Interviews <input type="checkbox"/>	Presentations √
	Practical demonstration <input type="checkbox"/>	Questionnaires <input type="checkbox"/>	Other:
	Test <input type="checkbox"/>	Structured questions <input type="checkbox"/>	Other:

<b>WEEK 8</b>	<b>MECHANICAL SYSTEMS</b>
SCIENTIFIC LITERACY	<p>Briefly discuss:</p> <ul style="list-style-type: none"> <li>• Mechanical systems (such as machines)</li> <li>• Rotation</li> <li>• Movement in straight lines</li> </ul>

<p>NOTES on HOW</p> <p>LO 5.2.1 – 5.2.2</p>	<p><b>Investigation: making a mechanical system</b></p> <p>Step 1 PLAN Remind learners of the different parts of mechanical systems and their functions (wheel, axle, pivot, handle, pedal, cogs, pestle and mortar, etc.) Remind learners that mechanical systems are designed to transfer energy from the energy source to the part that will do the work. Mechanical systems always have moving parts. (electrical systems do not always have moving parts)</p> <p>Step 2 Identify the movements that mechanical machines make in everyday life by looking at simple machines e. g. the grinding stone rolls across another stone to grind the mealies; the mechanical egg beater handle goes round and round to move the beaters, the needle in the sewing machine goes up and down.</p> <p>Step 3 Ask learners to think of a mechanical system they can make out of found materials. (E.g. they can make: a windmill, a toy car, sailing boat, etc.). They must draw a simple plan of what they want to make (they can research in books first to get ideas). They can work individually or in groups.</p> <p>Step 4 CONDUCT The learners make their simple mechanical systems</p> <p>Step 5 EVALUATE Learners:</p> <ul style="list-style-type: none"> <li>• Show the item they have made</li> <li>• Demonstrate how it works</li> <li>• Explain where the energy comes from and how the parts move</li> <li>• Explain how they could improve it.</li> </ul> <p>Step 6 Check the learners' knowledge. Can learners:</p> <ul style="list-style-type: none"> <li>• Draw a reasonable plan of what they want to make?</li> <li>• Make a mechanical system that works?</li> <li>• Show and tell, with confidence, how the system they made works?</li> </ul>	
<p>METHODOLOGY</p>	<p>Discussion, demonstration and research</p>	
<p>RESOURCES</p>	<p>Pictures, found materials, elastic bands, scissors, sticky tape, etc,</p>	
<p>INTEGRATION</p>	<p>NS strands</p>	<p>Matter and Materials – properties and uses of different materials</p>
	<p>Learning Areas</p>	<p>Social Sciences – mechanisms developed by ancient civilisations Technology – properties of materials and developing a system</p>



<b>ASSESSMENT</b> <i>Reminder :</i> Record learner performance on Formal Assessment Tasks	Self assessment <input type="checkbox"/> Peer assessment <input type="checkbox"/> Group assessment <input type="checkbox"/> Teacher assessment <input type="checkbox"/>		
	Investigation activities √	Case studies <input type="checkbox"/>	Mind mapping <input type="checkbox"/>
	Projects <input type="checkbox"/>	Simulations <input type="checkbox"/>	Concept mapping <input type="checkbox"/>
	Research <input type="checkbox"/>	Role-play <input type="checkbox"/>	Brainstorming tasks <input type="checkbox"/>
	Assignment <input type="checkbox"/>	Translation task <input type="checkbox"/>	Functional writing <input type="checkbox"/>
	Performance based assess. <input type="checkbox"/>	Interviews <input type="checkbox"/>	Presentations √
	Practical demonstration √	Questionnaires <input type="checkbox"/>	Other: drawing
	Test <input type="checkbox"/>	Structured questions <input type="checkbox"/>	Other:

<b>WEEK 9 ENERGY TRANSFER IN SOCIETY</b>	
<b>SCIENTIFIC LITERACY</b>	Briefly discuss: <ul style="list-style-type: none"> <li>• Technology : things that people have made to help them to do things and solve problems</li> <li>• Adapted: things that have changed to suit the present circumstances.</li> </ul>
<b>NOTES on HOW</b>  LO 5.3.1 – 5.3.3	<p>Step 1 Have a class discussion about how technology has changed from the past to the present day. (E.g. Typewriters have been replaced by computers; horse and carts have been replaced by motor cars, propeller aeroplanes have been replaced by jets etc.) However older technologies do not just die out suddenly. We still use some of them depending on the circumstances (in rural areas some older technologies are used whilst in the cities more modern technologies are used).</p> <p>Step 2 Discuss the following research projects: Learners choose to do one of the following projects: (they can use books; internet and magazines; talk to older people etc.)</p> <ol style="list-style-type: none"> <li>1. Research ways in which technologies (e.g. vehicles, ways of making bread, etc) have been changed from long ago until today.</li> <li>2. Research in their neighbourhood what kinds of stoves (or vehicles, appliances, etc) people use. They must find out how these technologies help people.</li> <li>3. Research how the lives of people are affected if they do not have access to technology (do not have computers, or electricity etc.)</li> </ol> <p>Step 3 Learners make a poster, (leaflet, zig-zag booklet) with a heading, drawings or pictures, writing and labels to show what they found out. Or Learners can present their information in any other suitable way (e.g. tape recording, show and tell, interview with another person, survey notes etc.)</p> <p>Step 6 Check the learners' knowledge. Can learners: <ul style="list-style-type: none"> <li>• Find a reasonable amount of interesting information?</li> <li>• Communicate their information in an interesting way?</li> </ul> </p>

METHODOLOGY	Discussion, research and demonstration	
RESOURCES	Research materials	
INTEGRATION	NS strands	Matter and Materials – properties and uses of different materials
	Learning Areas	Social Sciences – the development of new technologies EMS – the development and improvement of products and services looking at production costs and using cheaper materials
ASSESSMENT <i>Reminder :</i> Record learner performance on Formal Assessment Tasks	Self assessment <input type="checkbox"/> Peer assessment <input type="checkbox"/> Group assessment <input type="checkbox"/> Teacher assessment <input type="checkbox"/>	
	Investigation activities <input type="checkbox"/>	Case studies <input type="checkbox"/>
	Projects <input type="checkbox"/>	Simulations <input type="checkbox"/>
	Research √	Role-play <input type="checkbox"/>
	Assignment <input type="checkbox"/>	Translation task <input type="checkbox"/>
	Performance based assess. <input type="checkbox"/>	Interviews √
	Practical demonstration <input type="checkbox"/>	Questionnaires <input type="checkbox"/>
	Test <input type="checkbox"/>	Structured questions <input type="checkbox"/>
	Mind mapping <input type="checkbox"/>	Concept mapping <input type="checkbox"/>
	Brainstorming tasks <input type="checkbox"/>	Functional writing √
	Presentations √	Other:
	Other:	Other:

WEEK 10		CONSOLIDATION & FORMAL ASSESSMENT TASK 1								
SCIENTIFIC LITERACY	<ul style="list-style-type: none"> <li>• Make an energy poster with headings, labels, pictures and notes to show energy sources and forms of energy.</li> <li>• Find a picture of an energy system, and then use a flow diagram to show how energy is transferred in the system.</li> <li>• Find examples of machines (mechanical systems) that rotate (go round and round). Draw and write to explain how it works.</li> <li>• Explain and demonstrate what you would do if your clothes catch fire. (stop, drop and roll)</li> <li>• Draw a simple food web and describe the energy transfer through it.</li> </ul>									
NOTES on HOW	<p><b>For Example: Assessment Task 1 should consist of the following items</b></p> <p><b>LO 2 AS 1</b> Draw a concept map on energy.</p> <p><b>LO 2 AS 2.</b> Sort the following into two columns. Make a heading for each column to explain how you have grouped them: Coal, heat, light, wood, paper, sound, paraffin, electricity, wind.</p> <p><b>LO 2 AS 1</b> Discuss an energy source under the following headings:</p> <table border="1" style="margin-left: 40px;"> <tr> <td>Name energy source</td> <td></td> </tr> <tr> <td>What the energy source is used for</td> <td></td> </tr> <tr> <td>Advantages of using this energy source</td> <td></td> </tr> <tr> <td>Disadvantages of using this energy source</td> <td></td> </tr> </table>		Name energy source		What the energy source is used for		Advantages of using this energy source		Disadvantages of using this energy source	
Name energy source										
What the energy source is used for										
Advantages of using this energy source										
Disadvantages of using this energy source										

**LO 2 AS 1** Name some mechanical systems in everyday life.

**LO 2 AS 1** Describe how energy is transferred in a picture of a food chain.

**LO 2 AS 1** Identify the correct statements:

- Wind has no energy
- Wood stores the Sun's energy
- Coal stores the Sun's energy
- Energy from somewhere else is transferred to a stretched elastic band.

**LO 1 AS 2** Write a question to investigate the differences between paraffin and candles.

Name the materials you will need to investigate the difference between these two energy sources (paraffin and candles)

Make a labelled drawing of how you will set up the materials for the investigation.

Make a table to show the differences.

**LO 3 AS 2:** Explain how paraffin (or gas or electricity) can be dangerous when used incorrectly at home. Explain what you can do to use it safely.

**LO 3 AS 2** Explain how mechanical systems can improve the lives of disabled people.

## TERM 2: MATTER AND MATERIALS

WEEK 11	BASELINE ASSESSMENT – MATTER AND MATERIALS (Grade 4)
SCIENTIFIC LITERACY	<p>Briefly define concepts from grade 4:</p> <ul style="list-style-type: none"> <li>• Materials: solids that are useful for making things</li> <li>• Properties of materials: the way substances react and appear</li> <li>• The 3 phases of matter: matter can exist in three different forms or phases: solids, liquids and gases. Heating changes the phase from solid to liquid to gas, and cooling (loss of heat) reverses the change of phase</li> <li>• Boiling water: water gains enough energy to change into gas</li> <li>• Melting ice: ice gains enough energy to change into a liquid.</li> </ul>
NOTES on HOW  LO 5.1 – 5.2	<p>Step 1</p> <p>Class discussion based on the above mentioned concepts: Use questions to prompt the learners</p> <ul style="list-style-type: none"> <li>• Name a few familiar materials.</li> <li>• What do you understand under the concept of “properties of materials”?</li> <li>• Name a few materials and their properties</li> <li>• Name the main classes in which materials can be categorised. E.g. metals, plastics, wood, paper etc.</li> <li>• Sort the materials into the classes as mentioned above.</li> <li>• Name the three phases in which matter can be found.</li> <li>• Explain what you understand about the concept of boiling.</li> <li>• How do you know when water is boiling?</li> <li>• Explain what you understand about the concept of melting.</li> <li>• Explain how you can melt an ice cube to make it reach melting point.</li> </ul> <p>Step 2</p> <p>Teacher makes short notes on the chalk board when additional information comes to mind during the group discussion.</p>
METHODOLOGY	Discussions; questions and answers

WEEK 12	PROPERTIES OF MATERIALS
SCIENTIFIC LITERACY	<p>Briefly define concept:</p> <ul style="list-style-type: none"> <li>• Classes of materials – fibres, glass, ceramics, polymers (plastics), paper, wood, metals</li> <li>• Properties of materials             <ul style="list-style-type: none"> <li>○ Texture: the way a material feels when you touch or rub it between your fingers.</li> <li>○ Appearance: The visible features of something</li> <li>○ Flexibility: ability to bend/change shape without breaking</li> <li>○ Hardness: ability to withstand physical wear and tear</li> <li>○ Heat conduction: the way in which a material allows heat to travel through it</li> <li>○ Heat insulation: the way in which a material stops heat energy from moving through it</li> <li>○ Magnetism: the way in which a material responds (is attracted) to a magnet or not</li> <li>○ Solubility: the ability of a substance to dissolve.</li> </ul> </li> </ul>

<p>NOTES on HOW</p> <p>LO 5.2.1 – 5.2.2</p>	<p>Step 1 Bring a few interesting objects to class, made of paper, plastic, glass, wood etc. Make sure that the object includes a variety of properties (as above) which would make it easy for the learner to identify and name.</p> <p>Step 2 Explain to the learners what properties are. Guide the learners into what to look for when trying to identify properties of the materials. Continuously refer to differences and similarities of various objects.</p> <p>Step 3 Learners name and draw the materials and write to describe the properties (e.g. flexibility, hardness, physical appearance and durability/strength) of a range of materials/objects such as paper, plastic, glass, string, copper wire etc.</p> <p>Step 4 Check the learners' knowledge. Can learners:</p> <ul style="list-style-type: none"> <li>Describe the properties of different materials using suitable vocabulary?</li> </ul>		
<p>METHODOLOGY</p>	<p>Discussions; allow learners to explore materials using their senses; make conclusions</p>		
<p>RESOURCES</p>	<p>Variety of materials and objects</p>		
<p>INTEGRATION</p>	<p>NS strands</p>	<p>Planet Earth &amp; Beyond – naturally occurring materials Energy &amp; Change – any input of energy is required to change materials</p>	
<p>Learning Areas</p>		<p>Technology – understanding properties of materials EMS – production and cost of goods</p>	
<p>ASSESSMENT <i>Reminder :</i> Record learner performance on Formal Assessment Tasks</p>	<p>Self assessment <input type="checkbox"/> Peer assessment <input type="checkbox"/> Group assessment <input type="checkbox"/> Teacher assessment <input type="checkbox"/></p>		
<p><input type="checkbox"/></p>	<p>Investigation activities</p>	<p>Case studies</p>	<p>Mind mapping</p>
<p><input type="checkbox"/></p>	<p>Projects</p>	<p>Simulations</p>	<p>Concept mapping</p>
<p><input type="checkbox"/></p>	<p>Research</p>	<p>Role-play</p>	<p>Brainstorming tasks</p>
<p><input type="checkbox"/></p>	<p>Assignment</p>	<p>Translation task</p>	<p>Functional writing</p>
<p><input type="checkbox"/></p>	<p>Performance based assess. <input type="checkbox"/></p>	<p>Interviews</p>	<p>Presentations</p>
<p><input checked="" type="checkbox"/></p>	<p>Practical demonstration</p>	<p>Questionnaires</p>	<p>Other:</p>
<p><input type="checkbox"/></p>	<p>Test</p>	<p>Structured questions</p>	<p>Other:</p>

<p>WEEK 13</p>	<p><b>PROPERTIES OF MATERIALS IN THREE CLASSES: metals, plastics (polymers) ceramics</b></p>		
<p>SCIENTIFIC LITERACY</p>	<p>Briefly define concepts: <b>Materials</b></p> <ul style="list-style-type: none"> <li>Metals: materials which conduct electricity and heat e.g. copper, tin, silver, gold, lead etc.</li> <li>Polymers (plastics and plant fibres): a giant long-chained molecule made up of a large number of smaller molecules joined together e.g. plastics, rubber, plastic fibres</li> <li>Ceramics and glass: materials made of hardened clay or glass e.g. china cups, glasses, flower pots, tiles</li> </ul>		

