

NATURAL SCIENCES

INTERMEDIATE PHASE GRADES 4-6

1ST TERM

REVISED LESSON EXEMPLARS

JAN-MAR 2010

Notes to Teachers

- This document contains lessons for **term 1** for about 10 weeks.
- These lessons are prepared according to the work schedule that is aligned to National content mapping document.
- Use text books to get the relevant content and as references.
- Do the practical activities beforehand to make sure that it works properly.
- Prepare additional memos, checklists, rubrics and observation sheets for the learners.
- Give learners instructions on what to observe and what to record.
- Alter the activities or make additions to suit your context.
- These are suggested activities, use as guidelines, together with your work schedule.
- Feel free to adapt these activities.
- Choose activities that you think are very relevant.
- Pay attention to progression when dealing with same content in different grades.
- Choose available resources that suit your context.
- Make additions wherever necessary.
- Give class works and home works regularly.
- Vary the methods of assessments.
- Give time to learners to write notes on new content.
- Give short tests as part of informal assessment regularly.
- Demonstrate practical activities and allow learners to take part in the activity.
- Give more credit to hands-on activities.
- Keep evidence of all daily classroom activities.

CONTENT OVERVIEW

GRADE 4

TERM 1	TERM 2	TERM 3	TERM 4
<p>LEARNING OUTCOMES AND ASSESSMENT STANDARDS:</p> <p>LO 1. Scientific Investigations: The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.</p> <p>AS 1. Plans Investigation;</p> <p>2. Conducts investigation and collects data;</p> <p>3. Evaluates data and communicate findings.</p> <p>LO 2. Constructing Science Knowledge: The learner will know and be able to interpret and apply scientific, technological and environmental knowledge.</p> <p>AS 1. Recalls meaningful information;</p> <p>2. Categorises information.</p>	<p>LEARNING OUTCOMES AND ASSESSMENT STANDARDS:</p> <p>LO 1. Scientific Investigations: The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.</p> <p>AS 1. Plans Investigation;</p> <p>2. Conducts investigation and collects data;</p> <p>3. Evaluates data and communicate findings.</p> <p>LO 2. Constructing Science Knowledge: The learner will know and be able to interpret and apply scientific, technological and environmental knowledge.</p> <p>AS 1. Recalls meaningful information;</p> <p>2. Categorises information.</p>	<p>LEARNING OUTCOMES AND ASSESSMENT STANDARDS:</p> <p>LO 1. Scientific Investigations: The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.</p> <p>AS 1. Plans Investigation;</p> <p>2. Conducts investigation and collects data;</p> <p>3. Evaluates data and communicate findings.</p> <p>LO 2. Constructing Science Knowledge: The learner will know and be able to interpret and apply scientific, technological and environmental knowledge.</p> <p>AS 1. Recalls meaningful information;</p> <p>2. Categorises information.</p>	<p>LEARNING OUTCOMES AND ASSESSMENT STANDARDS:</p> <p>LO 1. Scientific Investigations: The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.</p> <p>AS 1. Plans Investigation;</p> <p>2. Conducts investigation and collects data;</p> <p>3. Evaluates data and communicate findings.</p> <p>LO 2. Constructing Science Knowledge: The learner will know and be able to interpret and apply scientific, technological and environmental knowledge.</p> <p>AS 1. Recalls meaningful information;</p>

<p>LO 3 Science, Society and Environment: The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.</p> <p>AS 1. Understands science and technology in the context of history and indigenous knowledge;</p> <p>2. Understands the impact of science and technology.</p>	<p>LO 3 Science, Society and Environment: The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.</p> <p>AS 1. Understands science and technology in the context of history and indigenous knowledge;</p> <p>2. Understands the impact of science and technology.</p>	<p>LO 3 Science, Society and Environment: The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.</p> <p>AS 1. Understands science and technology in the context of history and indigenous knowledge</p> <p>2. Understands the impact of science and technology.</p>	<p>2. Categorises information.</p> <p>LO 3 Science, Society and Environment: The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.</p> <p>AS 1. Understands science and technology in the context of history and indigenous knowledge</p> <p>2. Understands the impact of science and technology.</p>
<p><u>LIFE AND LIVING</u> <u>Living things that share the world with us</u> Living things-characteristics • Variety of plants; Green plants-parts of the plant, functions of the various parts, factors that help plants to grow- (water, sunlight, soil, air) -Identify visible differences describe characteristics, sort and classify, make drawings. • Variety of animals Visible differences between them, differences in behaviours of some familiar animals</p>	<p><u>EARTH AND BEYOND</u> <u>The rocks of Earth</u> Earth- the different layers of earth • Below the surface we stand on, there is a great depth of rock. • Earth is hot, deep down. • Igneous rocks formed as hot molten rock cooled and hardened. (Granite is only required example). • Weathering of rocks' surfaces. (Make the link with soil - broken-up rock becomes soil. • Erosion of rock particles • Deposition of rock particles • Sediment (Layer of particles) • Sedimentary rock.</p>	<p><u>ENERGY AND CHANGE</u> <u>Air, wind, sound and musical instruments</u> • Evidence that air is a real substance. • Air and wind as moving air. • We can use the energy of the wind. • Sound travels through materials. • The concept of vibration. We can feel and hear vibrations in materials. • Vibrations pass energy on to other things. • Quick and slow vibrations give high notes and low notes. • .Musical notes are good</p>	<p><u>LIFE AND LIVING</u> <u>How plants and animals live, and the places where they live</u> • Plants make their own food using sunlight, water and the air. • Some animals eat plants, some animals eat plant-eating animals, and some animals eat both plants and other animals. • Habitats for animals (= places where they can survive) to feed, get water, shelter/escape and reproduce- vertebrates and invertebrates and the characteristics to adapt to these habitats. • Dependence of animals and</p>

