NATURAL SCIENCES LESSON EXEMPLARS

INTERMEDIATE PHASE

GRADES 4-6

4TH TERM

AUGUST 2009

Notes to Teachers

- This document contains lessons for forth term for about 6 weeks.
- These lessons are prepared according to the work schedule.
- Use text books to get the relevant content.
- 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.
- Keep evidence of all daily activities and show progression.
- The last two weeks are assigned for revision work and teachers are encouraged to do revision in preparation for the formal assessment task.

OVERVIEW

GRADE 4

TERM 1	TERM 2	TERM 3	TERM 4
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. 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.	**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. 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.	**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. 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.	**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. 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.

AS 1. Recalls meaningful information; 2. Categorises information. **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; 2. Understands the impact of science and technology.	AS 1. Recalls meaningful information; 2. Categorises information. **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; 2. Understands the impact of science and technology.	AS 1. Recalls meaningful information; 2. Categorises information. **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 2. Understands the impact of science and technology.	AS 1. Recalls meaningful information; 2. Categorises information. **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 2. Understands the impact of science and technology.
Life and living Water: the important role of water in the ecosystem The impact of water shortage and water quality **Matter and materials** Three phases of matter-solids ,liquids & gases.(examples) ice, water & water vapour Melting temperature & boiling	**Energy and change** Energy –what is energy Types of energy-heat energy, light energy Sources of energy-wind, fire, sun, animals, falling water **Life & living** Sun as a source of energy. Animals cannot make their own	**Life & living** Vegetative reproduction-growing new plants from cuttings **Energy and change** Temporary and permanent changes to materials	**Life & living** Different habitats of animals-vertebrates and invertebrates and the characteristics to adapt to these habitats. **Earth and beyond** Earth –solid rocks, soil, water, Gases in the atmosphere Weather changes, seasons

temperature Water cycle(clouds, rain, hail, and snow) **Life & living** Living things-characteristics, Green plants-parts of the plant, functions of the various parts, factors that help plants to grow-(water, sunlight, soil, air)	food-feeding habits of different animals(herbivores& carnivores),types of food, food groups and healthy living, balanced diet **Earth and beyond** Solar system Planet earth in the solar system-sun, inner planets outer planets Day and night Rotation of earth on its axis Moon and its shape –quarter, half and full moon.		The planet Continents, oceans **Energy & Change** Energy from electrical sources Safety rules for using electricity

Grade: 4	**Learning Area: Natural Sciences**	
Strand: Life and Living		
Duration: 2 Weeks (weeks1-2)	**Content : Different habitats of animals**	
Integration: 1**.Language** LO2: Speaking LO3: Reading LO5: Thinking and reasoning AS: Collects and records and presents information in different ways 3**. Mathematics** LO 5: Data handling AS 4: Collects, organizes and records data		
Selected LOs and Ass	**Learning Activities**	**Details of assessment**
LO 1: SCIENTIFIC INVESTIGATIONS **AS:** Plans investigations: **AS:** Conducts investigation and collects data **AS:** Evaluates data and communicates findings **LO2: CONSTRUCTING SCIENCE KNOWLEDGE:** **AS:** Recalls meaningful information: **AS**: Categorises information **L O 3: SCIENCE, SOCIETY AND THE ENVIRONMENT**	**Activity 1** A discussion on the differences between domestic (animals found at home) and wild animals (animals found in the forest). Give examples of domestic and wild animals and the places where they live and what they eat (food, air and water).Use pictures/video/charts and identify features and different habitats of the animals. **Activity 2** Teacher explains the concept 'habitat'. (This is the home of an animal where there is shelter, enough food, water, etc for its growth and survival). Take a field trip to research about habitats of different animals e.g. ant, termite, butterfly, locusts, cows, birds, lizards, etc. Learners record their observations in the worksheet:	**Research activity:** Learners conduct a research on habitats and the feeding habits of different animals. **Assignment:** Learners complete a worksheet on the habitat (They name at least 3 animals, where they live, what they eat and how they breathe, etc.) They write a report on findings from the visit. **Translation:** Create a drawing of the animal in