	<p><b>Properties</b></p> <ul style="list-style-type: none"> <li>• Properties of metals: Shiny, malleable (can be shaped), conduct electricity and heat; make a ringing sound, durable</li> <li>• Properties of plastics: Flexible, strong, insulator of heat and electricity, durable, have a chemical smell, burn when set alight, some plastics are transparent and some are opaque (cannot see through them)</li> <li>• Properties of glass and ceramics: Rigid, can shatter, make a ringing sound, durable, waterproof; glass can be transparent.</li> </ul>																
<p>NOTES on HOW</p> <p>LO 5.2.2</p>	<p>Step 1 Explain to the learners that properties are what the material is like, how it reacts, and what you can do to it. Guide the learners to identify the properties of metals, polymers and ceramics, using all their senses. Bring objects made of different metals, plastics, ceramics and glass. Learners bring some appropriate objects as well.</p> <p>Step 2 Sort everyday materials or objects into classes by their visible appearance, and what is known about them. Use table like the one below.</p> <table border="1" data-bbox="469 898 1382 1240"> <thead> <tr> <th>Object</th> <th>Class of material</th> <th>Properties (look, feel, smell)</th> <th>More everyday examples of materials in this class</th> </tr> </thead> <tbody> <tr> <td>Frying pan</td> <td>Metal</td> <td>Strong, shiny, conducts heat, makes a ringing sound</td> <td>Motor cars, jewellery, wire</td> </tr> <tr> <td>Etc.</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>Step 3 Write sentences to explain your own rule for categorising (e.g. reason why it is a metal - referring to properties of metals etc.).</p> <p>Step 4 Check the learners' knowledge. Can learners:</p> <ul style="list-style-type: none"> <li>• Recognise different kinds of metals, plastics and ceramics from the objects provided?</li> <li>• Describe the properties of these materials using suitable vocabulary?</li> <li>• Sort metals, plastics, ceramics and glass based on their properties?</li> </ul>	Object	Class of material	Properties (look, feel, smell)	More everyday examples of materials in this class	Frying pan	Metal	Strong, shiny, conducts heat, makes a ringing sound	Motor cars, jewellery, wire	Etc.							
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Frying pan	Metal	Strong, shiny, conducts heat, makes a ringing sound	Motor cars, jewellery, wire														
Etc.																	
<p>METHODOLOGY</p>	<p>Explanation, sorting; discussion; motivate reasons</p>																
<p>RESOURCES</p>	<p>Different objects and materials from three groups; work sheet</p>																
<p>INTEGRATION</p>	<table border="1"> <tr> <td>NS strands</td> <td>Planet Earth &amp; Beyond – natural resources</td> </tr> <tr> <td>Learning Areas</td> <td>Technology – man-made and synthetic materials EMS – nature, process and production of materials</td> </tr> </table>	NS strands	Planet Earth & Beyond – natural resources	Learning Areas	Technology – man-made and synthetic materials EMS – nature, process and production of materials												
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<b>ASSESSMENT</b> <i>Reminder :</i> Record learner performance on Formal Assessment Tasks	Self assessment <input type="checkbox"/> Peer assessment <input type="checkbox"/> Group assessment <input type="checkbox"/> Teacher assessment <input type="checkbox"/>		
	Investigation activities <input type="checkbox"/>	Case studies <input type="checkbox"/>	Mind mapping <input type="checkbox"/>
	Projects <input type="checkbox"/>	Simulations <input type="checkbox"/>	Concept mapping <input type="checkbox"/>
	Research <input type="checkbox"/>	Role-play <input type="checkbox"/>	Brainstorming tasks <input type="checkbox"/>
	Assignment <input type="checkbox"/>	Translation task √	Functional writing √
	Performance based assess. <input type="checkbox"/>	Interviews <input type="checkbox"/>	Presentations <input type="checkbox"/>
	Practical demonstration <input type="checkbox"/>	Questionnaires <input type="checkbox"/>	Other:
	Test <input type="checkbox"/>	Structured questions <input type="checkbox"/>	Other:

<b>WEEK 14 HEATING AND COOLING CAN CHANGE MATERIALS</b>	
<b>SCIENTIFIC LITERACY</b>	<p>Briefly define concepts:</p> <ul style="list-style-type: none"> <li>• Thermal energy: heat energy</li> <li>• Solid: matter with a fixed shape, takes up space, cannot be poured, particles very close together</li> <li>• Liquid: can be poured, takes the shape of the container, takes up space, particles touching but further apart than in solids</li> <li>• Gas: particles very far apart, matter with no structure</li> <li>• Heat energy: always moves from a warmer place or object to a cooler place or object</li> <li>• Energy loss: this happens when matter releases its energy because its surroundings are cooler</li> <li>• Energy gain: this happens when matter absorbs energy because its surroundings are warmer</li> <li>• Melts: when a solid is heated and it changes to a liquid</li> <li>• Solidifies: when a liquid cools (loses heat) and changes to a solid</li> <li>• Evaporates: when a liquid is heated and changes to a gas</li> <li>• Condenses: when a gas cools (loses heat) and changes to a liquid.</li> </ul>
<b>NOTES on HOW</b>  LO 5.2.1 - 5.2.2	<p><b>Materials respond to heat</b></p> <p>Step 1  Explain:</p> <ul style="list-style-type: none"> <li>• Heat can bring about the following changes to materials:</li> </ul> <p><b>Phase changes</b>  Solids, liquids and gases can change from one phase to another when heat energy is added or released. E.g. Water turns to water vapour when heated and freezes when cooled (when it loses enough heat)</p> <p><b>Expansion and contraction</b>  Solids, liquids and gases also expand in size when they are heated and contract when cooled (lose heat); e.g. place a thermometer in hot water. The liquid alcohol in the thermometer expands and moves up the thin tube inside. Take freshly baked muffins out of the oven. They contract away from the side of the pan as they cool.</p>

## **Burning**

Some materials catch fire when they are heated.

Explain:

- Some changes to materials are permanent (cannot be reversed) and some are temporary (can be reversed)

Step 2

- Do an activity to demonstrate some changes to materials when you heat them.

Show expansion with the ball and ring apparatus; bend a thin metal pipe over a flame (use oven gloves); melt plastics in hot water or in a flame; melt wax; burn fabrics & paper; boil water; bake clay (ceramics); cook pancake batter; (crack glass with hot water); place a balloon over the neck of a bottle and place the bottle in hot water (the balloon expands) etc.

Learners :

- Draw and write to describe the changes (expansion/contraction; phase change; burning) that take place in the materials when they are heated and when they cool down again.
- Describe whether the changes are permanent or temporary (can be reversed).

Step 3

### **Sorting materials in different ways**

- Sort the materials into three groups: solid, liquid, gas.
- Make a table to show sorting. Headings across the top of table: *Phase, Properties, Examples*. Headings for rows down side of table: *Solid, Liquid, Gas*
- Write sentences to explain your own rule for placing the material in a group (e.g. reason why it is a solid, liquid or gas referring to properties of solids, liquids and gases etc.).

Step 4

**Sorting materials according to how they react to heating/cooling** (e.g. metals expand/contract; plastics melt and solidify etc.). Make your own table or drawing or list to show your sorting.

Step 5

### **Sort materials according to whether the change is permanent or temporary in response to heating**

Sort materials according to the type of change (permanent or temporary) they undergo when heated. Make your own table or drawing or list to show your sorting.

Step 6

Write sentences to explain the following words: Melting, Solidifying, Evaporating, Condensing; and Burning, Bending, Expanding, Contracting

Step 7

Check the learners' knowledge. Can learners:

- Understand the difference between the following concepts: Melting, Solidifying, Evaporating, Condensing; and Burning, Bending, Expanding, Contracting?

METHODOLOGY

Explanation, discussion, sorting activities, writing



RESOURCES	Different materials that change when heated: thin metal pipe, plastics, wax, fabrics & paper, water, clay, pancake batter, glass, balloon, etc. Apparatus: Spirit burners, candles, matches, boiling water, containers, oven gloves etc.		
INTEGRATION	NS strands	Energy and change – energy is needed to change materials	
	Learning Areas	Life Orientation – safety precautions Technology – processing materials	
ASSESSMENT <i>Reminder:</i> Record learner performance on Formal Assessment Tasks	Self assessment <input type="checkbox"/> Peer assessment <input type="checkbox"/> Group assessment <input type="checkbox"/> Teacher assessment <input type="checkbox"/>		
	Investigation activities <input type="checkbox"/>	Case studies <input type="checkbox"/>	Mind mapping <input type="checkbox"/>
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	Assignment <input type="checkbox"/>	Translation task ✓	Functional writing ✓
	Performance based assess. <input type="checkbox"/>	Interviews <input type="checkbox"/>	Presentations <input type="checkbox"/>
	Practical demonstration <input type="checkbox"/>	Questionnaires <input type="checkbox"/>	Other:
	Test <input type="checkbox"/>	Structured questions <input type="checkbox"/>	Other:

WEEK 15 + 16		DIFFERENCES BETWEEN MIXTURES AND SOLUTIONS	
SCIENTIFIC LITERACY	<p>Briefly define concepts:</p> <ul style="list-style-type: none"> <li>Mixtures: a combination of two or more substances which can be separated again</li> <li>Dissolve: when a substance mixes with a liquid and seems to disappear inside the liquid, and so cannot be seen</li> <li>Solution: a special mixture in which a solid, liquid or gas is dissolved in a liquid</li> <li>Soluble substances: substances which dissolve (seem to disappear) when mixed with a liquid (e.g. sugar mixed into water)</li> <li>Insoluble substances: substances which cannot dissolve in a liquid (e.g. tea leaves in water).</li> </ul>	<p style="text-align: center;"><b>SOLUTION</b></p>	
NOTES on HOW  LO 5.2.1	<p><b>The differences between mixtures and solutions</b></p> <p>Step 1 Mixtures Learners can use a variety of solids and liquids and make mixtures. Name the ingredients of mixtures e.g. mixture of marbles and sand Ask learners if they will be able to separate this mixture by hand.</p>		

## Step 2

### Solutions

Learners can mix a solute (sugar) and a solvent (water) to form a solution.

Name the ingredients of a solution.

Name the parts of a solution using scientific language e.g. solvent: the liquid part; solute: the solid part.

## Step 3

Sort different household and everyday substances into mixtures and solutions e.g. cake mixture, sports drink, Handy Andy, Coca Cola, coffee etc.

Explain (write) their own rule for deciding whether the substances are mixtures or solutions.

Ask learners if they would be able to separate these mixtures and solutions by hand.

## Step 4

**Describe** how some mixtures can be separated by hand, whereas other mixtures and solutions need a process for them to be separated.

Explain the following processes and let learners try them out.

**Filtering:** the process in which solid particles are separated from a liquid by passing it through a filter.

**Decanting:** the process of separating a solid from a liquid by pouring the liquid off, leaving the solid behind.

**Distilling:** The process of separating two liquids or a liquid from a solid. The mixture is heated. The liquid boils and forms a vapour. This vapour is then condensed by cooling to become liquid again. (Hold a cold plate above the boiling solution and see the water condense back to a liquid). The solid stays behind.

## Step 5

Teacher lists properties of mixtures on the board:

- Mixtures can be separated by hand, by decanting and by filtering, or by distillation

Describe the properties of a solution:

- Solute cannot be seen once it has dissolved
- Light can pass through a solution (solution has a glassy appearance)
- The solute does not settle to the bottom after some time
- Solute and solvent **cannot** be separated by filtering or pouring
- Can get the solute back by evaporating the solvent (liquid). The solid crystallises.
- Can get the solvent back by distillation.

## Step 6

Learners:

- Make solutions and mixtures in a show and tell demonstration
- Make posters with suitable labels and headings to explain the differences between mixtures and solutions.

## Step 7

Check the learners' knowledge. Can learners:

- Demonstrate how to make and separate solutions and mixtures correctly?
- Describe the differences between solutions and mixtures by referring to their properties?

METHODOLOGY	Explain; describe; categorise	
RESOURCES	Different kinds of solids to form mixtures; different kind of soluble solids to use in the forming of solutions. Spirit burners , matches, glass beakers or test tubes, etc.	
INTEGRATION	NS strands	Planet Earth & Beyond – water pollution and water purification
	Learning Areas	Social Sciences – people and the environment, natural resources
ASSESSMENT <i>Reminder :</i> Record learner performance on Formal Assessment Tasks	Self assessment <input type="checkbox"/> Peer assessment <input type="checkbox"/> Group assessment <input type="checkbox"/> Teacher assessment <input type="checkbox"/>	
	Investigation activities √	Case studies <input type="checkbox"/>
	Projects <input type="checkbox"/>	Simulations <input type="checkbox"/>
	Research <input type="checkbox"/>	Role-play <input type="checkbox"/>
	Assignment <input type="checkbox"/>	Translation task <input type="checkbox"/>
	Performance based assess. √	Interviews <input type="checkbox"/>
	Practical demonstration √	Questionnaires <input type="checkbox"/>
	Test <input type="checkbox"/>	Structured questions <input type="checkbox"/>
	Mind mapping <input type="checkbox"/>	Concept mapping <input type="checkbox"/>
	Brainstorming tasks <input type="checkbox"/>	Functional writing √
	Presentations <input type="checkbox"/>	Other:
	Other:	

WEEK 17	SOLUTIONS
SCIENTIFIC LITERACY	<p>Briefly define concepts:</p> <ul style="list-style-type: none"> <li>• Dissolve: when a substance mixes with a liquid and seems to disappear inside the liquid, and so cannot be seen.</li> <li>• Solution: a special mixture in which a solid, liquid or gas is dissolved in a liquid</li> <li>• Soluble substances: substances which dissolve (seem to disappear) when mixed with a liquid (e.g. sugar mixed into water)</li> <li>• Insoluble substances: substances which cannot dissolve in a liquid (e.g. tea leaves in water)</li> <li>• Solute: a solid that dissolves in a liquid, forming a solution</li> <li>• Solvent: the liquid into which a solid dissolves</li> <li>• Factors affecting solubility: processes or actions that make a solute dissolve faster or slower in a liquid such as: amount of stirring; temperature of liquid; size of the particles of the solid; amount of solid compared to liquid.</li> </ul>
NOTES on HOW  LO 5.1.1 – 5.1.3	<p><b>Investigation:</b> <b>Does heat speed up dissolving?</b></p> <p>Step 1 PLAN</p> <ul style="list-style-type: none"> <li>• Revise the following:</li> <li>• Name the 2 ingredients (e.g. water and sugar) of a solution in scientific language (e.g. solute, soluble and solvent).</li> <li>• Describe the solute and solvent.</li> <li>• Describe properties of a solution (e.g. it is clear).</li> <li>• Learners practice using thermometers (to measure temperature in degrees Celsius (°C)).</li> <li>• Practice using measuring cups or cylinders to measure the amount of water in millilitres (ml).</li> <li>• Use medicine spoons to measure the amount of solute in ml.</li> </ul>

	<p>Step 2 Learners make a mind map of what they know about dissolving substances in familiar situations (e.g. dissolving sugar in cold or in hot water). Learners help to suggest questions for investigations e.g. <b>Does heat speed up dissolving?</b></p> <p>Step 3 CONDUCT Learners</p> <ul style="list-style-type: none"> <li>• Develop their own instructions or the teacher can give the instructions to make solutions using water at different temperatures. (e.g. hot water, tap water, ice water)</li> <li>• Give each solution two stirs to mix the ingredients before starting to measure time.</li> <li>• Keep the amount of water and solute the same for each container (measure them).</li> <li>• Record observations and measurements (temperature of water, time taken to dissolve, volume of solvent, amount of solute) on a table as part of procedure.</li> <li>• Draw bar graphs of results: Horizontal X-axis: bars representing hot water, tap water and ice water. Vertical Y-axis; time taken in minutes for the solute to dissolve.</li> </ul> <p>Step 4 Report (draw and write) on group's procedure. Report on results obtained. Write to explain how heat affects the speed of dissolving.</p> <p><i>Extended learning: learners develop own instructions</i></p> <p>Step 5 Learners <b>perform</b> a similar test on the following:</p> <ul style="list-style-type: none"> <li>• <b>Does shaking or stirring speed up dissolving?</b> Use three containers with same ingredients. Stir first container 5 times, next container 10 times, last container 15 times. Measure the time to see which takes longer for the ingredients to dissolve. Record results and a draw graph.</li> <li>• <b>Does the size of the solid particles speed up dissolving</b> Use three containers with water. Add coarse salt to first, table salt to second and finely ground salt to last container. Keep measurements of salt, water and temperature the same in all three. Stir once. Measure the time of how long the salt takes to dissolve in each container. Record results and draw graph.</li> </ul> <p>Step 6 Check the learners' knowledge. Can learners:</p> <ul style="list-style-type: none"> <li>• Carry out the investigation with understanding?</li> <li>• Measure and record accurately?</li> <li>• Understand that the following factors speed up dissolving: higher temperature, more shaking /stirring, smaller particles?</li> <li>• Draw bar graphs correctly (suitable scale and axes, points/bars correctly plotted, axes labelled and suitable heading for graph).</li> </ul>
METHODOLOGY	Class discussion; practical work