<ul style="list-style-type: none"> • Existence of fossils, as signs that other kinds of plants or animals lived in SA long ago. -Water: the important role of water in the ecosystem -The impact of water shortage and water quality <p><u>MATTER AND MATERIALS</u> <u>Choosing and changing materials</u></p> <ul style="list-style-type: none"> • Materials as substances we choose for particular uses • Properties of materials that learners can see, feel, hear, etc. (“Properties” as adjectives that describe materials) • Combining materials to get a new material that has new, different properties -Three phases of matter-solids, liquids & gases.(examples) ice, water & water vapour -Differences between solids, liquids and gases. <p>Note: Technology Grade 4 - Processing and materials -can complement this section.</p>	<ul style="list-style-type: none"> • Some sedimentary rocks contain fossils. • Sedimentary rock can be changed to metamorphic rock. -causes of erosion- wind, moving water. 	<p>vibrations Musical instruments can give sounds (notes) ranging from high notes to low notes.</p> <ul style="list-style-type: none"> • Boxes and tubes on musical the sound louder. 	<p>humans on plants; simple food chains.</p> <ul style="list-style-type: none"> • Dependence of plants, animals and humans on water Different habitats of animals.
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Grade: 4		Learning Area
Strand/ Theme: Life and Living		
Duration: 6 Weeks (Weeks 1-6)		Content : Living things that share the world with us
Integration: Language LO2: Speaking LO3: Reading LO5: Thinking and reasoning AS: Collects and records information in different ways		Resources: Books, Newspaper, Magazines, Specimens of plants and animals, seeds, water, soil, tray, sand, real plant, charts, pictures, videos.
Selected LOs and ASs	Teaching & Learning Activities	Details of assessment
LO 1. Scientific Investigations: The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts. AS 1. Plans Investigation; 2. Conducts investigation and collects data; 3. Evaluates data and communicate findings. LO 2. Constructing Science Knowledge: The learner will know and be able to interpret and apply scientific,	1.1 Topic: Living things All learners will see a hairy four-legged animal like a cow as an animal, but many of them will not think of a spider (which has 8 legs) and an earthworm (which has no legs) as animals. Yet in science all these organisms are regarded as animals. Similarly plants are not considered as living things by many learners. Learners should develop an appreciation and necessity for a wider grouping and classification of animal kingdom. Activities Learners discuss about the visible features and properties of a variety of living things a tree, grass, or algae as part of the group of living things called “plants”. What kinds of things are living? For example, which of these are living: mouse, fire, wind, river, bird, soil? 1. Teacher uses pictures, charts and specimens to name the characteristics of living things. 2. Learners recall some of the features of animals and plants.	Write characteristics of plants and animals. Written work using tables to sort plants and animals. Make a drawing of a plant and an animal to show the main external features. Write down the similarities and differences between plants and animals Investigation What kinds of things are living? For example, which of these are living: mouse, fire, wind, river, bird, soil?

<p>technological and environmental knowledge.</p> <p>AS 1. Recalls meaningful information;</p> <p>2. Categorises information.</p> <p>LO 3 Science, Society and Environment: The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.</p> <p>AS 1. Understands science and technology in the context of history and indigenous knowledge;</p> <p>2. Understands the impact of science and technology.</p>	<ol style="list-style-type: none"> 3. Learners take a field trip to collect different plants and animals around the school. 4. Make a list of different plants and animals. 5. Identify and sort plants and animals according to observable features. 6. Groups discuss similarities and differences between plants and animals. 7. Complete tables about similarities and differences. 8. Teacher summarises the characteristics of plants, animals and make a comparison. <p>1.2 Topic: Variety of plants Plants are green living organisms, but some are very small like algae, some are very large, like trees, and there are many sizes and shapes in between the very small and the very large. Leaves and flowers and stems are very varied.</p> <p>Activities</p> <ol style="list-style-type: none"> 1. Learners collect different types of plants from the school yard and teacher provides other types of plants. Learners describe visible differences between several different plants, and compare their leaves, fruit, and flowers. 2. Learners identify similarities in these types of plants. 3. Identify visible differences and describe characteristics and, sort and classify them into different groups. 4. Learners make a table showing the differences and similarities of a variety of plants. 5. Teacher summarizes the differences and similarities in a variety of plants. 6. Learners make drawings of different plants. 	<ul style="list-style-type: none"> • How many different kinds of plants can you find in the school grounds / a small area? • In what ways are the plants different from each other? Describe these differences. Do all plants have the same parts? • • Describe, name and identify birds by colours, behaviour, song, habitat (observing and comparing are process skills) • Collect, sort and describe different types of seeds (observing and comparing) <p>Present your findings in a written report.</p>
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1.3 Topic: Green plants-parts of the plant, functions of the various parts

Activities

1. Learners recall the characteristics of a plant.
2. Collect small plants, observe, identify and name the parts.
3. Teacher explains the functions of the different parts of a plant.
4. Learners observe a chart showing the parts of a plant and compare it to the real plant that they brought to the class.
5. Observe different types of plants. e. g. a bean plant, tomato plant, maize plant, willow tree, algae, to compare its parts.

1.4 Topic: factors that help plants to grow

Activities

1. Teacher asks questions related to plant growth: e.g. have you planted any plants? How do plants grow in your garden/ what do plants need to grow well in your garden?
2. Ask learners to grow a plant from a seed and observe the root, stem and leaves.
3. Ask learners to place some beans seed in wet soil and some in dry soil for 7-10 days and observe what happens to the seeds. Explain the changes happened to the seeds.
4. Ask learners to keep some seeds in a wet tray outside and some in a wet tray in a fridge for 7 – 10 days and make observations about the changes that happened to the seeds.
5. Ask learners to place a pot plant on the window seal and one in the cupboard and observe what happens after a few days.
6. Teacher explains factors that affect the growth of the plant e.g. water, sunlight, soil and air.

Completion of worksheet on investigation of the factors that affect plant growth.
Draw and label the different parts of a plant.

Assignment: Write notes on the functions of different parts of a plant.

Practical investigation of the growth of plant
Learners plant bean seeds in small containers on the window seal and observe for few days; record their observations, make drawings of their observations, and report to class.
Place a pot plant on the window seal and one in the cupboard and observe what happens after a few days.

<p>1.5 Topic: Variety of animals Activities</p> <ol style="list-style-type: none"> Learners should discuss visible differences between animals, differences in behaviours of some familiar animals including very small animals like insects and other invertebrates Learners discuss and find answers to the questions. E.g. how do you know that something is an animal? What differences between animals can we see? Describe all the differences you can find. What kinds of things are called animals? For example, which of these are animals: cow, cat, spider, worm, cricket, frog, mosquito, and fish? Learners make a list of all the things that all animals do. <p>1.6 Topic: Fossils Activities</p> <p>Existence of fossils, as signs showing that other kinds of plants or animals lived in SA long ago.</p> <ol style="list-style-type: none"> Teacher explains the existence of fossils with the aid of pictures/charts/video. Some rocks have traces, called fossils, left by other plants or animals that lived here in South Africa long ago. Learners observe and make notes on fossils. 	<p>Sort cards representing herbivores, carnivores, omnivores. Learners must explain why they put certain cards together. (Sorting and classifying)</p> <p>Work out the real size of <i>Tyrannosaurus rex</i> or other dinosaurs and draw their footprints to real size on the ground and mark their height on a wall, with chalk. (Interpreting and inferring, estimating and measuring)</p> <p>Investigate the existence of fossils.</p> <p>Make a fossil model (a permanent imprint of a leaf, small footprint, sea-shell, dead beetle in clay or plaster of Paris)</p>
<p>Expanded opportunity: Investigate and suggest possible solutions to improve water quality in your area. Make a sand filter. Study more about various types of plants and animals in different parts of South Africa.</p>	<p>Reflection: What improvement to be made for a more successful lesson.....</p>

Grade: 4		Learning Area: Natural Sciences	
Strand/Theme: Matter and materials			
Duration: 4 Weeks (Weeks 7 – 10)		Content : Choosing and changing materials	
Integration Language LO2: Speaking LO3: Reading LO5: Thinking and reasoning AS: Collects and records information in different ways Life Orientation: LO 1:Health promotion Technology LO 2: Processing		Resources: wood, plastic, salt, mealie-meal, steel, aluminium cooking-foil, glass, syrup, paint, Prestik, water, porcelain, pottery polymers , rubber, fabrics,	
Selected LOs and ASs	Teaching & Learning Activities		Details of assessment
LO 1. Scientific Investigations: The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts. AS 1. Plans Investigation; 2. Conducts investigation and collects data; 3. Evaluates data and communicate findings. LO 2. Constructing Science Knowledge: The learner will know and be able to interpret and apply scientific, technological and environmental knowledge	Topic 2.1: Materials Materials are the substances (i.e. the matter) we choose and use to make things. Examples are wood, plastic, salt, mealie-meal, steel, aluminium cooking-foil, glass, syrup, paint, Prestik, water and even air. Activities: 1. Learners look at different types of materials that are available in the classroom. Learners realise that there are many kinds of substances called liquids, many kinds of substances called gases, many kinds of substances called solids. 2. Learners describe the different types of materials. 3. Sort the materials into different groups: solids, liquids and gases		Written work on materials, examples of materials. Identify different types of materials.