AS: Understands science and technology in the context of history and indigenous knowledge. **AS:** Understands the impact of science and technology **AS:** Understands bias in science and technology	the name of an animal, its habitat, how the animal looks like, what it eats, its shelter, and how the habitat looks like, **Activity: 3** Learners share the information from the observations they made in the field trip and discuss the habitats of at least three animals and compare the different habitats of the animals. **Activity: 4** Discuss why these animals are found in these respective habitats? Discuss the importance of learning about the habitats of animals.	its habitat. P**resentation:** Create a story and make a presentation about any animal and its habitat. The presentation should include the following: The name of the animal, its features, where it lives and what it eats. (Link to Language assessment) **Case study:** Learners choose any ecosystem in their school yard and study animals, how they adapt in that environment. They write report on their findings.

Resources: Charts with different animals, books, magazines, pictures, school yard, zoo, beach, videos, habitats of various animals (forest, riverbanks, dam, etc.).

EXPANDED OPPORTUNITY	**TEACHER REFLECTIONS**
Visit the zoo, forest and beach to learn more about different habitats, their interaction with the environment and the way animals live in those habitats.	What improvement to be made for a more successful lesson? How can the learners benefit more from learning about the habitats of animals in their environment?

WORKSHEET:

Name of animal	Where it lives	What it eats	How it breathes
1.			
2.			
3.			

CHECKLIST:

Has the learner given the right number of animals?	**Yes**	**No**
Has the learner correctly stated where they live?	**Yes**	**No**
Have she/he stated the right food for it?	**Yes**	**No**
Has the learner correctly stated how it breathes?	**Yes**	**No**

RUBRIC TO ASSESS PRESENTATION

CRITERIA	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
Presentation Skills	Presentation skills lacking	Reasonably good presentation. But needs improvement	Has shown good presentation skills: motivating introduction, information presented logically, used media, audible and understandable presentation, concluded well	Presented very well with very good motivating introduction, articulated well, used the resources, good presentation skills, logical presentation of the content, content very accurate, kept time limit, summarized the important points as conclusion.
Features	Is having difficulty in describing features of the animal concerned	Some features have been described	Good description that contains most features. Facts mostly correct	Excellent description of features including the internal features. The content well described.
Where the animal lives	Does not know where the animal lives	Some important aspects are missing	Clearly describes the habitat of an animal.	Cleary describes the habitat of an animal and further states its adaptations
What they eat	Does not know what the animal eats	Knows, but gets confused somehow and needs some assistance.	Knows exactly what the animal eats	Has stated what the animal eats and has even associated the food with its features.

Grade: 4	**Learning Area: Natural Sciences**	
Strand: Energy and Change		
Duration: 2 Weeks (weeks 3-4)	**Content: Energy from electrical source (electricity)**	
Integration: 1**.Language** LO2: Speaking, LO3: Reading , LO5: Thinking and reasoning AS: Collects and records information in different ways 2. **Technology** LO 1: Technological Processes and Skills, AS 1: Investigations		
Selected LOs and Ass	**Learning Activities**	**Details of assessment**
LO 1: SCIENTIFIC INVESTIGATIONS **AS:** Plans investigations: **AS:** Conducts investigation and collects data **AS:** Evaluates data and communicates findings **LO2: CONSTRUCTING SCIENCE KNOWLEDGE:** **AS:** Recalls meaningful information: **AS**: Categorises information **L O 3: SCIENCE, SOCIETY AND THE ENVIRONMENT** **AS:** Understands science and technology in the context of history and indigenous	**Activity 1** The teacher brings cells, bulbs, connecting wires into the classroom and connects them to show how a light bulb lights up using electrical energy. Learners identify the different components. The teacher asks learners to make some connections such that the bulb glows. The teacher moves from one group to the next helping learners. A successful group demonstrates to the rest of the class. The other groups do likewise. Then they draw the circuit diagram. **Activity 2** The teacher explains an electric circuit (components and their functions and how an electric circuit works). The teacher demonstrates (explains) how a torch works. Discuss the cell and battery as sources of electric energy. **Activity 3** The teacher explains to learners and demonstrates how to	**Practical activity:** Learners are given electrical components to make their own electric circuits. **Assignment:** Learners draw a circuit diagram which reflects what they have been doing. Also use flash cards with symbols which earners arrange to show the circuit they have built. **Question and answer** Learners answer questions orally. **Practical activity:** Learners conduct an experiment by connecting cells and bulbs in series. They write down their observations in