RESOURCES	Substances and solids, test tubes, activity work sheet, text books etc.		
INTEGRATION	NS strands	Planet Earth & Beyond – natural solutes, water pollution, acid rain	
	Learning Areas	Mathematics – measurement, drawing graphs	
ASSESSMENT <i>Reminder :</i> Record learner performance on Formal Assessment Tasks	Self assessment <input type="checkbox"/> Peer assessment <input type="checkbox"/> Group assessment <input type="checkbox"/> Teacher assessment <input type="checkbox"/>		
	Investigation activities √	Case studies <input type="checkbox"/>	Mind mapping <input type="checkbox"/>
	Projects <input type="checkbox"/>	Simulations <input type="checkbox"/>	Concept mapping <input type="checkbox"/>
	Research <input type="checkbox"/>	Role-play <input type="checkbox"/>	Brainstorming tasks <input type="checkbox"/>
	Assignment <input type="checkbox"/>	Translation task √	Functional writing <input type="checkbox"/>
	Performance based assess. √	Interviews <input type="checkbox"/>	Presentations <input type="checkbox"/>
	Practical demonstration <input type="checkbox"/>	Questionnaires <input type="checkbox"/>	Other:
	Test <input type="checkbox"/>	Structured questions <input type="checkbox"/>	Other:

WEEK 18	SATURATED AND UNSATURATED SOLUTIONS
SCIENTIFIC LITERACY	<p>Briefly define concepts:</p> <ul style="list-style-type: none"> <li>• Dissolve: when a substance mixes with a liquid and seems to disappear inside the liquid, and so cannot be seen</li> <li>• Solution: a special mixture in which a solid, liquid or gas is dissolved in a liquid</li> <li>• Soluble substances: substances which dissolve (seem to disappear) when mixed with a liquid (e.g. sugar mixed into water)</li> <li>• Insoluble substances: substances which cannot dissolve in a liquid (e.g. tea leaves in water)</li> <li>• Solute: a solid that dissolves in a liquid, forming a solution</li> <li>• Solvent: the liquid in which a solid dissolves</li> <li>• Factors affecting solubility: processes or actions that make a solute dissolve faster or slower in a liquid such as: amount of stirring; temperature of liquid; size of the particles of the solid; amount of solid compared to liquid.</li> </ul>
NOTES on HOW  LO 5.1.1 – 5.1.3  LO 5.2.1	<p><b>Investigate: saturated and unsaturated solutions</b></p> <p>Step 1 PLAN Learners list factors which affect solubility from previous lesson. List what is known about the proportion of solvent to solute used to make familiar solutions (e.g. cool drink versus syrup).</p> <p>Step 2 Explain that if we keep on adding more sugar to a certain amount of water eventually there will be too much sugar to dissolve in the water. Then we say it is a saturated solution.</p> <p>Step 3 Suggest focus questions to investigate saturated and unsaturated solutions e.g: <b>How much solute and solvent do we need to make a saturated solution?</b></p>

	<p>Step 4 CONDUCT Learners can develop their own instructions or the teacher can give the instructions. Learners try to make a saturated solution. They measure and record the amounts of water and sugar they use until they reach the point of saturation. Learners draw and write to explain their procedure.</p> <p>Step 5 EVALUATE Write about their findings Explain the difference between a saturated solution and an unsaturated solution (draw and write).</p> <p>Step 6 Check the learners' knowledge. Can learners:</p> <ul style="list-style-type: none"> <li>• Carry out the investigation with understanding?</li> <li>• Measure and record accurately?</li> <li>• Understand that a saturated solution is reached when no more solute will dissolve in the solvent?</li> </ul>		
METHODOLOGY	Class discussion, practical work		
RESOURCES	Sugar, test tubes/ beakers, activity work sheet, text books etc.		
INTEGRATION	NS strands	Energy & Change – energy required for processes	
	Learning Areas	Mathematics - measurement	
ASSESSMENT <i>Reminder :</i> Record learner performance on Formal Assessment Tasks	Self assessment <input type="checkbox"/> Peer assessment <input type="checkbox"/> Group assessment <input type="checkbox"/> Teacher assessment <input type="checkbox"/>		
	Investigation activities √	Case studies <input type="checkbox"/>	Mind mapping √
	Projects <input type="checkbox"/>	Simulations <input type="checkbox"/>	Concept mapping <input type="checkbox"/>
	Research <input type="checkbox"/>	Role-play <input type="checkbox"/>	Brainstorming tasks <input type="checkbox"/>
	Assignment <input type="checkbox"/>	Translation task <input type="checkbox"/>	Functional writing √
	Performance based assess. √ <input type="checkbox"/>	Interviews <input type="checkbox"/>	Presentations <input type="checkbox"/>
	Practical demonstration <input type="checkbox"/>	Questionnaires <input type="checkbox"/>	Other:
	Test <input type="checkbox"/>	Structured questions <input type="checkbox"/>	Other:

WEEK 19		SUGGESTIONS FOR CONSOLIDATION	
SCIENTIFIC LITERACY	Revise all previous concepts		
NOTES on HOW	<p><b>Properties of materials:</b> Make something to use at home out of found materials (e.g. a bird feeder, a lamp, clothing, a candle holder, etc). Show how it works and explain why those materials were used (refer to properties of the materials).</p> <p><b>Mixtures and solutions:</b> Do a 'show and tell' on making mixtures and solutions using everyday materials/ingredients. Explain why the sea is salty. How did this come about?</p>		

	<b>Effects of heat on materials:</b> Write and draw about how heat changes substances and materials at home (e.g. baking cakes expand in the hot oven and contract when cooled etc.).		
METHODOLOGY	Practical work with support		
RESOURCES	Work sheet, cold and hot water, substances to dissolve; available source of heat e.g. spirit burner or candle, heating stand, protecting gloves		
INTEGRATION	NS strands	Life & Living – effects of air, water and soil pollution on plants and animals	
	Learning Areas	Social Sciences – people and the environment, using resources responsibly, impact of pollution	
ASSESSMENT <i>Reminder:</i> Record learner performance on Formal Assessment Tasks	Self assessment <input type="checkbox"/> Peer assessment <input type="checkbox"/> Group assessment <input type="checkbox"/> Teacher assessment <input type="checkbox"/>		
	Investigation activities <input type="checkbox"/>	Case studies <input type="checkbox"/>	Mind mapping <input type="checkbox"/>
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	Performance based assess. <input type="checkbox"/>	Interviews <input type="checkbox"/>	Presentations <input type="checkbox"/>
	Practical demonstration <input type="checkbox"/>	Questionnaires <input type="checkbox"/>	Other:
	Test <input type="checkbox"/>	Structured questions <input type="checkbox"/>	Other:

WEEK 20	FORMAL ASSESSMENT TASK 2 - SOLUTIONS
SCIENTIFIC LITERACY	<p>Briefly define concepts:</p> <ul style="list-style-type: none"> <li>• Mixtures: a combination of two or more substances</li> <li>• Solutions: a mixture of a liquid with a dissolved solid or gas (e.g. coffee)</li> <li>• Soluble: substances which can dissolve in a liquid are soluble (e.g. sugar)</li> <li>• Insoluble: substances which cannot dissolve in a liquid are insoluble (e.g. tea leaves)</li> <li>• Temporary change: change is not permanent - can change back again</li> <li>• Permanent change: cannot change back to its original form.</li> </ul>
NOTES on HOW  LO 5.1.1 – 5.1.3	<p><b>Scientific investigation to demonstrate how to change the solubility of a solute</b></p> <p>Step 1 PLAN Learners list questions to investigate how to change the speed of dissolving</p> <p>Step 2 Learners suggest a focus question.</p> <p>Step 3 CONDUCT Learners carry out instructions. Learners make solutions to show the effect on the speed of dissolving when:</p> <ul style="list-style-type: none"> <li>• the amount of stirring is varied. or</li> <li>• The particle size of the solute is varied.</li> </ul>

	<p>Step 4 Learners:</p> <ul style="list-style-type: none"> <li>• draw and write to explain their procedure.</li> <li>• record observations.</li> </ul> <p>Step 5 EVALUATE Learners write to tell what they have learnt.</p> <p>Step 6 Check the learners' knowledge. Can learners:</p> <ul style="list-style-type: none"> <li>• List questions and identify a suitable focus question?</li> <li>• Make up and carry out a suitable procedure with understanding?</li> <li>• Measure and record accurately?</li> <li>• Explain what they have learnt in their own words?</li> </ul>		
METHODOLOGY	Investigation		
RESOURCES	Work sheets		
INTEGRATION	NS strands	Energy & Change – energy is needed for processes e.g. heat energy	
	Learning Areas	Mathematics - measurement	
ASSESSMENT <i>Reminder :</i> Record learner performance on Formal Assessment Tasks	Self assessment <input type="checkbox"/> Peer assessment <input type="checkbox"/> Group assessment <input type="checkbox"/> Teacher assessment <input type="checkbox"/>		
	Investigation activities √	Case studies <input type="checkbox"/>	Mind mapping <input type="checkbox"/>
	Projects <input type="checkbox"/>	Simulations <input type="checkbox"/>	Concept mapping <input type="checkbox"/>
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	Practical demonstration √	Questionnaires <input type="checkbox"/>	Other:
	Test <input type="checkbox"/>	Structured questions <input type="checkbox"/>	Other:



Revise words from previous weeks.

**LO 2 AS 1** Prepare an assessment task in which the learners should be able to recall scientific knowledge based on the following

- Properties of materials
- Properties of materials in their surroundings
- Properties of metals, plastics and ceramics (including glass)
- The phases of matter
- The differences between mixtures and solutions
- Saturated and unsaturated solutions

**LO 2 AS 1** Learners must describe: classes of materials  
the properties of materials  
the phases of matter

**LO 2 AS 1** Learners must explain: the differences between mixtures and solutions  
Saturated and unsaturated solutions

**LO 2 AS 2** Learners must categorise:  
materials in to the classes: metals, plastics and ceramics  
(including glass)  
the phases of matter

**LO 2 AS 2** Learners must explain their own rule for categorising

**LO 3 AS 2** Learners explain technological products by referring to mixtures and solutions

### TERM 3: LIFE AND LIVING

WEEK 22		BASELINE ASSESSMENT - LIFE AND LIVING (GRADE 4)
SCIENTIFIC LITERACY	Learners explain the following: <ul style="list-style-type: none"> <li>• Life Processes: all living things carry out ALL of these processes: move, reproduce, grow, respond to stimuli, breathe, feed and excrete</li> <li>• Interactions in environment: living organisms interact with the living environment and are affected by the non-living environment.</li> </ul>	
NOTES on HOW	Step 1 Learners tell teacher what they understand about life processes.  Which of the following carries out all the life processes? Learners compare: <ol style="list-style-type: none"> <li>(1) a stone with a dog</li> <li>(2) a car with a bird</li> <li>(3) a fire with a human being etc.</li> </ol> Discuss different learners' ideas and correct where necessary.	
LO 5.2.1	Step 2 Teachers give learners pictures showing stages in the life cycles of (1) a plant (2) an animal and (3) a human. Learners sequence the pictures in their correct order and label the pictures and the processes.	
	Step 3 Check the learners' knowledge: Can the learners <ul style="list-style-type: none"> <li>• Distinguish between living and non-living things?</li> </ul>	
METHODOLOGY	Class discussion; refer to previous knowledge and experiences, poster making.	
RESOURCES	Worksheets on prior knowledge.	
INTEGRATION	NS strands	Matter and materials – different forms and kinds of materials
	Learning Areas	Life Orientation – personal and physical development

WEEK 22 continued +WEEK 23		ECOSYSTEMS
SCIENTIFIC LITERACY	Briefly define concepts : <ul style="list-style-type: none"> <li>• Ecosystem: an ecosystem includes the living non-living things in an area and their interaction with one another</li> <li>• Environment: the living and non-living surroundings that affect living things</li> <li>• Habitat: a specific place, within an ecosystem, where plants and animals live and reproduce</li> <li>• Organisms: any living things e.g. animals and plants</li> <li>• Interdependence: living organisms depending on one another for survival</li> <li>• Biodiversity: “bio” means LIFE / living organisms; “diversity” means a variety – i.e. the many different kinds of living organisms (plants and animals).</li> </ul>	

<p style="text-align: center;">NOTES on HOW</p> <p>LO 5.2.1 – 5.2.2</p>	<p><b>Ecosystems</b> <b>Biodiversity in ecosystems</b></p> <p>Step 1 Learners contribute ideas about what they understand about biodiversity. Teacher makes a mind-map of learners' ideas and clarifies the meaning of biodiversity. (Biodiversity is the number of different organisms (variety) found within a specified place or geographical region).</p> <p>Step 2 Teacher shows a variety of pictures of plants and animals from newspapers or the internet. Explain the following: (1) a high biodiversity of animals (many different types of animals in the same area) (2) a low biodiversity of animals (little variety / all animals may be the same) (3) a high biodiversity of plants (4) a low biodiversity of plants</p> <p>Step 3 Learners write sentences about the biodiversity in: (1) Gardens at home or on the school grounds (take them out if possible) (2) A natural place they have visited e.g. the seaside, a park etc.</p> <p>Step 4</p> <ul style="list-style-type: none"> <li>• Learners make a poster to show the biodiversity of plants and animals in an area of their choice. They use pictures or their own drawings.</li> <li>• They write the names of the plants and animals and notes next to the pictures.</li> </ul> <p><b>Adaptations of plants and animals in an ecosystem</b></p> <p>Step 5</p> <ul style="list-style-type: none"> <li>• Teacher gives learners a picture of a plant that has clear adaptations to its environment e.g. a cactus which is adapted to a dry environment.</li> <li>• In groups, learners discuss the plant's adaptations which they feed back to the teacher who makes notes on the board. Learners copy these notes as an annotation onto their pictures.</li> <li>• Do the same with a picture of an animal e.g. a fish which is adapted to life under water.</li> </ul> <p><b>The importance of parts of an ecosystem</b></p> <p>Step 6 Learners look at a picture of an ecosystem containing plants and animals. Learners describe (write sentences) how animals are dependent on plants (e.g. for food, shelter from weather, protection from predators) and how plants are dependent on animals (e.g. animal droppings fertilise soil, disperse seeds and fruit).</p> <p>Step 7 Learners write notes and describe why water and soil are important in an ecosystem (e.g. soil: anchors plants, it provides nutrients and water: is needed by all living things for life, and needed for photosynthesis).</p>
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	<p>Step 8 Give learners a list of plants and / or animals to categorize according to which habitat they are best suited to e.g. dry (arid) or wetland. They explain in what ways they are suited to the habitat.</p> <p><i>Extended learning:</i> <i>In groups, learners look at ecosystems from other countries using reference books or the internet, and determine the biodiversity of the ecosystem by writing down the names of the various plants and animals.</i> <i>Learners write notes describing how a different plant and animal is adapted to its specific environment.</i></p> <p>Step 9 Check the learners' knowledge: Can the learners:</p> <ul style="list-style-type: none"> <li>• Describe what biodiversity is?</li> <li>• Determine the biodiversity of an area?</li> <li>• Name or list adaptations of a plant or animal?</li> <li>• Describe how plants and animals depend on each other in an ecosystem?</li> <li>• State the importance of water and soil in an ecosystem?</li> </ul>																					
METHODOLOGY	Refer to things around them or use cards, show pictures, interaction class mates, table.																					
RESOURCES	Text books, posters, pictures and things around them, crayons, internet.																					
INTEGRATION	<table border="1"> <tr> <td>NS strands</td> <td>Matter and Materials - Earth materials Planet Earth &amp; Beyond – plant and animal habitats</td> </tr> <tr> <td>Learning Areas</td> <td>Life Orientation - personal, physical and social development Social Sciences – people and the environment</td> </tr> </table>	NS strands	Matter and Materials - Earth materials Planet Earth & Beyond – plant and animal habitats	Learning Areas	Life Orientation - personal, physical and social development Social Sciences – people and the environment																	
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Reminder : Record learner performance on Formal Assessment Tasks																						