<p>AS 1. Recalls meaningful information; 2. Categorises information.</p> <p>LO 3 Science, Society and Environment: The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.</p> <p>AS 1. Understands science and technology in the context of history and indigenous knowledge; 2. Understands the impact of science and technology.</p>	<p>Topic 2.2 : Properties of materials Properties of materials that learners can see, feel, hear, etc. (“Properties” as adjectives that describe materials). The properties of materials are described by adjective words such as hard, soft, springy, sticky, brittle, wet, dry, runny, stiff, and shiny, dull for example. Learners might invent some words like “bendy” or “stretchy”. They can also use words like “Glass makes a ringing sound when I tap it with a spoon but it will crack easily”. The materials learners examine and test should include metals and non-metals including ceramics (glass, porcelain, pottery) and polymers (plastics, rubber, fabrics). We choose materials with properties that will work best for the purpose we have (the things we want to make).</p> <p>Activities</p> <ol style="list-style-type: none"> 1. Learners place a teaspoonful of methylated spirit in a large clear container and watch it evaporate. They describe their observations of its change of state from liquid to gas. 2. Learners should identify processes like evaporation 3. Learners press an apparently empty glass mouth-down into water and try to explain why the water rises only a short way inside the glass. 4. Make observations and conclusions 	<p>Investigates properties of materials and sorts the materials in to different groups</p> <p>Practical activity</p> <ul style="list-style-type: none"> - Follow instructions to do the practical activity - Describe observations - Make inferences/conclusions
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Topic: 2.3: Combining materials to get materials with new, different properties

We can mix materials to get a new material. Sometimes we need to heat the materials in order to make them mix, and then let the mixture cool. The new material can have properties that are different to the properties of the starting materials.

Activities

1. Learners do a task in which the teacher creates a purpose for making a new material. For example- making a pot to hold water, or making a pot to hold sugar, inventing a liquid with a smell that will keep mosquitoes away. (Link these concepts with the Processing strand in Technology.)
2. Learners must mix materials to make a new material, and compare the properties of the starting materials with the end material. (An important part of the learning is the before-and-after comparisons, oral descriptions and written work). Learners should experience making at least two of these materials below – they must make them or shape them for a purpose. Some materials must dry in a warm place; others will react and set without such help.
 - 2.1 Mixing clay and water (varying quantities of water give varying stiffness of clays; also try the effect of mixing string or grass in the clay – do they make the object stronger?)
 - 2.2 Mixing sand, cement-powder and water to make concrete
 - 2.3 Mixing flour and water to make play-dough or to make glue (also try the effect of adding a little oil - does it prevents cracking?)
 - 2.4 Mixing Plaster of Paris and water (or Polyfilla or Rhinolite) to make a hard plaster
 - 2.5 Mixing liquids that give off smelly gases (e.g. vinegar and bleach) to get a new smell. (Warning: use small quantities of these liquids.)
 - 2.6 Mixing jelly-powder and water and food colouring to make a new kind of jelly
 - 2.7 Mixing sugar and bicarbonate of soda in a little water, heated together to make a kind of sweet.
 - 2.8 Mixing flour and bicarbonate of soda to make self-rising flour

Complete a table showing the starting materials and the end materials, observation/description of what they did and what happened.

Starting materials	End materials	Observations Descriptions

3. Learners warm and melt candle-wax and let it harden.
4. Teacher explains terms like “solid wax”, “melting”, “liquid wax”, “changing back” from liquid to solid, “temporary change”.
5. Learners look at a variety of solids, liquids and gases (including semi-liquids like golden syrup, and soft solids like rubber or cotton-wool, and powdered solids like sugar) They are asked to put them in three groups and describe the properties that are common across the groups.
Solids, liquids and gases (their characteristic properties, and less emphasis on change of state)

Topic 2.4: Three phases of matter-solids, liquids & gases.

Materials are called solids if their shape does not change. All the materials that flow but stay in a cup are called liquids. All the materials that will not stay in a cup but spread upwards and sideways by themselves are called gases (examples of gases are air, perfume, the gas that comes from vinegar, the gas that comes from bleach (“Jik”), gas from a gas stove, petrol vapour).

By heating solid substances we can change them into the liquid state/form, and those hot liquids will cool down to become solids again. (This idea does not need much emphasis because learners will do more on change of state in Grade 5 – see topic ***Heating and cooling causes changes in materials***)

Activities

1. Learners observe different materials and describe the properties.
2. Teacher introduces the concept phases of matter-solids, liquids and gases.
3. Learners compare and find out the differences between solids, liquids and gases.
4. Use materials like metals, ceramics and polymers.
5. Learners discuss how to describe substances like powders (a heap of sugar or salt), rubber (rubber bands, balloons) or jelly. They should ask classifying questions such as “Does it keep its shape? Or does it flow? Or does it spread upwards by itself?” They can then decide on the best description of the substance – is it more like a solid, more like a liquid or more like a gas?
6. Teacher concludes the lesson by summarising the properties of materials.

Practical investigation- Phases of matter
- completion of worksheet.
Write short notes on properties of materials.

CONTENT OVERVIEW

GRADE 5

TERM 1	TERM 2	TERM 3	TERM 4
<p>LEARNING OUTCOMES AND ASSESSMENT STANDARDS: LO 1. Scientific Investigations: The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.</p> <p>AS 1. Plans Investigation;</p> <p>2. Conducts investigation and collects data;</p> <p>3. Evaluates data and communicate findings.</p> <p>LO 2. Constructing Science Knowledge: The learner will know and be able to interpret and apply scientific, technological and environmental knowledge.</p>	<p>LEARNING OUTCOMES AND ASSESSMENT STANDARDS: LO 1. Scientific Investigations: The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.</p> <p>AS 1. Plans Investigation;</p> <p>2. Conducts investigation and collects data;</p> <p>3. Evaluates data and communicate findings.</p> <p>LO 2. Constructing Science Knowledge: The learner will know and be able to interpret and apply scientific, technological and environmental knowledge.</p>	<p>LEARNING OUTCOMES AND ASSESSMENT STANDARDS: LO 1. Scientific Investigations: The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.</p> <p>AS 1. Plans Investigation;</p> <p>2. Conducts investigation and collects data;</p> <p>3. Evaluates data and communicate findings.</p> <p>LO 2. Constructing Science Knowledge: The learner will know and be able to interpret and apply scientific, technological and environmental knowledge.</p>	<p>LEARNING OUTCOMES AND ASSESSMENT STANDARDS: LO 1. Scientific Investigations: The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.</p> <p>AS 1. Plans Investigation;</p> <p>2. Conducts investigation and collects data;</p> <p>3. Evaluates data and communicate findings.</p> <p>LO 2. Constructing Science Knowledge: The learner will know and be able to interpret and apply scientific, technological and environmental knowledge.</p>