<table>
<tr><td>knowledge.</td><td>connect bulbs and cells in series.
Discusses the observation regarding the brightness of the bulb
- when the cells are connected in series
- When the bulbs are connected in series

Activity 4
Discuss safety measures while handling electrical appliances and using electricity and highlights the importance of using electricity safely at home.</td><td>terms of the brightness of the bulbs as more cells and bulbs are added.

Assignment:
Learners are given charts and pictures to identify safety and unsafety measures.</td></tr>
<tr><td colspan="3">RESOURCES: Books, posters, charts, pictures and electricity kit.</td></tr>
<tr><td colspan="2"><u>EXPANDED OPPORTUNITY</u>
Learners make a model of an electric circuit (bedside lamp; fan).</td><td><u>TEACHER REFLECTIONS</u>

• How the lesson could have been presented differently
• What impacts on practical activities done
• Other examples that could have been used
• What was good/weak about the lesson
• Concepts that have not been dealt with effectively</td></tr>
</table>

Grade: 4	**Learning Area: Natural Sciences**	
Strand: Life and Living		
Duration: 3 Weeks(weeks 5-6)	**Content: Vertebrates and Invertebrates.**	
Integration: **Language** LO2: Speaking, LO3: Reading , LO5: Thinking and reasoning AS: Collects and records information in different ways **Technology** LO 1: Technological Processes and Skills, AS 1: Investigations		
Selected LOs and Ass	**Learning Activities**	**Details of assessment**
LO 1: SCIENTIFIC INVESTIGATIONS **AS:** Plans investigations: **AS:** Conducts investigation and collects data **AS:** Evaluates data and communicates findings **LO2: CONSTRUCTING SCIENCE KNOWLEDGE:** **AS:** Recalls meaningful information: **AS**: Categorises information **L O 3: SCIENCE, SOCIETY AND THE ENVIRONMENT** **AS:** Understands science	**Activity 1:** Teacher uses pictures/specimens to introduce and explain the two main categories of animals (Vertebrates and Invertebrates). Teacher gives examples of vertebrates and invertebrates and discusses the main features of each with the learners. **Activity 2** Learners complete a table and categorize animals in to vertebrates and invertebrates. Learners, in groups, specify the features they used in grouping the animals. Investigates and reports back on the life cycle of an invertebrate. (E.g. butterfly or locust). **Activity 3** Learners observe two or more vertebrates and complete the worksheet given with information such as name of the animal, body structure, legs and movement, structure of eyes, etc. Discuss the differences between vertebrates and invertebrates by means of examples. List the characteristic features of each group. Learners complete a table and categorise animals in to vertebrates and invertebrates.	**Assignment:** Learners, in writing, categorise animals into two groups considering similar and different features. Written work on categories of invertebrates and vertebrates. Written work on a worksheet on characteristics of animals. **Assignment:** Learners give their own