WEEK 24		PHOTOSYNTHESIS and FOOD CHAINS
SCIENTIFIC LITERACY	<p>Briefly define concepts:</p> <ul style="list-style-type: none"> <li>• Photosynthesis: the process by which green plants use sunlight, carbon dioxide and water to make food substances</li> <li>• Food chain: a food chain shows 'who eats whom' in an ecosystem</li> <li>• Producer (e.g. plants): an organism, at the start of a food chain, that does not need to eat, but makes its own food</li> <li>• Consumer (herbivores, carnivores and omnivores): an organism which feeds on other organisms in a food chain</li> <li>• Decomposer: an organism that breaks down the dead bodies of plants and animals.</li> </ul>	

<p>NOTES on HOW</p> <p>LO 5.2.1 – 5.2.4</p>	<p>Step 1 Teacher explains the process of photosynthesis and the importance of the Sun in the process.</p> <p>Step 2 Learners draw and write to explain the process of photosynthesis using the words below: <i>A green plant; food (starch); sunlight energy; water; roots; carbon dioxide; leaves; oxygen; takes in; gives off; makes.</i></p> <p>Step 3 Teacher shows learners different food chains. She writes down the food chains and draws arrows to connect the organisms. <b>(Remember the arrows go from the food to the animal eating it, e.g. grass → buck → lion)</b></p> <p>Teacher identifies the producers and consumers, and explains these terms. e.g. <i>grass (producer) → buck (consumer) → lion (consumer)</i></p> <p>Step 4 Activity on food chains:</p> <ul style="list-style-type: none"> <li>• Learners recall the food they ate that day.</li> <li>• Learners draw a food chain to show where their food came from. They write labels with the <i>producers</i> and <i>consumers</i> in the food chain.</li> </ul> <p>Step 5 Learners write down different food chains found in different ecosystems. Learners name and describe the <i>producers</i> and <i>consumers</i> in the food chains. Learners describe the importance of each member in each of their food chains.</p> <p><i>Extended learning: draw a food chain which includes an owl. Draw a freshwater and marine food chain.</i></p> <p>Step 6 Check the learners' knowledge: Can the learners:</p> <ul style="list-style-type: none"> <li>• List the things needed for photosynthesis to take place?</li> <li>• List things produced during photosynthesis?</li> <li>• Describe the process of photosynthesis?</li> <li>• Draw a food chain, with arrows to show the flow of food (energy)?</li> </ul>				
<p>METHODOLOGY</p>	<p>Class discussion, research, experiments, plants</p>				
<p>RESOURCES</p>	<p>Text books, pictures, flip charts, plants, worksheets,</p>				
<p>INTEGRATION</p>	<table border="1"> <tr> <td data-bbox="392 1612 564 1680"> <p>NS strands</p> </td> <td data-bbox="564 1612 1457 1680"> <p>Energy &amp; Change – transfer of food energy Planet Earth &amp; Beyond – Earth materials (air, water, soil)</p> </td> </tr> <tr> <td data-bbox="392 1680 564 1744"> <p>Learning Areas</p> </td> <td data-bbox="564 1680 1457 1744"> <p>Life Orientation – promoting healthy habits e.g. exercise etc.</p> </td> </tr> </table>	<p>NS strands</p>	<p>Energy &amp; Change – transfer of food energy Planet Earth &amp; Beyond – Earth materials (air, water, soil)</p>	<p>Learning Areas</p>	<p>Life Orientation – promoting healthy habits e.g. exercise etc.</p>
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<p>Learning Areas</p>	<p>Life Orientation – promoting healthy habits e.g. exercise etc.</p>				

<b>ASSESSMENT</b> <i>Reminder :</i> Record learner performance on Formal Assessment Tasks	Self assessment <input type="checkbox"/> Peer assessment <input type="checkbox"/> Group assessment <input type="checkbox"/> Teacher assessment <input checked="" type="checkbox"/>		
	Investigation activities <input type="checkbox"/>	Case studies <input type="checkbox"/>	Mind mapping <input type="checkbox"/>
	Projects <input type="checkbox"/>	Simulations <input type="checkbox"/>	Concept mapping <input type="checkbox"/>
	Research <input checked="" type="checkbox"/>	Role-play <input type="checkbox"/>	Brainstorming tasks <input type="checkbox"/>
	Assignment <input type="checkbox"/>	Translation task <input checked="" type="checkbox"/>	Functional writing <input checked="" type="checkbox"/>
	Performance based assess. <input type="checkbox"/>	Interviews <input type="checkbox"/>	Presentations <input type="checkbox"/>
	Practical demonstration <input type="checkbox"/>	Questionnaires <input type="checkbox"/>	Other:
	Test <input type="checkbox"/>	Structured questions <input type="checkbox"/>	Other:

WEEK 25		SENSES																																																				
<b>SCIENTIFIC LITERACY</b>	Briefly define concepts: <ul style="list-style-type: none"> <li>• Senses: an organ or part of the body that is sensitive to a stimulus such as sound, touch or light</li> <li>• Sight: the ability to see light</li> <li>• Hearing: the ability to hear sounds</li> <li>• Tasting: an ability to taste sweet, salt, sour and bitter flavours in the mouth</li> <li>• Feeling: (Touch): the ability to feel touch and pressure</li> <li>• Smell: the ability to smell odours by means of organs in the nose.</li> </ul>																																																					
<b>NOTES on HOW</b>  LO 5.2.1 – 5.2.2	Step 1 Learners discover which sense is used by the animals in the table. Learners tick off in the table. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">Statements</th> <th style="width: 10%;">Sight</th> <th style="width: 10%;">Hearing</th> <th style="width: 10%;">Smell</th> <th style="width: 10%;">Touch</th> <th style="width: 10%;">Taste</th> </tr> </thead> <tbody> <tr> <td>The spider uses 8 eyes to spot its enemy.</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Sharks use their lateral lines and are sensitive to electric fields given off by animals.</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>The bat tracks prey with echo location radar.</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>The Grasshopper has tiny hairs all over its body.</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>The tongue of the rabbit contains 17000 taste buds.</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Snakes have a special organ to detect the odour of their prey.</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Add more.....</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>						Statements	Sight	Hearing	Smell	Touch	Taste	The spider uses 8 eyes to spot its enemy.						Sharks use their lateral lines and are sensitive to electric fields given off by animals.						The bat tracks prey with echo location radar.						The Grasshopper has tiny hairs all over its body.						The tongue of the rabbit contains 17000 taste buds.						Snakes have a special organ to detect the odour of their prey.						Add more.....					
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	<p>Step 2 Teacher discusses how animals' senses have developed in strange and wonderful ways e.g. bat-eared fox, aardvark, owl etc. Learners write down the name of the animal, its special sense organ, and its use.</p> <p>Step 3</p> <ul style="list-style-type: none"> <li>• Teacher gives learners a list of animals e.g. lion, owl, snake etc.</li> <li>• In groups, learners discuss the importance of the senses of these animals and how they help them to (1) hunt and (2) protect themselves against dangers.</li> <li>• Learners record their information in the form of a table, creating their own categories. They explain their rules for categorising.</li> </ul> <p><i>Extended learning: Learners find information on other animals and their senses (e.g. bat, spider) and share with rest of the class.</i></p> <p>Step 4 Check the learners' knowledge: Can the learners:</p> <ul style="list-style-type: none"> <li>• List the five senses and their functions?</li> <li>• Determine how senses are used by different animals to survive in their environment?</li> </ul>		
METHODOLOGY	Class discussion, draw tables, research information, show pictures, question / answer.		
RESOURCES	Text books, pictures, encyclopaedia, tables		
INTEGRATION	NS strands	Planet Earth & Beyond – relating to the physical environment	
	Learning Areas	Life Orientation – personal, physical and social environment	
ASSESSMENT <i>Reminder :</i> Record learner performance on Formal Assessment Tasks	Self assessment <input type="checkbox"/> Peer assessment <input type="checkbox"/> Group assessment <input type="checkbox"/> Teacher assessment <input type="checkbox"/>		
	Investigation activities <input type="checkbox"/>	Case studies <input type="checkbox"/>	Mind mapping <input type="checkbox"/>
	Projects <input type="checkbox"/>	Simulations <input type="checkbox"/>	Concept mapping <input type="checkbox"/>
	Research √	Role-play <input type="checkbox"/>	Brainstorming tasks <input type="checkbox"/>
	Assignment <input type="checkbox"/>	Translation task √	Functional writing <input type="checkbox"/>
	Performance based assess. <input type="checkbox"/>	Interviews <input type="checkbox"/>	Presentations <input type="checkbox"/>
	Practical demonstration <input type="checkbox"/>	Questionnaires <input type="checkbox"/>	Other:
	Test <input type="checkbox"/>	Structured questions √	Other:

WEEK 26		DIGESTIVE SYSTEMS	
SCIENTIFIC LITERACY	<p>Briefly define concepts:</p> <ul style="list-style-type: none"> <li>• Digestive system: the organs which help with the process of digesting food</li> <li>• Digestion: the process by which food is broken down into simple chemical compounds</li> <li>• Parts of the digestive system: mouth, salivary glands, gullet, stomach, liver, pancreas, small intestine, large intestine and anus.</li> </ul>		

<p>NOTES on HOW</p> <p>LO 5.2.1</p>	<p>Step 1 Teacher gives learners a picture of a human's digestive system and names the parts. She also describes the path taken by food as it passes through the digestive system.</p> <p>Step 2 Learners use a picture of the digestive system and label each part. Learners describe, in their own words, what happens to their food when they eat it.</p> <p>Step 3 Teacher describes the functions of each organ of the digestive system, using a picture or model. Learners describe the function(s) of the different parts by writing short notes next to each label.</p> <p><i>Extended learning: Learners use other resources to find information on other kinds of digestive systems in animals.</i></p> <p>Step 4 Check the learners' knowledge: Can the learners:</p> <ul style="list-style-type: none"> <li>• Label the human digestive system?</li> <li>• Describe the path food takes through the digestive system?</li> <li>• List the function(s) of parts of the digestive system?</li> </ul>		
<p>METHODOLOGY</p>	<p>Recall information and build on it, label drawings.</p>		
<p>RESOURCES</p>	<p>Pictures, models, posters, flash cards</p>		
<p>INTEGRATION</p>	<p>NS strands</p>	<p>Energy &amp; Change – processing food and using energy Matter and Materials - phases of matter</p>	
	<p>Learning Areas</p>	<p>Life Orientation - healthy lifestyle</p>	
<p>ASSESSMENT</p> <p><i>Reminder :</i> Record learner performance on Formal Assessment Tasks</p>	<p>Self assessment <input type="checkbox"/> Peer assessment <input type="checkbox"/> Group assessment <input type="checkbox"/> Teacher assessment <input type="checkbox"/></p>		
	<p>Investigation activities <input type="checkbox"/></p>	<p>Case studies <input type="checkbox"/></p>	<p>Mind mapping <input type="checkbox"/></p>
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	<p>Assignment <input type="checkbox"/></p>	<p>Translation task <input type="checkbox"/></p>	<p>Functional writing √</p>
	<p>Performance based assess. <input type="checkbox"/></p>	<p>Interviews <input type="checkbox"/></p>	<p>Presentations <input type="checkbox"/></p>
	<p>Practical demonstration <input type="checkbox"/></p>	<p>Questionnaires <input type="checkbox"/></p>	<p>Other:</p>
	<p>Test <input type="checkbox"/></p>	<p>Structured questions <input type="checkbox"/></p>	<p>Other:</p>



WEEK 27	FOOD PYRAMID
SCIENTIFIC LITERACY	<p>Define the following concepts:</p> <ul style="list-style-type: none"> <li>• Food pyramid: a diagram in the shape of a pyramid, which shows the main food groups</li> <li>• Nutrients: substances which provide nourishment</li> <li>• Carbohydrates: foods which serve as a major energy source in our diets. Sugars, starches and cellulose are all carbohydrates.</li> <li>• Proteins: foods which are used for building up the body. Meat, fish, eggs, beans and nuts contain proteins.</li> <li>• Fats and oils: foods (olive oil, butter meat fat) which serve as a source of energy and maintain parts of the body such as the nervous system</li> <li>• Vitamins and minerals: special food substances which are needed in small amounts for normal growth and activity of the body</li> <li>• Balanced diet: when foods containing the important nutrients are eaten in the correct amounts</li> <li>• HIV/AIDS patients: people who are infected with the <i>Human Immunodeficiency Virus</i> (HIV), which breaks down the immune system.</li> <li>• Diabetes: a disorder where the body is incapable of keeping its blood glucose levels normal.</li> </ul>
<p>NOTES on HOW</p> <p>LO 5.2.1 – 5.2.2 5.3.3</p>	<p>Step 1 Learners discuss the role that food plays in their every day life. The importance of food and why it is necessary to follow a healthy diet. They record their discussions in point form under the headings '<i>The importance of food</i>' and '<i>The importance of a balanced diet</i>'.</p> <p>Step 2 Teacher gives learners a diagram of the food pyramid and describes the different groups of food on the different levels of the food pyramid. Teacher names the main nutrients present in each food group. (carbohydrates, proteins, fats, minerals &amp; vitamins) Teacher explains the function of each food group in our bodies.</p> <p>Step 3</p> <ul style="list-style-type: none"> <li>• Learners mention the foods they have eaten the previous day and the teacher lists them.</li> <li>• Learners categorize the different food types according to their place on the food pyramid.</li> </ul> <p>Step 4 Learners can use this information from step 3 with pictures to make a food pyramid on a poster.</p> <p>Step 5</p> <ul style="list-style-type: none"> <li>• Teacher gives learners information on what constitutes a healthy diet.</li> <li>• Learners write down their own diet for a week and evaluate their diet to determine whether it is balanced or not. They make recommendations about how they can improve their diets.</li> </ul> <p>Step 6 Describe and discuss why certain conditions require certain diets. People who are diabetics are only allowed to eat certain types of foods due to their illnesses. Athletes are on certain diets to build up their energy and control their body weight. People who are obese need special diets.</p>

	<p>Step 7 Learners do research to complete the table below:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Disease</th> <th>Caused by</th> <th>Diet needed</th> <th>Supplements needed</th> <th>What will happen if diet &amp; supplements not taken</th> </tr> </thead> <tbody> <tr> <td>Diabetes</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>TB</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>HIV/AIDS</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>Step 8 Check the learners' knowledge: Can the learners:</p> <ul style="list-style-type: none"> <li>• State the importance of food and a balanced diet?</li> <li>• Categorise basic foods into different food groups and identify the main nutrients in each group?</li> <li>• Distinguish between a balanced and an unbalanced diet?</li> <li>• Explain why certain people may need a special diet?</li> </ul>			Disease	Caused by	Diet needed	Supplements needed	What will happen if diet & supplements not taken	Diabetes					TB					HIV/AIDS				
Disease	Caused by	Diet needed	Supplements needed	What will happen if diet & supplements not taken																			
Diabetes																							
TB																							
HIV/AIDS																							
METHODOLOGY	Discussions, create, develop, build, describe, research.																						
RESOURCES	Picture of Food pyramid , magazines, table																						
INTEGRATION	NS strands	Energy & Change – energy in different foods																					
	Learning Areas	Life Orientation – health promotion, personal and social development																					
ASSESSMENT <i>Reminder :</i> Record learner performance on Formal Assessment Tasks	Self assessment <input type="checkbox"/> Peer assessment <input type="checkbox"/> Group assessment <input type="checkbox"/> Teacher assessment <input type="checkbox"/>																						
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	Practical demonstration <input type="checkbox"/>	Questionnaires <input type="checkbox"/>	Other:																				
	Test <input type="checkbox"/>	Structured questions <input type="checkbox"/>	Other:																				

**WEEK 28 CONSOLIDATION AND FORMAL ASSESSMENT TASK 4**

**Consolidation**

- Cut and paste pictures to describe areas with low and high biodiversity.
- List five ways in which a cactus is adapted to desert life and a frog is adapted to pond life.
- Write sentences to describe the importance of water and soil in ecosystems.
- List four ways in which plants and animals depend on one another in ecosystems.
- Make an annotated drawing of a plant to show the process of photosynthesis.
- Draw three food chains and identify the producers and consumers in each.
- Write notes to describe the roles of producers and consumers in a food chain.
- Choose a picture of an animal, label its senses and describe the importance of each sense for the animal's survival.