<p>AS 1. Recalls meaningful information;</p> <p>2. Categorises information.</p> <p>LO 3 Science, Society and Environment: The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.</p> <p>AS 1. Understands science and technology in the context of history and indigenous knowledge;</p> <p>2. Understands the impact of science and technology.</p>	<p>AS 1. Recalls meaningful information;</p> <p>2. Categorises information.</p> <p>LO 3 Science, Society and Environment: The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.</p> <p>AS 1. Understands science and technology in the context of history and indigenous knowledge;</p> <p>2. Understands the impact of science and technology.</p>	<p>AS 1. Recalls meaningful information;</p> <p>2. Categorises information.</p> <p>LO 3 Science, Society and Environment: The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.</p> <p>AS 1. Understands science and technology in the context of history and indigenous knowledge;</p> <p>2. Understands the impact of science and technology.</p>	<p>AS 1. Recalls meaningful information;</p> <p>2. Categorises information.</p> <p>LO 3 Science, Society and Environment: The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.</p> <p>AS 1. Understands science and technology in the context of history and indigenous knowledge;</p> <p>2. Understands the impact of science and technology.</p>
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<p><u>LIFE AND LIVING</u> <u>How living things depend on their environment</u></p> <ul style="list-style-type: none"> • Animals depend on the soil, plants and other animals in their environment, for food, shelter and places to breed. • Animals cannot make their own food, and so some animals eat plants for food while some animals eat other animals. All animals ultimately depend on green plants for their food which gives them energy. • Plants make their own food, but plants depend on air, on the soil for water and anchorage for their roots, and on the Sun for energy to help the leaves make the food. • Soil forms from broken-down (= weathered) rock and the remains of living organisms. (Refer to topic Rocks of the Earth) • Soil types are clay, sandy soil and loam. • A habitat for each kind of living thing is the kind of place where it can find or make food, find shelter and reproduce. 	<p><u>EARTH AND BEYOND</u> <u>Atmosphere and weather</u></p> <ul style="list-style-type: none"> • Wind as moving air. <p>Air as a substance that exists even when the wind is not blowing</p> <p>defined in terms of east, west, north and south</p> <ul style="list-style-type: none"> • A few different kinds of clouds, and their relationship to weather conditions. • Height of water in a container as a measure of rainfall. • Water changes its state with temperature changes – liquid, solid ice and water vapour. • Evaporation and ways to slow down evaporation or speed it up • Water-vapour in air can condense from the gas state and form drops of liquid • A “cycle” as a series of events that occur again and again. <p>The water cycle - various examples of it.</p>	<p><u>ENERGY AND CHANGE</u> <u>Heating and cooling causes changes in materials</u></p> <ul style="list-style-type: none"> • Heating materials can make them change state e.g. from solid to liquid to gas. <p>Cooling can reverse those changes of state.</p> <ul style="list-style-type: none"> • Gaining and losing energy • Most substances (solids, liquids and gases) expand when they become hot, and they contract when they become cold <p>expansion and contraction of materials to show changes in the temperatures of things.</p> <ul style="list-style-type: none"> • When liquids evaporate, they take energy from their surroundings and this leaves the surroundings cooler than before. (Note links with Atmosphere & weather, and evaporation of water) 	<p><u>LIFE AND LIVING</u> <u>Plant and animal reproduction</u></p> <ul style="list-style-type: none"> • Plant reproduction from seeds. Plant growth and life cycle. • Vegetative reproduction. Its importance for agriculture because daughter plants are all the same. • Importance of indigenous plants for medicinal and other uses; need to conserve them and their habitats. • Reproduction in birds, fish, reptiles, amphibians, mammals. • Habitats that are needed by some of the animals above and the protection afforded to breeding animals by habitats; the impact of loss of habitat. • Social organisation of animals and patterns of behaviour. For solitary, pairing for life, or living in packs, prides, herds, troops or colonies. (Link with reproduction and care for the young)
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<p><u>MATTER AND MATERIALS</u> <i>Fair testing and comparison of materials</i></p> <ul style="list-style-type: none"> • Matter is any kind of solid, liquid or gas. A material is any kind of matter that we choose to use for a particular purpose. • Properties of materials may be colour, smell, hardness, toughness, flexibility, strength in tension • To compare materials on one of these properties, we have to test them in the same way. This is known as fair testing. 	<p><u>ENERGY AND CHANGE</u> <i>Energy for heating things</i></p> <ul style="list-style-type: none"> • We can heat materials by using fuel-burning systems like gas, wood and paraffin stoves. • We can also heat materials by using the Sun's energy. • Concept of energy sources. • Fire needs fuel, heat and air. • Safety with fires – safe use of candles, paraffin, gas and braziers • How to behave in the event of clothing catching alight or being in a burning building. 	<p><u>EARTH AND BEYOND</u> <i>Atmosphere and weather</i></p> <ul style="list-style-type: none"> • Seasons as a predictable annual change in weather patterns, • Air temperatures • The equatorial region and the polar regions on the Earth • Limits of land and drinkable water. 	
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Grade: 5		Learning Area	
Strand: Life and Living			
Duration: 6 Weeks (Weeks 1-6)		Content : How living things depend on their environment	
Integration: Language LO2: Speaking LO3: Reading LO5: Thinking and reasoning AS: Collects and records information in different ways Life Orientation LO 1: Health Promotion Social Sciences LO2: Geographical knowledge		Resources: Charts, models, pictures, soil, books	
Selected LOs and ASs		Learning Activities	
LO 1. Scientific Investigations: The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts. AS 1. Plans Investigation; 2. Conducts investigation and collects data; 3. Evaluates data and communicate findings. LO 2. Constructing Science Knowledge: The learner will know and be able to interpret and apply scientific, technological and environmental knowledge		Topic 1.1: What animals need to live? Animals depend on the soil, plants and other animals in their environment, for food, shelter and places to breed. Animals cannot make their own food, and so some animals eat plants for food while some animals eat other animals. All animals ultimately depend on green plants for their food which gives them energy. Activities: 1. Learners discuss how living organisms depend on each other for food by answering questions like- <ul style="list-style-type: none"> - How do we know that something is living? - What do ALL living things do? - How do people use plants? 	
		Details of assessment	
		Draw a mind map to illustrate the food eaten by different animals and their interdependence	