and technology in the context of history and indigenous knowledge. **AS:** Understands the impact of science and technology **AS:** Understands bias in science and technology	**Activity 4** Discusses the life cycle of locust, by means of a chart/picture. Learners are encouraged to observe the different stages of locust in its habitat. **Activity 5** Learners are given worksheets to complete. They observe the characteristic features of two more different animals.(e.g. snail, bird, /fish, earthworm) They give the name of the animals, body division, eyes (number and type), legs (number) and movement. Compare the two animals. **Activity 5** Learners study about an invertebrate and a vertebrate animal from their immediate environment, identify the animals, observe the features and list them, observe its behaviour, its feeding habits. Use this information to make a poster with the drawings of the animals and descriptions. Present it to the class. (The number of animals and the animals selected is left to the choice of the teacher, the environment of the learners and availability). **Activity 5** Teacher summarizes the characteristic features of vertebrates and invertebrates and gives other examples.	definition of vertebrate and invertebrate animals. They give five examples of each category. Using their examples they complete a table by listing vertebrates and invertebrates. **Translation:** From a given text, learners draw a flow chart and report to the whole class **Assignment:** Learners complete a worksheet on the following: name of the animal, body division, eyes (number and type), legs (number) and movement.
RESOURCES: Books, posters and charts with different animals, pictures of animals.		
EXPANDED OPPORTUNITY Learners observe animals (vertebrates and invertebrates) at their homes and compare the different features of animals.	**TEACHER REFLECTIONS** Teachers will reflect on • How the lesson could have been presented differently • The impacts of practical activities done • Other examples that might have been used • What was good/weak about the lesson • Concepts that have not been dealt with effectively.	

OVERVIEW

GRADE 5

TERM 1	TERM 2	TERM 3	TERM 4
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. 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.	**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. 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.	**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. 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.	**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. 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.

AS 1. Recalls meaningful information; 2. Categorises information. **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; 2. Understands the impact of science and technology.	AS 1. Recalls meaningful information; 2. Categorises information. **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; 2. Understands the impact of science and technology.	AS 1. Recalls meaningful information; 2. Categorises information. **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 2. Understands the impact of science and technology.	AS 1. Recalls meaningful information; 2. Categorises information. **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 2. Understands the impact of science and technology.
Live & living Ecosystems-biotic actors-plants, animals-producers, consumers-primary and secondary, decomposers A biotic factors-water, air, soil, temperature and its effects on biotic factors **Matter and materials** Substances that dissolve in water	**Life & living** Adaptation of plants to various climatic conditions-dry land/desert, marshy/wet land Adaptations of animals in their habitats- dry land/desert, marshy/wet land **Matter and materials** pure substances, impure substances	**Life & living** Food relationships in the ecosystems-simple food chains and food webs Compare habitats of different animals and adaptations **Matter and materials** mixtures and compounds and their properties	**Life & living** Sense organs and its functions Human Reproduction-puberty, sexual reproduction, contraception, stages of development of a new born baby, STDs, HIV&AIDS **Matter and materials** Separation of mixtures-filtration, magnetic and non magnetic

(sugar, salt, coffee) Terminologies-soluble, insoluble, solutions, solvent, solute etc. **Energy and change** Forms of energy Use of energy Transfer of energy **Earth and beyond** Sun, moon, earth Weather-temperature, wind direction, speed, precipitation	**Energy and change** Systems which store energy-Energy from food-chemical energy **Earth and beyond** Annual seasonal changes Changes in rainfall, average wind direction-windmills as a source of energy	**Energy and change** Solar energy **Earth and beyond** Length of day and night Average maximum and minimum temperatures Water cycle-hydrosphere, atmosphere and lithosphere Erosion, Land forms	substances, sorting, **Energy and Change** Safety rules for using energy sources **Earth and beyond** Weathered rocks Composition of soil Formation of soil Properties of soil Water retention