#### FORMAL ASSESSMENT TASK 4

- LO 1 AS 1** Vocabulary and spelling.
- LO 1 AS 1** Draw a food chain of breakfast (cereal and milk or egg and bread).
- LO 2 AS 1** Describe photosynthesis in any way. (notes, drawing with labels)
- LO 3 AS 1** Describe the importance of water in an ecosystem.
- LO 3 AS 2** Describe what would happen if there were no more plants left in the world.
- LO 2 AS 1** Describe the relationship between plants and animals within an ecosystem.
- LO 2 AS 1** Describe how photosynthesis takes place.
- LO 2 AS 1** Name and describe the functions of each organ in the digestive system.
- LO 2 AS 1** Describe how animal senses are adapted for survival.
- LO 2 AS 1** Describe the importance of soil and water in an ecosystem.
- LO 2 AS 2** Describe the different role players in a food chain.
- LO 2 AS 1** Use your own examples of producers and consumers and describe your own food chain.  
Describe a meal that has all the food groups in it.

#### WEEK 29

#### SEXUAL REPRODUCTION IN PLANTS

#### SCIENTIFIC LITERACY

Define the following concepts:

Processes

- Sexual reproduction: reproduction involves two parents. Fertilization takes place in sexual reproduction.
- Pollination: when pollen is carried from the male parts to the female part of a plant (from the anther to the stigma)
- Mating: when the male and female animals of the same species come together so that the male can deposit sperm cells into the female's body to fertilize her eggs.
- Fertilization: the joining of male and female sex cells to form a new individual
- Seed dispersal: to distribute seeds in different directions
- Germination: seeds germinate when they start to grow and develop their first root and shoot.

Sex cells

- Pollen: contains the male sex cells of a flowering plant
- Sperm cells: the male sex cells of animals
- Ovules: contain the female sex cells of a flowering plant
- Eggs: the female sex cells of animals.

	<p>Sex organs</p> <ul style="list-style-type: none"> <li>• Carpel: female part of a flower (consists of the stigma, style and ovary)</li> <li>• Stamen: the male part of a flower (consists of the anther and filament)</li> <li>• Ovary and uterus and vagina: female sexual organs in animals</li> <li>• Penis and testes: male sex organs in animals.</li> </ul>
<p>NOTES on HOW</p> <p>LO 5.2.1</p>	<p><b>Sexual reproduction in plants</b></p> <p>Step 1 Learners draw real examples of plants and label the parts (with roots, stems and leaves).</p> <p>Step 2 Learners draw real examples of flowers and label the parts. Outer parts: calyx, corolla; female parts: ovary, style and stigma; male parts: stamen (anther and filament).</p> <p>Step 3 Teachers give learners pictures of two flowers (same type), a seed, a germinating seed and a fruit. Learners arrange the pictures in their correct order (in the form of a life cycle with arrows). Label the pictures and the processes.</p> <p>Step 4 Learners list things (e.g. insects and water, wind blowing) that are responsible for (1) pollination and (2) dispersal of seeds. Learners give a heading and draw and write sentences to explain pollination and dispersal.</p> <p><b>Sexual reproduction in animals</b> Teacher explains how sexual reproduction takes place in animals (mating, fertilization)</p> <ul style="list-style-type: none"> <li>• in frogs and fishes (external fertilization)</li> <li>• birds, reptiles and mammals (internal fertilization).</li> </ul> <p>Learners choose one species of animal (e.g. elephant). They research that animal to find out:</p> <ul style="list-style-type: none"> <li>• How male and female mate (mating dance, pair off for life etc.)</li> <li>• How the animal gives birth (eggs or born alive)</li> <li>• How the animals protect their young (and for how long they care for them)</li> <li>• What they feed the young on.</li> </ul> <p>Learners make a poster and present their findings.</p> <p>Step 5 Check the learners' knowledge: Can the learners:</p> <p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• Draw and label the parts of a plant and flower?</li> <li>• Describe the life cycle of a flowering plant?</li> <li>• Identify and describe various agents that pollinate flowers and agents that disperse seeds?</li> </ul>

	<b>Animals</b> <ul style="list-style-type: none"> <li>Find sufficient accurate information about reproduction in an animal of their choice?</li> <li>Make a poster (with heading, pictures, labels and notes) with information they found from their research?</li> <li>Present their poster and answer any questions about it?</li> </ul>		
METHODOLOGY	Discussion and recall of information. Build on information through drawings, Research		
RESOURCES	Plants, flowers, seeds, pictures, illustrations, books , internet, paper ,crayons		
INTEGRATION	NS strands	Matter & Materials – wind (moving air) and water	
	Learning Areas	Arts & Culture – visual art (poster making) Life Orientation – personal development	
ASSESSMENT <i>Reminder :</i> Record learner performance on Formal Assessment Tasks	Self assessment <input type="checkbox"/> Peer assessment <input type="checkbox"/> Group assessment <input type="checkbox"/> Teacher assessment <input type="checkbox"/>		
	Investigation activities <input type="checkbox"/>	Case studies <input type="checkbox"/>	Mind mapping <input type="checkbox"/>
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	Research ✓	Role-play <input type="checkbox"/>	Brainstorming tasks <input type="checkbox"/>
	Assignment <input type="checkbox"/>	Translation task ✓	Functional writing ✓
	Performance based assess. <input type="checkbox"/>	Interviews <input type="checkbox"/>	Presentations ✓
	Practical demonstration <input type="checkbox"/>	Questionnaires <input type="checkbox"/>	Other:
	Test <input type="checkbox"/>	Structured questions <input type="checkbox"/>	Other:

WEEK 30	INVESTIGATION TASK AND PREPARATION FOR FORMAL ASSESSMENT TASK 5
LO 5.1	<p><b>Investigation: Sexual reproduction in plants</b></p> <p>Step 1 PLAN List questions which relate to the sexual reproduction in plants. Suggest a testable question e.g. what conditions are best for germinating seeds and growing plants?</p> <p>Step 2 CONDUCT Carry out own investigation or given instructions. Seeds (of the same type of plant) are germinated and grown into mature plants under different conditions (e.g. in full sun, in shade, in a cupboard etc.). Observe and record growth every three days by measuring, drawing and describing.</p> <p>Step 3 EVALUATE Report on group's procedure. Report on results obtained. Draw conclusions based on results.</p> <p><i>Extended learning: repeat the investigation using seeds of different plants.</i></p>

**Consolidation**

- Label a diagram of the digestive system and state the function(s) of its parts.
- Cut out pictures of various foods and sort them into the different food groups in the form of a food pyramid.
- Write down the names of the main nutrients in each food group.
- In the form of a table, compare a balanced diet and one which is not balanced.
- Explain why some people may need a special diet.
- Draw and label the parts of a plant and a flower.
- Describe the life cycle of a plant e.g. a bean plant.
- Describe things that (1) pollinate flowers and (2) disperse seeds.

**FORMAL ASSESSMENT TASK 5**

LO 5.2 – 5.3 3

- LO 2 AS 1** Vocabulary and spelling
- LO 2 AS 2** Give learners 8-10 food types and ask them to categorise them by providing their own rule
- LO 2 AS 2** Provide a list of animals or plants and ask them to categorise them into groups.
- LO 3 AS 1** Describe how you would choose a balanced diet in your own circumstances.
- LO 2 AS 1** Draw and describe the life cycle of a plant.
- LO 2 AS 1** Describe what obesity means.
- LO 2 AS 1** Name and Describe the functions of each organ the digestive system.
- LO 3 AS 3** Describe how the lack of access to healthy food and other supplements has a deadly impact on people living with HIV, Tuberculosis or Diabetes.

## TERM 4: PLANET EARTH AND BEYOND

WEEK 31 continued	BASELINE ASSESSMENT (Grade 4)	
<p style="text-align: center;">NOTES on HOW</p> <p style="text-align: center;">LO 1</p>	<p><b>Baseline assessment of Planet Earth and Beyond (Grade 4)</b></p> <p>Ask learners to elaborate on the following concepts in writing. Have class discussion to reach agreement on the correct meaning:</p> <ul style="list-style-type: none"> <li>• Solar System: a star together with the planets, moons, asteroids, comets and dust which orbit around it</li> <li>• Earth materials: soil, water and air</li> <li>• Rotation: a planet or moon spinning on its own axis</li> <li>• Revolution: a circular path of movement (orbit) of the Earth around the Sun and the Moon around the Earth</li> <li>• Length of day: the number of daylight hours from sunrise to sunset</li> <li>• Length of night: the number of hours from sunset to sunrise</li> <li>• Earth year: the period of time it takes the Earth to complete one revolution (orbit) around the sun the Sun.</li> <li>• Atmosphere: the layers of gases around Earth</li> <li>• Weather: the temperature in °C, wind speed and direction, amount of sunlight and the amount of moisture (e.g. rain) measured on a daily basis</li> <li>• Measuring weather: a thermometer measures the temperature, a wind gauge measures the wind speed, a rain gauge measure the amount of rainfall.</li> </ul>	
METHODOLOGY	Research and class discussion	
RESOURCES	Research material	
INTEGRATION	NS strands	Matter & Materials – Earth materials, Moon rock and Sun gases Energy & Change - solar (light and heat ) energy
	Learning Areas	Mathematics - measurement Social Sciences - people and the environment, astronomy in ancient civilisations and early Southern African societies
WEEK 32	THE MOON	
<p style="text-align: center;">SCIENTIFIC LITERACY</p>	<p>Briefly define concepts:</p> <ul style="list-style-type: none"> <li>• Satellite: any object in space that orbits around another object</li> <li>• Phases of the Moon: as seen from Earth, the appearance of the Moon changes every day over a period of time</li> <li>• Reflected light: light energy which hits an object and then bounces off in another direction</li> </ul>	
<p style="text-align: center;">NOTES on HOW</p> <p style="text-align: center;">LO 5.1.1 – 5.1.3</p> <p style="text-align: center;">LO 5.2.1</p>	<p>Step 1</p> <ul style="list-style-type: none"> <li>• Describe the features and properties of the Moon.</li> <li>• Describe the movement of the Moon in relation to the Earth.</li> <li>• Explain how the Moon reflects light from the Sun.</li> <li>• Identify and describe the different phases of the Moon (e.g. New and Full Moon, Gibbous and Quarter Moon).</li> </ul> <p>Step 2</p> <ul style="list-style-type: none"> <li>• List what learners know about the phases of the Moon in a summary table or mind map.</li> <li>• Learners suggest questions to investigate about the phases of the Moon.</li> </ul>	

	<p><b>Example:</b></p> <ul style="list-style-type: none"> <li>• Does the Moon appear the same (shape and size) every night? Explain.</li> <li>• What does the waxing and waning of the Moon mean, and when does waxing and waning of the Moon take place?</li> <li>• Do the phase changes of the Moon appear to follow a pattern?</li> </ul> <p>Step 3</p> <ul style="list-style-type: none"> <li>• Learners plan and set up an investigation to observe the phases of the Moon.</li> <li>• Learners carry out the instructions of the investigation.</li> <li>• Learners observe and record the phases of the Moon on a Moon watch chart. (individually or in or in groups).</li> </ul> <p>Step 4</p> <ul style="list-style-type: none"> <li>• Learners explain the group's (or individual) investigation procedures.</li> <li>• Learners report (write and draw) on the phases of the Moon they observed.</li> <li>• Learners report (present and share) their results obtained.</li> </ul> <p><i>Extended learning:</i></p> <ul style="list-style-type: none"> <li>• Can we live on the Moon?</li> <li>• What is a lunar eclipse?</li> <li>• Report on visits to the Moon.</li> </ul> <p>Step 5</p> <p>Check the learners' knowledge. Can learners:</p> <ul style="list-style-type: none"> <li>• Describe the properties and features of the Moon?</li> <li>• Identify and describe the phases of the Moon in the order that they change over a period of time?</li> </ul>		
METHODODOLOGY	Practical work with support.		
RESOURCES	Moon watch chart, Research material		
INTEGRATION	NS strands	Life & Living - environmental requirements for sustaining life (air and Energy & Change - light energy Matter & Materials - composition of the Moon	
	Learning Areas	Arts & Culture - cultural traditions and practices related to the Moon Social Sciences - the environment, astronomy in early societies	
ASSESSMENT <i>Reminder :</i> Record learner performance on Formal Assessment Tasks	Self assessment <input type="checkbox"/> Peer assessment <input type="checkbox"/> Group assessment <input type="checkbox"/> Teacher assessment <input type="checkbox"/>		
	Investigation activities <input checked="" type="checkbox"/>	Case studies <input type="checkbox"/>	Mind mapping <input type="checkbox"/>
	Projects <input type="checkbox"/>	Simulations <input type="checkbox"/>	Concept mapping <input type="checkbox"/>
	Research <input type="checkbox"/>	Role-play <input type="checkbox"/>	Brainstorming tasks <input type="checkbox"/>
	Assignment <input type="checkbox"/>	Translation task <input checked="" type="checkbox"/>	Functional writing <input checked="" type="checkbox"/>
	Performance based assess. <input type="checkbox"/>	Interviews <input type="checkbox"/>	Presentations <input checked="" type="checkbox"/>
	Practical demonstration <input type="checkbox"/>	Questionnaires <input type="checkbox"/>	Other:
	Test <input type="checkbox"/>	Structured questions <input type="checkbox"/>	Other:



WEEK 33		MOON AND CULTURE
SCIENTIFIC LITERACY	<p>Briefly define concepts:</p> <ul style="list-style-type: none"> <li>• Tradition: long-established custom or belief</li> <li>• Cultural: characteristic way of life of different groups of people</li> <li>• Celebrations: festivals of particular importance to a specific culture</li> <li>• Full Moon: a Moon phase where the full face of the Moon is visible (when the Moon looks round), it occurs about half way through the Moon cycle</li> <li>• New Moon: this Moon phase occurs when the Moon is not illuminated by direct sunlight and is not invisible to the naked eye. The New Moon usually signals the start of a new Moon cycle.</li> </ul>	
NOTES on HOW  LO 5.3.1	<p>Step 1 Learners name and describe the phases of the Moon.</p> <p>Step 2</p> <ul style="list-style-type: none"> <li>• Learners research and relate the importance of the Moon and its phases to certain traditions, cultural activities and beliefs in society.</li> <li>• Learners report (write and present) on those connections to the Moon and its phases that they know in their own communities.</li> </ul> <p>Step 3</p> <ul style="list-style-type: none"> <li>• Learners report (write and present) on the importance of the Moon and its phases to another culture or tradition in the world.</li> </ul> <p><i>Extended learning:</i></p> <ul style="list-style-type: none"> <li>• <i>How do some people feel about a full Moon? (Refer to superstitions about the Moon)</i></li> <li>• <i>How do some animals respond to the Moon? (E.g. dogs are known to howl at the Moon)</i></li> <li>• <i>What natural occurrences are said to be influenced by the phases of the Moon? (e.g. tides)</i></li> </ul> <p>Step 4 Check the learners' knowledge. Can learners:</p> <ul style="list-style-type: none"> <li>• Describe the importance of the phases of the Moon to different cultural groups?</li> </ul>	
METHODOLOGY	Research and class discussion.	
RESOURCES	Research material	
INTEGRATION	NS strands	Matter & Materials – composition of the Moon Life & Living – animal responses to the Moon
	Learning Areas	Arts & Culture – religious practices associated with the Moon e.g. Islam