<p>AS 1. Recalls meaningful information;</p> <p>2. Categorises information.</p> <p>LO 3 Science, Society and Environment: The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.</p> <p>AS 1. Understands science and technology in the context of history and indigenous knowledge;</p> <p>2. Understands the impact of science and technology</p>	<ul style="list-style-type: none"> - What do animals need, to survive and grow well? - What prey does this animal eat? And what did the prey eat? - What do domestic animals eat? (Cow, dog, cat, sheep, etc.) - What do birds and insects eat? <ol style="list-style-type: none"> 2. Teacher discusses how we depend on plants/animals for food. Learners give examples of food. 3. Teacher explains the terms-ecosystem, habitat, etc. Learners will embark on an excursion to look at different eco-systems in an environment e.g. pond, dam, stream, school yard, school garden, a maize field, river, etc and observe what different types of animals feed on. (Or watch a video showing different habitats) 4. Learners report back on their findings. 5. Teacher asks learners to group the animals that eat grass into one and the meat eating ones into another group and so on. 6. Teacher introduces the terms-herbivore, carnivore and omnivore, explains the meaning of these terms and learners identify animals belonging to each group. 7. Teacher explains food chain and food web, draws food chains and food webs using the animals and plants the learners collected. 8. Learners draw food chains using the information they collected. 	<p>Investigation on different ecosystems. Oral presentations</p> <p>Drawing of simple food chains and food webs.</p> <p>Improving the mind map drawn earlier to indicate further learning.</p>
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Topic:1.2: Plants depend on the soil

Plants make their own food, but plants depend on air, on the soil for water and anchorage for their roots, and on the Sun for energy to help the leaves make the food.

Activities:

1. How do plants spread?
2. In what kinds of place does each sort of plant grow well and make more plants?
3. Do experimental investigations to find out how plants depend on the soil.

Topic:1.3: Soil

Soil forms from broken-down (= weathered) rock and the remains of living organisms. Good soil has air, water, the remains of dead organisms and very small living organisms in it. (Refer to topic Rocks of the Earth) Soil types are clay, sandy soil and loam. (Qualitative comparisons of water retention, stickiness, etc. are adequate.)

Activities:

1. Learners discuss factors that contribute to weathering of rocks.
2. Collect different types of soil and compare the water retention and stickiness of these soils, by experiments.

Identification and sorting of different types of soil

Comparison of different types of soil.

Description of different types of soil.

Topic: 1.4: Habitats for plants and Animals

A habitat for each kind of living thing is the kind of place where it can find or make food, find shelter and reproduce. Examples are the bark of trees, river-banks, ponds, the sea-shore above the high tide line, burrows in soil, wetlands, damp dark places.

Activities:

1. Teacher discusses:-
 - In what kinds of place does each sort of animal grow well and have babies?
 - How should people behave towards the places where animals live?
2. Comparison of habitats of different animals and their adaptations to survive in these habitats-shape of body, number of legs(absent or present), wings, body covering, place where it lives, the food they eat, method of feeding(feeding habits), movement etc.
3. Learners go for a field trip to observe different types of animals in their natural habitat and record their observations.

Learners observe and study habitats for small living things such as trunks and roots of trees, river-banks, ponds, burrows in soil, wetlands, damp dark places.

Study of living organisms in their natural environment Study groups: The class should be divided into groups of five to seven learners. Members of a group work together on this research project.

Study Area: A piece of undeveloped ground can be divided into a number of plots/ part of the school garden can be utilised /life on a tree can be observed by one or two groups/life in a running stream or a pond. Plots are assigned to study groups.

A group studies the life on the plot for a period of time, observations to be made weekly and report of the observations has to be kept in observation sheets.

1. Draw a map of the plot in your book and indicate the vegetation of your study area on the map.
2. Remember, this is a study of plants and animals in the area over a period of time. Try to observe how the living organisms influence one another and also how they are influenced by the environment.
3. Collect specimens of all the smaller plants on the plot and also leaves and seeds of the larger plants.
4. Dry the plants and leaves between the pages of unwanted newspapers.
5. Use sticky tape and cardboard to make wall charts.
6. Visit the study area once a week to observe and record changes as to size, colour, flowers, seeds, seasons, humidity, new plants etc.
7. Look for animals in the air, on plants, in the soil, under stones etc.
8. Mammals-look for foot prints, droppings and sleeping places, try to explain why an animal was or is in the particular spot.
9. Look for frogs, lizards, chameleons and snakes and also small animals like insects, spiders, scorpions, snails and millipedes.
10. Use insect nets to catch insects, kill the insect in a killing bottle with a tight lid and mount the insect on a thick cardboard to make wall chart.
11. Be on the lookout for relationships between animals, e.g. an animal that preys on another (lizard catching insects) or an animal parasite (tick on a cow).

Relationships between plants and animals

12. Name all the animals you can observe eating plants; state the names of the plants and the parts of the plants

13. Name the animals using plants for protection, state the name of the plants and the parts of the plants

14. Give a description of relationships observed during pollination of flowers.

15. Give the names of organisms involved in seed dispersal.

16. The role of physical factors

17. List the plants preferring direct sunlight and those growing in the shade.

18. Note how light influence the direction of growth of stems of plants.

19. Name the plants flowering during winter.

20. Name the plants flowering during summer.

21. Name the animals you observe hiding away from bright sunlight and those that come out in bright light.

22. Record the temperatures of each week and find the average temperature for each week.

23. Based on your observations answer the following questions:

- How does the variation in temperature influence the growth of ever-green plants
- Name the plants which loose their leaves and those that retain their leaves
- Name all the plants killed by frost and that are not killed.
- Try to find plants, the seeds of which germinate only during winter.
- Name any animal influenced by the variation in temperature- how they are affected?

- ❖ Make a presentation of all your findings to the class.
- ❖ Teacher assesses your presentation using the following criteria-presentation skill, language use, and confidence, logical presentation of facts and correctness of facts.

Rubric to assess presentation

Criteria	Level 1	Level 2	Level 3	Level 4	Level 5
1 Presentation skills(e.g. eye contact, body language)	Lacking skills	Lacking skills here and there	Good use	Very good	Excellent
2 Language use	Has difficulty in using language	Needs some support	Good command of language	Very good use	Excellent use
3 Confidence	Lacks confidence	A bit shaky	Confident	Quite confident	Very confident
4 Logical presentation of facts	No logic at all	Mixing of facts here and there	Good presentation	Very good presentation of facts	Excellent presentation of facts
5 Correctness of facts	Lot of misconceptions	Poor understanding of facts	Facts are presented logically	Very good presentation of facts	Excellent presentation of facts

Grade: 5		Learning Area	
Strand: Matter and materials			
Duration: 4 Weeks (Weeks 7-10)		Content : Fair testing and comparison of materials	
Integration: Language LO2: Speaking LO3: Reading LO5: Thinking and reasoning AS: Collects and records information in different ways Technology LO2 :Processing		Resources: Different types of materials-paper, water, stones, spray, perfume, oil, iron, zinc, spirit lamp.	
Selected LOs and ASs		Learning Activities	
LO 1. Scientific Investigations: The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts. AS 1. Plans Investigation; 2. Conducts investigation and collects data; 3. Evaluates data and communicate findings. LO 2. Constructing Science Knowledge: The learner will know and be able to interpret and apply scientific, technological and environmental knowledge		Topic 2.1: A material Matter is any kind of solid, liquid or gas. When we choose to use one kind of matter (= a substance) to make something, we usually call it a material. Activities: Learners bring different types of materials; they observe, feel the texture, test how it differs and group them into different groups according to their visible differences.	
		Details of assessment	
		Comparison of materials. Identification of materials. Written notes on types of materials.	

<p>AS 1. Recalls meaningful information;</p> <p>2. Categorises information.</p> <p>LO 3 Science, Society and Environment: The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.</p> <p>AS 1. Understands science and technology in the context of history and indigenous knowledge;</p> <p>2. Understands the impact of science and technology</p>	<p>Topic 2.2: Properties of materials</p> <p>We choose materials because they have the properties we want. The properties of a material are the ways we can describe it. Examples of properties of materials are its colour, smell, hardness, its toughness (how much damage it can take without breaking), its flexibility (how easily it bends without breaking), and its strength when we stretch it, or how easily it melts.</p> <p>Activities:</p> <ol style="list-style-type: none"> 1. Designing fair tests to find out the properties of materials 2. Learners keep a record of what they do to the objects (such as how the objects were bent, dropped or stretched) keep a record of the effects (such as amount of bending, damage or elongation) 3. These records can be in the form of pictures, symbols or written in tables. 4. Learners compare the properties of solids, liquids and gases. (also compare different types of solids and different types of liquids) 5. Teacher summarises the properties of solids, liquids and gases. 	<ul style="list-style-type: none"> - Testing and comparing material - Recording of observations - Reporting findings <p>Assess the extent to which learners can test the materials or compare the materials in a controlled way.</p>
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Topic: 2.3 Comparing materials

To test and compare similar materials, we find ways to compare them fairly. When we compare them, we must use the same method on all of them.

Activities:

1. Think of ways to make a fair comparison of different kinds of plastic bottles (of the same shape) for toughness, and then carry out their test. The test could mean filling the plastic bottle with water, putting on the caps and dropping them (always from the same height) and comparing the damage. Or learners might decide to drop a brick on the bottles. Or they might plan a similar experiment with plastic bags full of water.

Test different materials and decide on their properties. Make a table showing the different groups.

<ol style="list-style-type: none">2. Think of ways to compare three kinds of glue, while being fair, to decide which one is the stronger glue. 3. Follow instructions to melt the wax of two kinds of candles and use a thermometer to measure the melting temperature of each kind of wax. 4. Follow instructions to compare three kinds of plastic ruler for flexibility. This might involve holding the rulers down at one end and bending them to flick objects across the room. 5. Think of a fair way to compare three kinds of wood for hardness. This could mean placing a nail on the wood and dropping a heavy object down a tube onto the nail. Then the learners measure the depth that the nail goes into each piece of wood.	<p>Practical investigation to compare various materials for categorisation. Correct observation, recordings and conclusions.</p>
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CONTENT OVERVIEW

GRADE 6

TERM 1	TERM 2	TERM 3	TERM 4
<p>LEARNING OUTCOMES AND ASSESSMENT STANDARDS: LO 1. Scientific Investigations: The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.</p> <p>AS 1. Plans Investigation;</p> <p>2. Conducts investigation and collects data;</p> <p>3. Evaluates data and communicate findings.</p> <p>LO 2. Constructing Science Knowledge: The learner will know and be able to interpret and apply scientific, technological and environmental knowledge.</p>	<p>LEARNING OUTCOMES AND ASSESSMENT STANDARDS: LO 1. Scientific Investigations: The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.</p> <p>AS 1. Plans Investigation;</p> <p>2. Conducts investigation and collects data;</p> <p>3. Evaluates data and communicate findings.</p> <p>LO 2. Constructing Science Knowledge: The learner will know and be able to interpret and apply scientific, technological and environmental knowledge.</p>	<p>LEARNING OUTCOMES AND ASSESSMENT STANDARDS: LO 1. Scientific Investigations: The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.</p> <p>AS 1. Plans Investigation;</p> <p>2. Conducts investigation and collects data;</p> <p>3. Evaluates data and communicate findings.</p> <p>LO 2. Constructing Science Knowledge: The learner will know and be able to interpret and apply scientific, technological and environmental knowledge.</p>	<p>LEARNING OUTCOMES AND ASSESSMENT STANDARDS: LO 1. Scientific Investigations: The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.</p> <p>AS 1. Plans Investigation;</p> <p>2. Conducts investigation and collects data;</p> <p>3. Evaluates data and communicate findings.</p> <p>LO 2. Constructing Science Knowledge: The learner will know and be able to interpret and apply scientific, technological and environmental knowledge.</p>

<p>AS 1. Recalls meaningful information;</p> <p>2. Categorises information.</p> <p>LO 3 Science, Society and Environment: The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.</p> <p>AS 1. Understands science and technology in the context of history and indigenous knowledge;</p> <p>2. Understands the impact of science and technology.</p>	<p>AS 1. Recalls meaningful information;</p> <p>2. Categorises information.</p> <p>LO 3 Science, Society and Environment: The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.</p> <p>AS 1. Understands science and technology in the context of history and indigenous knowledge;</p> <p>2. Understands the impact of science and technology.</p>	<p>AS 1. Recalls meaningful information;</p> <p>2. Categorises information.</p> <p>LO 3 Science, Society and Environment: The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.</p> <p>AS 1. Understands science and technology in the context of history and indigenous knowledge;</p> <p>2. Understands the impact of science and technology.</p>	<p>AS 1. Recalls meaningful information;</p> <p>2. Categorises information.</p> <p>LO 3 Science, Society and Environment: The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.</p> <p>AS 1. Understands science and technology in the context of history and indigenous knowledge;</p> <p>2. Understands the impact of science and technology.</p>
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<p><u>LIFE AND LIVING</u> <u>Environments and water resources</u></p> <ul style="list-style-type: none"> • The functions of water in ecosystems for plant and animal life and biodiversity. • Wetlands as habitats for many animals and as sponges that regulate the flow of water. • Groundwater and wetlands as resources for humans. • Catchment areas and factors in catchment areas that affect the quality of water. • Protecting catchment areas. Ground water: boreholes, springs. Protecting springs against pollution. • Water supply systems and sewerage systems – how they work. Emphasis on how to avoid damage to water supply and sewerage systems • Ways of storing water and cleaning it (simple filtration, use of chlorine). • Electricity generation uses vast amounts of water, and so saving electricity means saving water (Link with topic Energy from electricity) 	<p><u>EARTH AND BEYOND</u> <u>Simple astronomy</u></p> <ul style="list-style-type: none"> • The planet as a rocky ball in limitless space • The “down” direction and gravity • The Earth spins (rotates) on its axis • The Sun and stars only appear to move across the sky; in fact the Earth is spinning. • Day and night occur because each part of the Earth moves into shadow and then into sunlight • The time is different in different parts of the Earth that lie on an East-West line. • Horizon as the limit of what we see on the curve • N-S-E-W directions inside and outside the classroom, in terms of sunrise and sunset, and related to a globe model of the Earth • Objects in the sky shine for different reasons. • The Moon’s apparent shape changes during its cycle • People use the Moon, stars or star patterns for navigation or to mark a culturally significant event such as planting time or religious festival. 	<p><u>ENERGY AND CHANGE</u> <u>Energy from Electricity</u></p> <p>(This topic must reinforce NCS Grade 6 Technology content, in Electrical Systems & Control)</p> <ul style="list-style-type: none"> • Electric circuits with cells, bulbs, conducting materials, switches. Complete circuit needed for bulb to glow. • Concept of energy transfer from cell to circuit parts. • Current as a flow of electricity (charges). • Testing, comparing and classifying materials as conductors and insulators. • Energy transfer from a device to its surroundings by means of heat, light, sound. Concept of output devices such as heating wires, incandescent bulbs, beepers. • Simple understanding of dangers of mains electricity supply • Understanding of relative safety of high and low voltages, and the different sorts of appliances that work at differing voltages. 	<p><u>LIFE AND LIVING</u> <u>Plants’ and animals’ responses to their environment</u></p> <ul style="list-style-type: none"> • Living things can respond to changes in their environment. Examples of response to stimuli by plants and animals. • Humans and animals have senses of hearing, vision, taste, smell, touch. (Structure of the sense organs only so far as needed to understand how they receive stimuli from the environment.) <p><u>How animals and humans move themselves</u></p> <ul style="list-style-type: none"> • Humans and animals are able to move their body parts and move themselves from place to place because they have a skeleton and muscles to move the parts of that skeleton. • Muscles can only shorten (contract) pull on bones, they cannot push. • In humans and some animals, skeletons are inside the body (these are called endoskeletons) and in other animals the skeletons are outside, with the muscles inside (exoskeletons).
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MATTER AND MATERIALS