<b>ASSESSMENT</b> <i>Reminder :</i> Record learner performance on Formal Assessment Tasks	Self assessment <input type="checkbox"/> Peer assessment <input type="checkbox"/> Group assessment <input type="checkbox"/> Teacher assessment <input type="checkbox"/>		
	Investigation activities <input type="checkbox"/>	Case studies <input type="checkbox"/>	Mind mapping <input type="checkbox"/>
	Projects <input type="checkbox"/>	Simulations <input type="checkbox"/>	Concept mapping <input type="checkbox"/>
	Research √	Role-play <input type="checkbox"/>	Brainstorming tasks <input type="checkbox"/>
	Assignment <input type="checkbox"/>	Translation task <input type="checkbox"/>	Functional writing <input type="checkbox"/>
	Performance based assess. <input type="checkbox"/>	Interviews <input type="checkbox"/>	Presentations √
	Practical demonstration <input type="checkbox"/>	Questionnaires <input type="checkbox"/>	Other:
	Test <input type="checkbox"/>	Structured questions <input type="checkbox"/>	Other:

<b>WEEK 34</b>		<b>CLIMATE: ANNUAL SEASONAL CHANGES</b>
<b>SCIENTIFIC LITERACY</b>	Briefly define concepts: <ul style="list-style-type: none"> <li>• Weather: temperature, wind, sunlight and rain measured on a daily basis</li> <li>• Climate: weather conditions observed and measured over a period of time in a certain region</li> <li>• Seasons: a period of the year defined by a distinct climate, (e.g. winter, spring)</li> <li>• Seasonal adaptations made by humans: how humans survive in different seasons by making alterations / adjustments</li> <li>• Seasonal adaptations made by plants and animals: how plants and animals survive in different seasons</li> <li>• Greenhouse gases: gases (such as carbon dioxide and other gases) that absorb and trap heat energy from the Sun</li> <li>• Greenhouse effect: rather than reflecting the heat energy away from the Earth into outer space, greenhouse gases absorb the heat energy, thereby trapping the heat in the Earth's atmosphere</li> <li>• Global warming: worldwide average increase in temperature, attributed to trapped heat energy because of greenhouse gases.</li> </ul>	
<b>NOTES</b> on HOW  LO 5.2.1  LO 5.3.2	Step 1 Review what learners know about weather and climate. Collate information onto table or a mind map.  Step 2 Learners research and describe the features of at least 2 different climatic regions, (e.g. desert, polar region, temperate grassland, savannah grassland, etc.) . Include material such as tables and / or graphs representing the climate of different regions in the research.  Step 3 Learners report about (talk, write and describe) the adaptations made by animals, humans and plants according to the climatic regions where they live (e.g. Eskimos live in igloos; a desert plant, the cactus stores water; lions are well camouflaged in dry grasslands).	

	<p>Step 4 Learners report about (talk, write and describe) the adaptations made by animals, humans and plants according to the different seasons in the regions where they live (heat, cold, drought). (Some birds migrate as winter approaches, animals hibernate in winter, some plants shed their leaves in winter).</p> <p><b>Global Warming</b></p> <p>Step 5</p> <ul style="list-style-type: none"> <li>• Explain: What is global warming?</li> <li>• Learners identify (name and describe) scientific developments and Technological products that have contributed to global warming (e.g. burning coal in power stations, burning petrol and diesel for transport).</li> <li>• Explain about Greenhouse gases (CO<sub>2</sub> etc.) and the Greenhouse Effect</li> <li>• Learners identify (name, and describe) negative effects of global warming, and relate such negative effects to observed and recorded seasonal changes (e.g. melting ice at the polar regions, flooding and droughts).</li> </ul> <p>Step 6</p> <ul style="list-style-type: none"> <li>• Explain: What is a Carbon Footprint? Learners work out their Carbon Footprint.</li> <li>• Learners consider (talk and write) ways to reduce their carbon footprint. (Recycle, Reduce, Re-use and Refuse to buy or use items that are not environmentally friendly)</li> </ul> <p><i>Extended learning:</i></p> <ul style="list-style-type: none"> <li>• <i>Research and present a report on events attributed to:</i> <ul style="list-style-type: none"> <li>○ <i>Global warming, and</i></li> <li>○ <i>Climate change.</i></li> </ul> </li> <li>• <i>Research and report on what people around the world are doing to reduce or curb Greenhouse gas emissions.</i></li> <li>• <i>Suggest local solutions (what you can do at your school and at home) to Reduce your Carbon Footprint.</i></li> </ul> <p>Step 7 Check the learners' knowledge. Can learners:</p> <ul style="list-style-type: none"> <li>• Describe (talk and write): <ul style="list-style-type: none"> <li>⇒ the meaning of global warming?</li> <li>⇒ the causes of global warming?</li> <li>⇒ global warming and climate change?</li> <li>⇒ the impact of climate change on people, plants and animals?</li> <li>⇒ work out their Carbon Footprint?</li> </ul> </li> <li>• Describe ways to reduce the Carbon Footprint (home, school and community)</li> </ul>		
METHODOLOGY	Discussion and recall of information.		
RESOURCES	Reference material		
INTEGRATION	<table border="1"> <tr> <td data-bbox="399 1798 555 1933">NS strands</td> <td data-bbox="555 1798 1457 1933">Energy &amp; Change - light and heat (solar) energy Life and Living - impact of climate change on people, plants and animals Matter &amp; Materials - greenhouse gases / air pollution</td> </tr> </table>	NS strands	Energy & Change - light and heat (solar) energy Life and Living - impact of climate change on people, plants and animals Matter & Materials - greenhouse gases / air pollution
	NS strands	Energy & Change - light and heat (solar) energy Life and Living - impact of climate change on people, plants and animals Matter & Materials - greenhouse gases / air pollution	
Learning Areas	Technology – processing of materials Social Sciences - people and the environment, climatic regions, early settlements		

<b>ASSESSMENT</b> <i>Reminder :</i> Record learner performance on Formal Assessment Tasks	Self assessment <input type="checkbox"/> Peer assessment <input type="checkbox"/> Group assessment <input type="checkbox"/> Teacher assessment <input type="checkbox"/>		
	Investigation activities <input type="checkbox"/>	Case studies <input type="checkbox"/>	Mind mapping <input type="checkbox"/>
	Projects <input type="checkbox"/>	Simulations <input type="checkbox"/>	Concept mapping <input type="checkbox"/>
	Research √ <input type="checkbox"/>	Role-play <input type="checkbox"/>	Brainstorming tasks <input type="checkbox"/>
	Assignment <input type="checkbox"/>	Translation task <input type="checkbox"/>	Functional writing √
	Performance based assess. <input type="checkbox"/>	Interviews <input type="checkbox"/>	Presentations √
	Practical demonstration <input type="checkbox"/>	Questionnaires <input type="checkbox"/>	Other:
	Test <input type="checkbox"/>	Structured questions <input type="checkbox"/>	Other:

WEEK 35		WATER CYCLE AND WATER QUALITY	
<b>SCIENTIFIC LITERACY</b>	Briefly define concepts: <ul style="list-style-type: none"> <li>• Hydrosphere: (water and water vapour); that part of the Earth that is made up of water</li> <li>• Lithosphere: (rocks and soil); solid layer of the Earth consisting of the crust</li> <li>• Atmosphere: (air); mixture of gases around a planet</li> <li>• Water Cycle: processes by which the Earth's water circulates through the environment <ul style="list-style-type: none"> <li>➢ Evaporation: process by which a liquid (e.g. water) becomes a gas (water vapour)</li> <li>➢ Condensation: process by which a gas or vapour changes to a liquid</li> <li>➢ Precipitation: water returning to the Earth in a liquid or solid state (rain, snow), from the atmosphere to land or surface water.</li> <li>➢ Runoff: rain water that does not get soaked into the ground, but runs off it</li> <li>➢ Infiltration: movement of water into soil or porous rock</li> </ul> </li> <li>• Catchment area: natural areas where rainwater collects, like wetlands, lakes rivers</li> <li>• Water resources: sources of water that are useful or potentially useful to people.</li> </ul>		
<b>NOTES on HOW</b>  LO 5.1.1 - 5.1.3  LO 5.2.1  LO 5.3.2	Step 1 <ul style="list-style-type: none"> <li>• Review what is known about the water cycle. Collate information onto summary table or mind map.</li> <li>• Describe the features of a water cycle (e.g. how water changes its form e.g. from liquid to gas as it evaporates, condenses, precipitates, runs off, infiltrates) as it moves between the air, water and soil (atmosphere, hydrosphere and lithosphere).</li> <li>• Learners make labelled drawings and write about the water cycle describing the processes that take place.</li> <li>• Describe how energy from the Sun drives the water cycle.</li> </ul> Step 2 <ul style="list-style-type: none"> <li>• Review the origin of rivers.</li> <li>• Discuss the structures built by man to catch water for different purposes.</li> <li>• Learners research catchment areas situated nearby or in the area.</li> </ul>		

	<ul style="list-style-type: none"> <li>Identify and describe the negative effects of scientific developments or technological products on the quality of our water resources (e.g. factories, fertilizers, pesticides etc.).</li> <li>Identify and describe positive effects of scientific developments or technological products on the quality of water resources (e.g. How the water quality is determined from the catchment area and / or proper care and management guidelines, water treatment processes, etc.).</li> </ul> <p>Step 3 PLAN</p> <ul style="list-style-type: none"> <li>List what learners know about familiar situations that relate to the quality of water (e.g. describe the state of a nearby river, vlei or canal).</li> <li>Suggest questions for investigation about the quality of water.</li> </ul> <p><b>Example:</b></p> <ul style="list-style-type: none"> <li><b>What is the quality of water from sources in our area?</b></li> <li><b>Can we drink the water from the vlei, canal or river?</b></li> </ul> <p>Step 4 CONDUCT</p> <ul style="list-style-type: none"> <li>Learners collect water from identified sources in the area to analyse.</li> </ul> <p>Step 5 EVALUATE</p> <ul style="list-style-type: none"> <li>Identify and describe insoluble forms of pollution (e.g. packets, tins, etc).</li> <li>Identify and describe possible soluble forms of pollution, (e.g. salts, fertilizers, pesticides by looking at the sources of pollutants, such as factories or gardens near the location where the sample was taken).</li> <li>Identify and describe the water (colour, smell, solids, clear / cloudy).</li> <li>Learners report (write and present) on their findings of the sample of water.</li> </ul> <p><i>Extended learning:</i></p> <ul style="list-style-type: none"> <li><i>Research the kinds of organisms (plants and animals) you would find in natural rivers and streams.</i></li> <li><i>Research the kinds of organisms you would find in polluted rivers and streams.</i></li> <li><i>Write about the causes of water pollution in your area.</i></li> <li><i>Write a report in which you suggest possible solutions for the water pollution problems in your area.</i></li> </ul> <p>Step 6 Check the learners' knowledge. Can learners:</p> <ul style="list-style-type: none"> <li>Identify and describe the processes involved in the water cycle?</li> <li>Describe the soluble and insoluble pollutants of catchment areas and other water resources?</li> </ul>		
METHODOLOGY	Research, discussion, investigation		
RESOURCES	Water samples from locations in the area, water cycle posters, research material		
INTEGRATION	<table border="1"> <tr> <td data-bbox="399 1711 564 1805">NS strands</td> <td data-bbox="564 1711 1452 1805">Matter &amp; Materials - Water Cycle, properties of water, water pollution Life &amp; Living - plants and animals living in water (aquatic)</td> </tr> </table>	NS strands	Matter & Materials - Water Cycle, properties of water, water pollution Life & Living - plants and animals living in water (aquatic)
	NS strands	Matter & Materials - Water Cycle, properties of water, water pollution Life & Living - plants and animals living in water (aquatic)	
<table border="1"> <tr> <td data-bbox="399 1805 564 1935">Learning Areas</td> <td data-bbox="564 1805 1452 1935">Technology - impact of scientific developments and technological products on environment and people. Social Sciences – people and the environment, responsible use of natural resources, early settlements</td> </tr> </table>	Learning Areas	Technology - impact of scientific developments and technological products on environment and people. Social Sciences – people and the environment, responsible use of natural resources, early settlements	
Learning Areas	Technology - impact of scientific developments and technological products on environment and people. Social Sciences – people and the environment, responsible use of natural resources, early settlements		

<b>ASSESSMENT</b> <i>Reminder :</i> Record learner performance on Formal Assessment Tasks	Self assessment <input type="checkbox"/> Peer assessment <input type="checkbox"/> Group assessment <input type="checkbox"/> Teacher assessment <input type="checkbox"/>		
	Investigation activities √ <input type="checkbox"/>	Case studies <input type="checkbox"/>	Mind mapping <input type="checkbox"/>
	Projects <input type="checkbox"/>	Simulations <input type="checkbox"/>	Concept mapping <input type="checkbox"/>
	Research √ <input type="checkbox"/>	Role-play <input type="checkbox"/>	Brainstorming tasks <input type="checkbox"/>
	Assignment <input type="checkbox"/>	Translation task <input type="checkbox"/>	Functional writing √
	Performance based assess. <input type="checkbox"/>	Interviews <input type="checkbox"/>	Presentations √
	Practical demonstration <input type="checkbox"/>	Questionnaires <input type="checkbox"/>	Other:
	Test <input type="checkbox"/>	Structured questions <input type="checkbox"/>	Other:

<b>WEEK 36</b>		<b>EROSION</b>	
<b>SCIENTIFIC LITERACY</b>	Briefly define concepts: <ul style="list-style-type: none"> <li>• Erosion: soil or rock wearing away over a long period of time caused by wind and water, etc.</li> <li>• Weathering: physical or chemical break down of rock into smaller pieces by the wind, rain and temperature</li> <li>• Landforms: natural physical features of the Earth's surface</li> <li>• Deposition: accumulations (or deposits) of substances, something that gathers somewhere</li> <li>• Lithify: to change from loose sediments into solid rock</li> <li>• Rock particles: small pieces of rock</li> <li>• Catastrophic events: events causing widespread damage or death (e.g. floods, Earthquakes, tsunamis, etc).</li> </ul>		
<b>NOTES on HOW</b>  LO 5.2.1  LO 5.3.2	Step 1 <ul style="list-style-type: none"> <li>• Identify (name and describe) different landforms (mountains, hills, wetlands, beach etc.).</li> </ul> Step 2 <ul style="list-style-type: none"> <li>• Define the process of weathering.</li> <li>• Describe the factors involved (e.g. wind, water, lack of vegetation, heat and cold breaks rocks into particles).</li> </ul> Step 3 <ul style="list-style-type: none"> <li>• Explain how erosion (carrying particles away) and deposition (depositing particles) can change landforms (e.g. sand deposited on beaches or river banks, etc.)</li> <li>• Describe short and long term erosion.</li> <li>• Describe the factors involved (e.g. wind, water, heat and cold).</li> </ul> Step 4 <ul style="list-style-type: none"> <li>• Name and describe catastrophic events (locally and internationally) that resulted from erosion ( e.g. mud slides, spreading desert areas, etc)</li> </ul>		