Melting and dissolving, solutions and mixtures

- Melting contrasted with dissolving.
- Melting and dissolving as examples of temporary changes.
- A solution is an even mixture. Solvent, solute and solution. Water is one solvent but not the only solvent.
- Soluble and insoluble substances.
- Saturated solutions.
- Factors of temperature and grain size in the rate of dissolving.
- Conservation of matter means that when we can no longer see a solute, it still exists but as particles of solute among particles of the solvent. **(Note:** This topic must be integrated with the Processing project in Technology at Grade 6.)

LIFE AND LIVING

Nutrition and digestion

- Balanced diets. Simple classification of food types as protective foods, foods for growth and repair, and foods for energy.
- Food must have enough micro-nutrients, i.e. vitamins, trace elements.
- Examples of balanced diets from different cultures. Proportions of food types needed for health.
- Emphasise foods which boost the human immune system and are valuable for people with HIV.
- Digestive system in simple terms; its function as the breaking down of food into a solution which can pass through the wall of the intestine into the blood.

Grade: 6		Learning Area: Natural Sciences
Strand: Life and Living		
Duration: 6 Weeks (Weeks 1-6)		Content : Environment and water resources
Integration: Language LO2: Speaking LO3: Reading LO5: Thinking and reasoning AS: Collects and records information in different ways Life Orientation LO 1: Health Promotion Social Sciences LO 2: Geographical knowledge and understanding		Resources: Books, newspaper, videos, internet
Selected LOs and ASs	Learning Activities	Details of assessment
LO 1. Scientific Investigations: The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts. AS 1. Plans Investigation; 2. Conducts investigation and collects data; 3. Evaluates data and communicate findings. LO 2. Constructing Science Knowledge: The learner will know and be able to interpret and apply scientific, technological and environmental knowledge	Topic 1.1: Water in Ecosystems Water in an ecosystem supports plant and animal life and biodiversity in many ways. Activities 1. Learners answer questions related to the importance of water in the ecosystem. e. g. the use of water in everyday life, the different sources of water. 2. Teacher further explains the importance of water for everyday use and the impact of water shortage. (Use pictures, charts, videos, or newspaper cuttings showing dry desert areas) 3. Discusses water quality ,using water e.g. muddy water, clean water, water from the stream, water from the tap etc	Write a paragraph on the use of water Written work on the consequences of water shortages or polluted water. Teacher assessment using memo Practical activity-the filtration process Assessment - ability to follow instructions - correct handling of apparatus - group work - the correct use of equipment -the correct use of units

<p>AS 1. Recalls meaningful information;</p> <p>2. Categorises information.</p> <p>LO 3 Science, Society and Environment: The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.</p> <p>AS 1. Understands science and technology in the context of history and indigenous knowledge;</p> <p>2. Understands the impact of science and technology</p>	<ol style="list-style-type: none"> 1. Learners recall information about consequences of water shortages or polluted water. 2. Learners make a water filter using a coke bottle, sand, gravel etc (Teacher provides materials) 3. Learners evaluates by testing the water filter and report on the findings. 4. Learners make a rain gauge and measure the amount of rain using the correct unit. 5. Discuss the importance of water quality by comparing water from different sources, e.g. muddy water, clean water, water from the river or stream, tap water, bottled water, etc. 6. Learners research on modern and ancient purification methods. They collect information from parents, community members, water and forestry dept and municipality. Teacher describes how indigenous cultures kept water safe and pure in the past. 	<p>Written work/Assignment Teacher Assessment using Rubric</p>
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Topic 1.2: Wetlands

Wetlands are habitats for many animals and they act as sponges that regulate the flow of water. Wetlands are stop-over points for certain kinds of birds that migrate every year.

Activities:

1. Learners collect information on wetlands in South Africa, from news papers, local water authorities, Dept of water and forestry books videos and internet.
2. Make a presentation on the importance of wetlands and how to protect them.

Topic 1.3: Groundwater

Groundwater (= underground water) is a very important resource for humans in South Africa, and groundwater is fed by wetlands and catchment areas.

1. Learners investigate the effect of placing oil or soluble pollutants in the soil. The learners should realise that when rain falls, the pollutants are carried downwards to the underground water.

Topic 1.4: Catchment areas

A catchment area is the land that receives the rainfall or snow-melt that eventually feeds rivers and wetlands. Human activity in a catchment area affects the quality of water that comes from the catchment area. As people demand more water to use, the more important it becomes to preserve catchment areas, springs, wetlands, rivers and the groundwater that supplies boreholes.

- Learners collect the names and locations of catchment areas of water they use.

Topic 1.5: Protecting water

Protecting catchment areas. Ground water: boreholes, springs. Protecting springs against pollution.

1. Discuss how to protect catchment areas
2. How does pollution affect the ground water?
3. How do you prevent pollution of ground water?

1. **Investigate** a wetland near the school to describe what lives there, where the water comes from in normal times, what happens in times of flood.
2. **Read and interpret** descriptions of what happens when wetlands are filled in for farming or building.
3. Clean a river near the school, and **hypothesise** reasons why it became polluted.
4. Make models of underground water and boreholes.

Written work on protecting catchment areas.

Topic 1.6: Water supply and sewerage systems.

Water supply systems and sewerage systems are basic systems that improve the health of people. Clean water and sewage have to be kept separate even though they usually flow in pipes close together. (Place emphasis on how to avoid damage to water supply and sewerage systems.)

1. Learners read and **interpret information** on water supply systems, transform the information into models of a water supply system and then add to the model to show where the waste water and sewage goes.
2. Find out, with help from local authorities or farmers, where the school's water comes from and how it is cleaned (if it is cleaned at all). **Interpret** this information by drawing pipes on a map that includes the school. They should do the same for the sewage pipes if the school has water-borne sewerage.

Topic 1.7: Water storage

- Learners discuss about various ways of storing water and cleaning it (tanks, simple filtration, use of chlorine).

Debate: More electricity means less water.

Investigate how the sewerage systems work in your area and make suggestions to improve and to avoid damage to water supply and sewerage systems.

Write a written report on your findings.

Grade: 6		Learning Area: Natural Sciences
Strand: Matter and materials		
Duration: 4 Weeks (Weeks 7-10)		Content : Melting and dissolving, solutions and mixtures
Integration: Language LO2: Speaking LO3: Reading LO5: Thinking and reasoning AS: Collects and records information in different ways Technology LO 2: Technological processes AS: Investigations		Resources: Water, salt, sugar, soil, ice blocks, paraffin, coffee, tea, alcohol.
Selected LOs and ASs	Learning Activities	Details of assessment
LO 1. Scientific Investigations: The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts. AS 1. Plans Investigation; 2. Conducts investigation and collects data; 3. Evaluates data and communicate findings.	Topic2.1: Melting is not the same as dissolving Melting is a change of state caused by heating, and this is not the same process as dissolving. In melting, usually only one substance is involved, but in dissolving, at least two substances must be involved, so that one substance can dissolve in the other. Activities: 1. Compare substances such as salt, sugar, copper sulphate and chalk powder for solubility in water. The usual way of doing this is to measure how many teaspoons of the substance will dissolve in 100 ml of water, when the water is at room temperature and learners can stir for a minute or longer. 2. Learners should think about, for example, what happens to the sugar when it dissolves in their tea. 3. Add a drop of water to a small pile of sugar grains, many learners will say that the sugar is “melting”, but the grains are in fact dissolving in the water.	<ul style="list-style-type: none"> Investigate melting of different substances. Distinguish between melting and dissolving. Complete a worksheet on pairing of the solute and the solvent that will form a solution, using the two lists of solutes and solvents. Investigate factors in dissolving. For example, they must hold in mind BOTH the times (short, medium or long) it takes to dissolve a fixed quantity of sugar in water AND the different temperatures that the water can be (hot, warm or cool).

<p>LO 2. Constructing Science Knowledge: The learner will know and be able to interpret and apply scientific, technological and environmental knowledge AS 1. Recalls meaningful information;</p> <p>2. Categorises information.</p> <p>LO 3 Science, Society and Environment: The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment. AS 1. Understands science and technology in the context of history and indigenous knowledge;</p> <p>2. Understands the impact of science and technology</p>	<p>4. Learners should then experience sugar truly melting in a heated container. Note the point above, that in melting, usually only one substance is involved but in dissolving, at least two substances must be involved, so that one substance can dissolve in the other.</p> <p>Topic 2.2: Temporary changes. Melting and dissolving are examples of temporary changes. Solid materials can harden again after melting, and solid solutes can crystallise again after dissolving.</p> <ol style="list-style-type: none"> 1. Dissolve sugar in water and try to get the sugar back. 2. Heat the sugar and observe the change. 3. Dissolve salt in water and try to recover it. 4. Compare the changes and describe a solution. <p>Topic 2.3: A solution is an even mixture. Dissolving means that one substance becomes evenly mixed in another. The even mixture is called a solution. The substance with the greater quantity is the solvent, and the substance with the lesser quantity is the solute (= the substance that gets dissolved).</p> <ol style="list-style-type: none"> 1. Teachers use models of particles of solvent and solute to illustrate what happens. 	<ul style="list-style-type: none"> • In another activity, they must hold in mind BOTH the times (short or long) it takes to dissolve a fixed quantity of sugar in water AND the grain sizes of the sugar (big or small). (These investigations involve the concept of a fair test – if they are going to compare dissolving time for different water-temperatures, then they must keep other factors unchanged (e.g. there must be no difference in the amount of stirring). • Observe and record what happens with other solvents such as meth spirits and thinners, to extend the concept of dissolving, and go beyond solutes in water. • Dissolve fatty substances in meths (alcohol) and polystyrene or enamel paint in thinners. • Point out that these solute substances won't dissolve in water.
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2. Use liquids like water or alcohol, and the solutes like copper sulphate or fat. However, we should also mention that air dissolves in water, because this is important in understanding animals that live in water. Fizzy drinks have dissolved carbon dioxide gas in them.
3. Learners mix various substances in water, observe and describe what happens.

Topic 2.4: Soluble and insoluble substances

It all depends on which solvent we use. For example, some substances are soluble in water and others are insoluble in water; some substances are soluble in alcohol (meths) and other substances are insoluble in alcohol. Teachers can add other examples of different solvents and solutes.

1. Compare soluble and insoluble substances by testing substances in water/alcohol
2. Classify substances into soluble and insoluble substances.

Topic: 2.5: Saturated solutions.

Saturated solutions cannot dissolve any more solute and so any extra solute remains undissolved.(Teachers can use bead models of particles to illustrate dissolving and then saturation.) The hotter the solvent, the more of the solute will dissolve, but as the solvent cools, the solute un-dissolves i.e. crystallises.

1. Investigate the effects of factors such as temperature on dissolving.
2. Make saturated solutions of salt and sugar.
3. Observe the cooling effect on saturated solutions.
4. Make crystals of salt.

Topic: 2.6: Temperature and grain size are factors in the rate of dissolving.

Most solutes dissolve more quickly if the solvent is warm than if it is cold. Most solid solutes dissolve more quickly if the grain size is smaller. The word “rate” means how fast a mass of solute, e.g. 100 grams, will dissolve.

- **Investigate** how the factor of water temperature affects the time it takes to dissolve a solid solute.
- **Tabulate** and **graph** the results. Learners should be able to see and
- **State the relationship** in the form, “The hotter . . . the quicker. . . .”

Investigation on formation of crystals:

Learners grow a salt crystal and records the growth in the size of the crystal over period

1. Do experiments with small grain substances such as sugar and larger grain size the sugar cube; dissolve in the same amount of water. Compare the results.
2. **Investigate**, as above, how the factor of grain size affects the time it takes to dissolve a solid solute.
3. **Investigate** air dissolved in water and in a qualitative way **investigate** the effect of temperature on the quantity of air dissolved in water.

Topic: 2.7 Matter is neither destroyed nor created in dissolving and crystallising

The conservation of matter means that when we can no longer see a solute, it must still exist, but it exists as particles of solute among particles of the solvent. (This means that learners should be able to work out that the mass of solution is equal to the mass of the solute plus the solvent.)

1. **Use a bead model** to discuss the similarities between a crystal of potassium permanganate dissolving in water and a clump of red beads amidst white beads, being shaken and spreading out until there is an even mixture of both colours. (Here the beads act as an analogy for what might be happening in the invisibly-small world of molecules.

Investigation on the rate of dissolving of sugar in water at various temperatures
Complete worksheets
Compare results
Make conclusion about how temperature affects rate of dissolving