	<p><i>Extended learning:</i></p> <ul style="list-style-type: none"> <li>• Write a report on any incidences of soil erosion in your area (community, school, etc.)</li> <li>• Write a report on any disasters (local or international, e.g. mudslides) that resulted from soil erosion.</li> </ul> <p>Step 5 Check the learners' knowledge. Can learners:</p> <ul style="list-style-type: none"> <li>• Name and describe different landforms?</li> <li>• Distinguish between weathering and soil erosion?</li> <li>• Name and describe the factors causing weathering?</li> <li>• Name and describe the factors causing soil erosion?</li> <li>• Describe catastrophic events that cause erosion?</li> </ul>		
METHODOLOGY	Discussion and Research		
RESOURCES	Research, pictures, models		
INTEGRATION	NS strands	Matter & Materials - properties of soil, and water Life and Living - plants and soil	
	Learning Areas	Social Sciences - people and the environment, impact of human activities	
ASSESSMENT <i>Reminder :</i> Record learner performance on Formal Assessment Tasks	Self assessment <input type="checkbox"/> Peer assessment <input type="checkbox"/> Group assessment <input type="checkbox"/> Teacher assessment <input type="checkbox"/>		
	Investigation activities <input type="checkbox"/>	Case studies <input type="checkbox"/>	Mind mapping <input type="checkbox"/>
	Projects <input type="checkbox"/>	Simulations <input type="checkbox"/>	Concept mapping <input type="checkbox"/>
	Research √	Role-play <input type="checkbox"/>	Brainstorming tasks <input type="checkbox"/>
	Assignment <input type="checkbox"/>	Translation task <input type="checkbox"/>	Functional writing √
	Performance based assess. <input type="checkbox"/>	Interviews <input type="checkbox"/>	Presentations <input type="checkbox"/>
	Practical demonstration <input type="checkbox"/>	Questionnaires <input type="checkbox"/>	Other:
	Test <input type="checkbox"/>	Structured questions <input type="checkbox"/>	Other:

WEEK 37		EROSION Investigation	
NOTES on HOW  LO 5.1.1 – 5.1.3	<p><b>Investigation on erosion</b></p> <p>Step 1 PLAN</p> <ul style="list-style-type: none"> <li>• List what is known about the causes of erosion.</li> <li>• Suggest questions for investigation.</li> </ul> <p>Example</p> <ul style="list-style-type: none"> <li>• <b>Which erosion agent causes the most damage: wind or water?</b></li> </ul> <p>Step 2 CONDUCT</p> <ul style="list-style-type: none"> <li>• Decide on the procedures and materials for the investigation.</li> <li>• Set up containers (e.g. ice-cream boxes) with bare soil and soil with vegetation (e.g. grass).</li> <li>• Use a fan or hairdryer to simulate wind, catch and measure the quantity of soil that was removed by the wind over a certain time period (e.g. 5min).</li> </ul>		

	<ul style="list-style-type: none"> <li>• Use a container of water (tin or bottle) with holes punched in the bottom, to imitate the fall of raindrops. Slope the containers at the same angle, collect and measure the water that runs off and any sand or mud.</li> </ul> <p>Step 3 EVALUATE</p> <ul style="list-style-type: none"> <li>• Record the investigation using drawings, labels and observation notes.</li> <li>• Report (write and draw) on group's procedures.</li> <li>• Report (write, draw and present) on the results obtained.</li> </ul> <p><i>Extended learning:</i></p> <ul style="list-style-type: none"> <li>• Write and draw / or use pictures showing other forms of soil erosion.</li> <li>• Report on soil erosion in your area (e.g. fields, parks, sports grounds, etc).</li> <li>• As a TV News reporter, present a report on the negative impact of soil erosion in your area.</li> <li>• As an Environmentalist suggest possible solutions to curb the problems contributing to soil erosion in your area.</li> </ul> <p>Step 4 Check the learners' knowledge. Can learners:</p> <ul style="list-style-type: none"> <li>• Describe soil erosion?</li> <li>• Identify (name and describe) the factors causing soil erosion?</li> </ul>		
METHODOLOGY	Discussion , Research and Investigation		
RESOURCES	Research, soil and water, measuring apparatus, fan or hairdryer, containers for liquids.		
INTEGRATION	NS strands	Matter & Materials – properties of soil Life & Living - plants need soil, vegetation reduces soil erosion	
	Learning Areas	Mathematics - measurement Social Sciences - people and the environment, impact of human activities	
ASSESSMENT <i>Reminder :</i> Record learner performance on Formal Assessment Tasks	Self assessment <input type="checkbox"/> Peer assessment <input type="checkbox"/> Group assessment <input type="checkbox"/> Teacher assessment <input type="checkbox"/>		
	Investigation activities <input checked="" type="checkbox"/>	Case studies <input type="checkbox"/>	Mind mapping <input type="checkbox"/>
	Projects <input type="checkbox"/>	Simulations <input type="checkbox"/>	Concept mapping <input type="checkbox"/>
	Research <input type="checkbox"/>	Role-play <input type="checkbox"/>	Brainstorming tasks <input type="checkbox"/>
	Assignment <input type="checkbox"/>	Translation task <input type="checkbox"/>	Functional writing <input type="checkbox"/> <input checked="" type="checkbox"/>
	Performance based assess. <input type="checkbox"/>	Interviews <input type="checkbox"/>	Presentations <input checked="" type="checkbox"/>
	Practical demonstration <input type="checkbox"/>	Questionnaires <input type="checkbox"/>	Other:
	Test <input type="checkbox"/>	Structured questions <input type="checkbox"/>	Other:



<b>WEEK 38</b>	<b>REVISION / EXTENDED LEARNING</b>
	<ul style="list-style-type: none"> <li>• Write poems about the Moon.</li> <li>• Global Warming: Collect newspaper articles about global warming and climate change. Use the information and do 'News Presentations' (Simulations of TV News reports).</li> <li>• Research and present a report on "Green Inventions".</li> <li>• Research and present a report on "Green Efforts" at home, in your community and your school.</li> <li>• What does "Greening the City" mean, and what could your school do in the drive to "Green the Neighbourhood"?</li> </ul>

<b>WEEK 39</b>	<b>REVISION / EXTENDED LEARNING</b>
	<ul style="list-style-type: none"> <li>• Water Cycle: make a poster with labels and notes on the water cycle.</li> <li>• Make a model of a water cycle in a bottle (using soil, water and a plant) and record your observations.</li> <li>• Soil Erosion: Research, write and draw about farming and soil erosion, etc.</li> <li>• Soil Erosion: Write a report about soil erosion at your school.</li> </ul>

<b>WEEK 40</b>	<b>FORMAL ASSESSMENT TASK 6</b>
<b>Teacher may use the questions as part of an assessment task</b>	
<b>LO 2 AS 1</b>	Ask vocabulary and spelling words
<b>LO 2 AS 1</b>	Give learners a diagram of the phases of the moon. Ask the learners to describe the diagram.
<b>LO 2 AS 2</b>	Write and draw about the phases of the moon.
<b>LO 2 AS 2</b>	Provide graphs for interpretation on climates and regions.
<b>LO AS 1</b>	Ask learners to describe erosion with reference to wind and water.
<b>LO 2 AS 1</b>	List the human and animal factors that cause soil erosion (e.g. agriculture, mining, construction etc.).
<b>LO 2 AS 3</b>	Describe the effect of wind and water on certain landforms.
<b>LO 3 AS 1</b>	Explain the role of the moon in cultural celebrations.
<b>LO 3 AS 2</b>	Write sentences on the impact of climate change on any plant or animal (e.g. polar bear etc.).

## **PART THREE: APPENDIX**

### **GUIDE TO SCIENTIFIC INVESTIGATION: GRADE 5**

#### **A guide to investigations for teachers and their learners**

Identify an aspect of a natural phenomenon (plants, animals, weather, rocks, burning, electricity etc.) that you want to investigate. When you investigate something you find out more about it by observing or measuring something that occurs naturally (e.g. observing and measuring the natural daily changes in the weather). You can also investigate what happens when you **do** something to influence a natural phenomenon (e.g. adding salt or sugar to the water to see if it influences the temperature of boiling water). You can also investigate how to **make** something that relates to a natural phenomenon (e.g. how to make your house cooler in hot weather). You can use the following format to guide you through an investigation.

#### **LO1 AS1 : PLAN AN INVESTIGATION**

**NB: This part to be done as a class with teacher and learners**

##### **A. What do we know already?**

1. Choose a topic / natural phenomenon to be investigated.
2. Make a mind map of everything you know about the topic / natural phenomenon.

##### **B. What more do we want to find out?**

1. Teacher assists learners to pose questions about what they would like to know further about the topic. Teacher writes all questions on the board.
2. Teacher and learners decide which of the questions are possible to investigate in a classroom situation and which are not (could be researched in books).
3. Teacher and learners identify one specific question to investigate.
4. Teacher and learners discuss the following:
  - Apparatus / materials needed
  - What will the learners observe or measure or collect?
  - How many times will they make observations or take measurements?
  - What measuring instruments are needed?
  - Where will you record your observations? (on what format)
  - Safety measures

#### **LO1 AS1 : PLAN**

**NB: the following part to be done by learners**

##### ***What do we want to find out?***

1. *Topic / natural phenomenon to be investigated (write)*
2. *Your investigation question (write)*
3. *Make a hypothesis about your investigation question. (Write: I think the following will happen... because.....)*

#### **LO1 AS2 : CONDUCT THE INVESTIGATION & COLLECT DATA**

##### **C. What must we do to find out?**

1. *Write down all the steps you must carry out to do the investigation.*
2. *Use the apparatus to carry out a suitable procedure (explore the materials, make a series of observations or measurements etc.)*
3. *Record your observations and measurements in a suitable way. (on table, drawing etc.)*

#### **LO1 AS3 : EVALUATE DATA & COMMUNICATE FINDINGS**

##### **D. What do the results tell us?**

1. *Report on what you did.*
2. *Explain what you have learnt. (write ,draw, answer questions)*
3. *Decide whether the investigation has answered your original question successfully or not. (write)*
4. *Decide whether your hypothesis was true or not. (write)*
5. *Do you have any new questions for further investigation? (write)*
6. *Give an everyday example of something you have learnt from this investigation.*

Assessment instrument for NS Investigations

Strand : \_\_\_\_\_ Topic \_\_\_\_\_

ASSESSMENT TASK \_\_\_\_\_

<b>Form of assessment: SCIENTIFIC INVESTIGATION for Grade 5</b>				
<p><b>NS LO 1 AS 1 Plan</b>  Comments:  Learner could contribute prior knowledge <input type="checkbox"/></p> <p>Learner was able to identify an aspect to investigate <input type="checkbox"/></p> <p>Learner was able to describe some of the apparatus needed <input type="checkbox"/></p> <p>1 mark each = 3 marks</p>			Comments:	
<b>LO1 AS2 Conduct</b>	Could write the correct steps and carry them out safely and carefully on their own  3 marks	Could write the correct steps and carry them out correctly with teachers' help  2 marks	Learners struggled to write the steps and carry them out even with teachers' help  1 mark	Not done  0
	Could make careful, detailed and accurate measurements and observations on their own  6 marks	Could make measurements and observations correctly with teachers' help  4 marks	Learners struggled to make observations and measurements even with teachers' help  2 mark	Not done  0
<b>LO1 AS3 Evaluate</b>	Could report on their procedure in detail on their own (writing, drawing and labelling)  5 marks	Could report on their procedure correctly with teachers' help (writing, drawing and labelling)  3 marks	Struggled to report on their procedure (speaking, writing, drawing and labelling)  1 marks	Not done  0
	Could explain in detail what was learnt without teachers' help, could connect this knowledge to other situations  6 Marks	Could explain what was learnt with help from the teacher  4 marks	Learner struggled to explain what was learnt, had some misconceptions  2 marks	Not done.  0
Learner's behaviour was good. Work was diligently done. Work was neatly done. Learner did clean up. Half a mark each = total 2 marks : _____				

Total marks 25: \_\_\_\_\_

Teacher: \_\_\_\_\_

Date: \_\_\_/\_\_\_/2009

## **PART 4: SCIENTIFIC LITERACY**

### **Glossary**

#### **A**

Absorbed energy: when energy is gained / absorbed or has been added to an object or material.

Adapted: plants and animals that have changed to suit the present circumstances.

Atmosphere: (air) mixture of gases around a planet.

Axis: the imaginary axis on which the Earth rotates.

#### **B**

Balanced diet: when foods containing the important nutrients are eaten in the correct amounts to ensure health.

Biodiversity: “bio” means “life”; “diversity” means a variety – i.e. the many different kinds of living organisms (plants and animals).

Boiling point: the temperature at which a liquid turns into a gas.

Boiling water: water heated until it has enough energy to change into gas.

Breathing: the action of taking in air that is rich in oxygen and breathing out air that is rich in carbon dioxide.

Breed: to reproduce.

#### **C**

Carbohydrates: foods which serve as a major energy source in human diets. Sugars, starches and cellulose are all carbohydrates.

Carnivores: animals that eat other animals.

Carpel / pistil: female part of a flower consisting of the stigma, style and ovary.

Catastrophic events: events causing widespread damage or death (e.g. floods).

Catchment area: a natural area where rainwater collects, like wetlands, lakes etc.

Categorise: to sort / group things together which have the same visible appearance or properties.

Ceramics: materials made of baked clay e.g. china cups, flower pots, tiles. They are rigid, can shatter, they make a ringing sound, are durable and waterproof.

Circuit: the circular pathway for electricity to flow from the source to the appliance and back to the source. The electricity will not flow if the path is not complete.

Classes of materials – fibres, glass, ceramics, polymers (plastics), paper, wood, metals.

Classify: Arrangement of objects or living organisms into related groups according to their similarities.

Clay: very small (fine) rock particles (sometimes reddish, orange-brown or white in colour). Clay holds water and is sticky when wet.

Clayey soil: Soil which has a high proportion of clay particles in it.

Climate change: long term changes in the weather of the Earth's climatic regions.

Climate: weather conditions observed and measured over a long period of time in a certain region.

Coal: a fossil fuel formed in sedimentary rock from the remains of ancient plants.

Combustion: the process of burning which involves oxygen, a fuel and heat.

Condensation: when water vapour (a gas) cools down and changes to a liquid.

Condenses: when a gas cools (loses heat) and changes to a liquid.

Constellation: patterns of stars as seen from Earth. The patterns remain fixed but move across the sky as the Earth moves.

Consumer (herbivores, carnivores and omnivores): an organism that feeds on other organisms in a food chain.

Crops: plants that are cultivated on a large scale for food or other use.

Crude oil: a fossil fuel formed in sedimentary rock from the remains of ancient marine animals.

Crystallisation: a process of forming crystals by heating a saturated solution to evaporate the solvent.

#### **D**

Decomposer: an organism that breaks down the dead bodies of plants and animals.

Degree Celsius (°C): the unit to measure heat energy.

Deposition: when soil particles are washed or blown away and deposited somewhere else.

Diabetes: a disorder where the body is incapable of keeping its blood glucose levels normal.

Digestion: the process by which food is broken down into simple chemical compounds.

Digestive System: the organs which help with the process of digesting food; it consists of mouth, salivary glands, gullet, stomach, liver, pancreas, small intestine, large intestine.

**Dissolve:** when a substance mixes with a liquid and seems to disappear inside the liquid, and so cannot be seen.

**Distillation:** a process where a liquid is heated to produce vapour. The vapour is then condensed by cooling to form a pure liquid.

## **E**

**Earth materials:** air, water, rocks and soil

**Earth year:** the period of time it takes the Earth to complete one revolution (orbit) around the Sun. (365¼ days)

**Ecosystem:** an ecosystem includes the living and non-living things in an area and their interaction with one another; a community of plants, animals and micro-organisms living together in an environment.

**Eggs:** the female sex cells of animals.

**Electricity:** is a secondary energy source (it is produced from another source such as coal), and is used as a source for electrical appliances.

**Energy gain:** this happens when matter absorbs energy because its surroundings are warmer.

**Energy loss:** this happens when matter releases its energy because its surroundings are cooler.

**Energy sources:** a source that stores or supplies a form of energy (e.g. battery, falling water). Some sources consist of stored chemical or mechanical energy e.g. electrical cells, stretched or wound up elastic band, wood, coal, oil etc. Some energy sources are moving already and their movement is used as an energy source e.g. falling water, moving waves, wind (moving air) etc.

**Energy transfer systems:** a system made of two or more parts that transfers (moves) energy from one place to another e.g. a food chain, an electric circuit, an ecosystem etc.

**Energy transfer:** when energy is passed on from one part of a system to another.

**Energy transformation:** when energy is changed from one form to another, e.g. electrical energy is changed to light energy in a light bulb.

**Energy:** energy is needed to make everything work or move or live.

**Environment:** the living and non-living surroundings that affect living things.

**Erosion:** soil or rock wearing away over a long period of time caused by wind and water etc.

**Evaporate:** When a liquid is heated and changes to a gas.

**Evaporation:** the process by which a liquid (e.g. water) becomes a gas (water vapour).

**Excretion:** the removal of the waste products of metabolism (sweat and urine) by a living organism.

## **F**

**Factors affecting solubility:** processes or actions that make a solute dissolve faster or slower in a liquid such as: amount of stirring; temperature of liquid; size of the particles of the solid; amount of solid compared to liquid.

**Fats and oils:** foods (olive oil, butter, meat fat) which serve as a source of energy and maintain parts of the body such as the nervous system.

**Fertilization:** the joining of male and female sex cells to form a new individual.

**Flexibility:** ability to bend / change shape without breaking.

**Food chain:** a food chain shows 'who eats whom' in an ecosystem; the flow of energy in nature through living organisms. A series of organisms through which food energy is passed in an ecosystem.

**Food pyramid:** a pyramid-shaped diagram which is a guide to the main food groups and the recommended quantities to be eaten for a balanced diet.

**Forms of energy:** e.g. light, sound, heat, electricity, movement.

**Fossil casts:** exact three dimensional copies of the parts of plants or animals that have fossilised. They are made by researchers.

**Fossil fuels:** crude oil, coal and natural gas (formed from the fossilised remains of ancient plants and animals).

**Fossil imprints:** Footprints of animals or prints of leaves etc. which were made in mud that has since hardened to become rock.

**Fossilisation:** the process by which fossils are formed. The organic chemicals in a dead animal or plant body are replaced by inorganic chemicals, which make the body harden like stone.

**Fossils:** remains of an animal / plant preserved from an earlier time inside rock.

**Fuels:** sources of energy (we usually need to burn them to produce heat energy).

**Full Moon:** a Moon phase where the full face of the Moon is visible (when the Moon looks round), it occurs about half way through the Moon cycle.

## **G**

**Galaxy:** an assembly of stars, planets, gas and space dust.

**Gas:** a phase of matter consisting of particles moving rapidly and spaced very far apart; gas has no definite form.

**Germination:** seeds germinate when they start to grow and develop their first root and shoot.

**Glass:** a material made by melting sand mixed with limestone and sodium carbonate. Properties of glass: rigid, can shatter, makes a ringing sound, is durable and waterproof, brittle, and transparent.

**Global warming:** worldwide temperature increases, due to trapped sunlight energy, caused by 'greenhouse' gases. Some results of global warming are: melting of polar ice caps, rise in sea level and climate change.

**Greenhouse effect:** a phenomenon where greenhouse gases trap sunlight energy in the atmosphere.

**Greenhouse gases:** gases (such as carbon dioxide, methane and other gases) that absorb and trap heat in the Earth's atmosphere and are the possible cause of global warming.

## **H**

**Habitat:** a specific place, within an ecosystem, where plants and animals live and reproduce.

**Hardness:** ability to withstand physical wear and tear.

**Hazardous:** materials or substances which can be harmful to health and can damage the environment.

**Heat conduction:** the way in which a material allows heat to travel through it.

**Heat insulation:** the way in which a material stops heat energy from moving through it.

**Heating wires:** special wire that heats up when an electric current passes through it e.g. found in irons, heaters, geysers, kettles.

**HIV/AIDS patients:** people who are infected with the *Human Immuno-deficiency Virus* (HIV), which breaks down the immune system.

**Hydrosphere:** (water and water vapour) that part of the Earth that is made up of water.

## **I**

**Igneous rock:** rock formed by intense heat and solidification of volcanic magma.

**Indigenous knowledge:** knowledge from our own country.

**Indigenous:** home grown, originating in, native, growing naturally.

**Infiltration:** movement of water into soil or porous rock.

**Insoluble substances:** substances which cannot dissolve in a liquid (e.g. tea leaves or sand particles in water).

**Interdependence:** living organisms depending on one another for survival. They provide food, shelter, etc for each other.

**Invertebrates:** (insects, worms, molluscs, crustaceans, arachnids, myriapods) most have an external skeleton (exoskeleton).

## **J**

**Joints:** the place on a skeleton where two bones meet. Joints allow movement.

## **K**

**Kilojoules (kJ):** the unit for measuring energy is the Joule (J). A kilojoule is 1000 Joules.

**Kinetic energy (movement energy):** the energy in moving objects or particles; energy sources that move e.g. electricity, falling water, wind.

## **L**

**Landforms:** natural physical features of the Earth's surface e.g. mountains, rivers, valleys etc.

**Length of day:** the number of daylight hours from sunrise to sunset.

**Length of night:** the number of hours from sunset to sunrise.

**Life processes:** the processes that all living things carry out: movement, reproduction, sensitivity, growth, excretion, respiration, feeding.

**Ligament:** the tissue that holds bones together in a joint.

**Liquid:** a phase of matter; particles in a liquid move in relation one another, can be poured, takes the shape of the container, takes up space, particles touching but further apart than in solids.

**Lithify:** to change from loose sediments into solid rock.

**Lithosphere:** (rocks and soil) solid layer of the Earth consisting of the crust.

**Loamy soil:** a high quality soil made up of a mixture of sand, silt and clay particles, and humus (decomposing plant and animal material).

## **M**

**Magnetism:** the way in which a material is attracted to a magnet or not.

**Materials:** solid matter is divided into groups e.g. metals, ceramics and polymers etc; solids that are useful for making things.

**Mating:** when the male and female animals of the same species come together so that the male can deposit sperm cells into the female's body to fertilize her eggs.

**Matter:** anything which has mass and occupies space; everything on the Earth and in the Universe is made of matter. Matter is made of atoms.

**Measuring weather:** a thermometer measures the temperature; a wind gauge measures wind speed and direction; a rain gauge measures rainfall.

**Mechanical systems:** systems that have two or more moving parts e.g. the moving parts of an engine.

**Melting ice:** ice melts when it gains enough energy to change into a liquid.

**Melting point:** the temperature at which a solid turns into a liquid.

**Melting:** change of state from a solid to a liquid, usually caused by heat energy.

**Metals:** materials which conduct electricity and heat e.g. copper, tin, silver, gold, lead etc.; shiny, hard, malleable, pure substances such as iron, copper, gold and silver. Metals are made into objects such as nails, pipes, metal sharpener, metal ruler.

**Metamorphic:** rocks which have undergone a change in physical form, appearance, or character.

**Mixtures:** two or more substances mixed together and can be separated again.

**Movement of heat energy:** Energy always moves from a warmer place or object to a cooler place or object.

**Muscles:** body tissue that contracts to cause movement; types of muscles e.g. biceps, triceps.

## **N**

**Natural disasters:** Events like earthquakes, volcanoes, severe droughts, floods etc.

**Natural fibres:** long, flexible, strong strings that come from plants or animals e.g. in wood and paper, cotton, wool, linen etc.

**Natural gas:** a fossil fuel formed in sedimentary rock from the remains of ancient marine plants and animals; found in association with crude oil.

**New Moon:** this Moon phase occurs when the Moon is not illuminated (lit up) by direct sunlight and is not visible to the naked eye. The New Moon usually signals the start of a new Moon cycle.

**Nuclear energy:** a form of energy that is released by radioactive materials e.g. by uranium and plutonium.

**Nutrients:** substances in our food which provide nourishment: carbohydrates, proteins, vitamins and minerals, fats and oils.

## **O**

**Orbit:** the path a planet takes as it orbits around the Sun. The path a moon takes as it moves around a planet.

**Organisms:** any living things e.g. animals and plants.

**Ovary and uterus and vagina:** female sexual organs in animals.

**Ovule:** contains the female sex cells of a flowering plant.

## **P**

**Paraffin:** energy source in a household: liquid fuel used to cook food. When paraffin catches fire by accident, its flames are very hot and difficult to control.

**Penis and testes:** male sex organs in animals.

**Phase change:** to change from one state to the other (solids, liquids, gases).

**Phases of matter:** solids, liquids and gases. Heating changes the phase from solid to liquid to gas, and cooling (loss of heat) reverses the change of phase.

**Phases of the Moon:** when seen from Earth, the appearance of the Moon changes in a cycle over a period of time i.e. full moon, new moon, gibbous moon, quarter moon.

**Photosynthesis:** the process by which green plants use sunlight, carbon dioxide and water to make food substances.

**Pistil / carpel:** Female part of a flower consisting of the stigma, style and ovary.

**Pitch:** high or low sounds. Notes have a high pitch (high sound) or a low pitch (low sound). The pitch depends on the amount of material or air that is vibrating in an object or musical instrument; the faster the vibrations the higher the pitch.

**Planets:** space objects which move in an orbit around a star.

**Pliable:** something that can be rolled or bent into a sausage and / or a ring shape.

Pollen: contains the male sex cells of a flowering plant.

Pollination: when pollen is carried from the male part (stamen) to the female part (carpel) of a plant.

Polymers (plastics and natural fibres): giant long-chained molecules made up of a large number of smaller molecules joined together e.g. plastics, rubber, plant fibre, polyester etc. Polymers are flexible, strong insulators of heat and electricity, durable, burn when set alight. Some plastics are transparent and some are opaque (cannot see through them).

Potential energy (stored energy): energy in a stored form that is able to do work when it is released e.g. battery, cell, elastic band, chemicals, fuel etc.

Precipitation: when water falls from the atmosphere to the Earth's surface, such as rain, snow, sleet, hail and dew.

Primary consumers (herbivores): animals which only eat plants.

Producer: an organism (e.g. a plant), at the start of a food chain, that does not need to eat, but makes its own food.

Properties of soil: size of particles, colour, texture, smell and pliability.

Properties: how something looks, feels and behaves e.g. flexibility, hardness, texture, colour and solubility etc.

Proteins: foods which are used for building up the body. Meat, fish, eggs, beans and nuts contain proteins.

## **R**

Rainfall: the amount of rain that falls in an area at a certain time.

Reflected light: light energy which hits an object and then bounces off again.

Relative motion: e.g. the movement of the Earth in relation to the Sun - Earth orbiting around the sun.

The movement of the Moon in relation to the Earth - Moon orbits around the Earth, etc.

Relative position: Position of Sun, Moon and Earth in relation to each other in the universe e.g. The Sun is at the centre of the solar system and the planets are in orbit at fixed distances around it. Moons orbit around planets which together orbit around the Sun.

Revolution: the movement of a planet in orbit as it circles around the Sun. The movement of a moon in orbit as it circles around a planet.

Rock particles: very small pieces of rock.

Rotation: the spinning movement of planets and moons on their own axes.

Runoff: rain water that does not get soaked into the ground.

Rust: A chemical reaction between iron (where ever it is) and oxygen from the air.

## **S**

Sand: larger, light-coloured grains (rock particles), such as desert sand and beach sand.

Sandy soil: soil which contains a high proportion of sand particles

Satellite: any object in space that orbits around another object.

Seasons: a period of the year defined by a distinct climate (e.g. winter, spring).

Secondary consumers (omnivores or carnivores): second level consumers - animals which eat both plants and animals or only eat other animals.

Sedimentary rocks: rocks formed from material deposited as layers of sediment in water.

Seed dispersal: to spread seeds in different directions.

Separation: a process where solid substances are separated.

Sexual reproduction: reproduction which involves two parents. Fertilisation takes place in sexual reproduction. In plants seeds are produced after fertilisation.

Silt: very small powdery rock particles found in soil.

Silty soil: Soil that has a large proportion of silt particles.

Skeleton (human) – parts: skull, jaw, backbone (vertebrae), rib cage, front leg or arm (humerus, radius and ulna), back leg or legs (femur, tibia, fibula), shoulder (shoulder blade, collar bone) and hip girdle, feet and hands.

Social patterns: solitary animals, pairs, packs, prides, herds, troops, colonies.

Soil: the loose upper layer of the Earth made up of a mixture of different sized rocks / stones and soil particles, and decayed organic matter.

Solar heating: using energy from the Sun to heat water.

Solar System: a star together with the planets, moons, asteroids, comets and dust which orbit around it.

Solid: matter with a fixed shape, takes up space, cannot be poured, particles very close together.

Solidification: when a substance, like water becomes solid.

Solidifies: when a liquid cools (loses heat) and changes to a solid.

Solubility: the ability of a substance to dissolve.



**Soluble substances:** substances which dissolve (seem to disappear) when mixed with a liquid (e.g. sugar mixed into water).

**Soluble:** substances which can dissolve in a liquid are soluble (e.g. sugar).

**Solute:** a solid that dissolves in a liquid, forming a solution.

**Solution:** a special mixture in which a solid, liquid or gas is dissolved in a liquid e.g. salty water.

**Solvent:** the liquid in which a solid dissolves.

**Sound:** is a form of energy that is produced by a vibrating object. Sound can only travel through a medium (liquid, solid, gas). Sound cannot travel through a vacuum (i.e. no air); sound travels away from sources (e.g. radio, clapping hands, shouting etc); sound gets fainter as it moves away from the source.

**Source of energy:** See energy source.

**Species:** organisms with the same visible characteristics and that can only reproduce with their own kind.

**Sperm cells:** the male sex cells of animals.

**Stamen:** the male part (reproductive organs) of a flower, consists of a filament and anther.

**Stars:** gaseous masses in space which generate energy.

**Strata:** the layers which can be seen in sedimentary rock.

**Substances:** types of matter that can exist naturally or can be made.

**Sun:** the star at the centre of our Solar System.

**Sustainability:** consuming natural resources without destroying the ecological balance.

**Switches:** the components in an electric circuit that either open (break) or close (complete) the circuit.

**System:** a system is made of two or more parts that work together. In a system energy is transferred from one part of the system to another.

## **T**

**Technology:** things that people have made to help them to do things and solve problems.

**Temperature:** a numerical measure of hotness or coldness in degrees Celsius (°C).

**Temporary change:** change to a substance that is not permanent – it can change back again to its original form.

**Tendons:** the tissue that attaches a muscle to the bone.

**Tertiary consumers:** e.g. human, crocodile etc.; third level consumers.

**Texture:** the way a material feels when you touch or rub it between your fingers.

**The Moon:** our nearest neighbour in space orbiting around the Earth.

**Thermal energy:** heat energy.

**Thermometer:** an instrument used to measure temperature.

## **V**

**Vegetative reproduction:** reproduction in plants without seeds. A type of asexual reproduction in plants. The parent plant can make a new plant from part of its stem, root or leaf.

**Vertebrates:** (Fish, Amphibians, Reptiles, Birds, Mammals) have an internal skeleton (endoskeleton).

**Vibrations:** rapid movements made by an object (e.g. feel the vibrations coming from a speaker).

**Vitamins and minerals:** special food substances which are needed in small amounts for normal growth and activity of the body.

**Volume:** how soft or loud a sound is. The volume depends on the amount of energy used to generate the sound.

## **W**

**Warning signs / hazard symbols:** signs indicating danger or risky areas.

**Water cycle:** the natural recycling of water between the land, bodies of water and the atmosphere; processes by which the Earth's water circulates through the environment.

**Water resources:** sources of water that are useful or potentially useful to people.

**Weather:** temperature, wind, sunlight and rain measured on a daily basis; the state of the atmosphere (temperature, wind, etc.) at a particular time and place.

**Weathered rocks:** rocks which have been damaged by exposure to the weather.

**Weathering:** physical or chemical or biological breakdown of rock into smaller pieces: the breaking of rocks into smaller pieces by wind, water, heat and cold.

**Wind sock / Wind-vane:** instrument for showing wind direction.