Grade: 5	**Learning Area: Natural Sciences**	
Strand: Life and Living		
Duration: 2 weeks (weeks 1&2)	**Content : Sense organs and Human Reproduction**	
Integration: Language: LO2: Speaking, LO3: Reading, LO5: Thinking and reasoning, AS: Collects and records information in different ways. Life Orientation:LO1: Health Promotion Technology: LO1: Technological processes and skills AS: Investigations.		
Selected LOs and Ass	**Learning Activities**	**Details of assessment**
LO 1: SCIENTIFIC INVESTIGATIONS **AS:** Plans investigations: **AS:** Conducts investigation and collects data **AS:** Evaluates data and communicates findings **LO2: CONSTRUCTING SCIENCE KNOWLEDGE:** **AS:** Recalls meaningful information: **AS**: Categorises information **L O 3: SCIENCE, SOCIETY AND THE ENVIRONMENT** **AS:** Understands science and technology in the context of history and indigenous knowledge. **AS:** Understands the impact of science and technology	**Activity 1** The teacher use charts, pictures and own body to introduce and identify the sense organs. Teacher asks questions e.g. how do you taste food/smell things/see/feel and hear. Discuss the different types of sense organs and the different functions of these organs. **Activity 2** Teacher explains the functions of each sense organ. **TOPIC: HUMAN REPRODUCTION** **Activity1** Learners are grouped to brainstorm about the changes that occur in boys and girls between the ages of eleven and fifteen **(**Puberty). **Activity 2** Using charts, pictures, books, learners identify differences between male and female sex organs. The teacher explains sex organs in both male and female using charts	**Practical activity:** The teacher brings to class the following substances and objects: ice, sugar, salt, tartaric acid, vinegar, aloe, body spray, doom, silk, sandpaper, steel wool, a bell, radio. Learners taste, smell, feel and listen. They record their findings. (This activity is intended to introduce learners to different senses and sense organs) **Assignment:** The teacher gives learners a diagram to identify sense organs and match each organ with a relevant function. The teacher uses memorandum as a marking tool. **Assignment:** Learners are required to write physical changes they had observed in themselves while growing up.

AS: Understands bias in science and technology	**Activity 3** Teacher explains human reproduction -the different stages of development of the baby and the stages baby undergoes from birth up to two years, from three years to four years, and five years to six years. Use pictures, charts and diagrams to show developmental stages. **Activity 4** Teacher mentions various STDs, discusses how people get infected with these and how they can be prevented. E.g. STDs (syphilis, herpes etc), HIV and AIDS.	Write notes on the developmental stages of the baby Learners write differences between the male and female sex organs shown in the charts. **Research:** Learners research about causes, symptoms and prevention of STDs and HIV and AIDS. **Case study** Learners visit a local clinic or hospital to collect the following data about HIV/AIDS patients or invite a doctor to talk to the learners. • Number of STD infected patients • Sex (female or males) • Age group They tabulate the data and make a graphical representation.
Resources: Pictures, Charts, Models, Books, Humans.		
EXPANDED OPPORTUNITY: Research about STDs and its preventive measures.	**Teacher Reflection** What improvement to be made for a more successful lesson.	

RUBRIC TO ASSESS THE CASE STUDY

CRITERIA	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
Data collection	The data collected is irrelevant	Data collected not enough certain aspects missing.	Enough and relevant data collected	More than enough and relevant data collected
Data handling	Data not well categorised.	Few aspects correctly categorised.	Relevant aspects placed correctly in their respective columns.	All relevant aspects placed correctly and used well
Interpretation of data	Cannot interpret any information. Very confused.	Having some gaps in interpreting data	Shown correct interpretation of data.	Correct interpretation of data and further analysed the data.

Grade: 5	**Learning Area: Natural Sciences**	
Strand: Energy and Change		
Duration: 2 weeks (Weeks 3-4)	**Content : Safety rules for using energy sources**	
Integration: Language: LO2: Speaking, LO3: Reading, LO5: Thinking and reasoning, AS: Collects and records information in different ways. Mathematics: LO: 5 Data handling. Technology: LO1: Technological processes and skills, AS: Choose possible solutions.		
Selected LOs and Ass	**Learning Activities**	**Details of assessment**
LO 1: SCIENTIFIC INVESTIGATIONS **AS:** Plans investigations: **AS:** Conducts investigation and collects data **AS:** Evaluates data and communicates findings **LO2: CONSTRUCTING SCIENCE KNOWLEDGE:** **AS:** Recalls meaningful information: **AS:** Categorizes information: **L O 3: SCIENCE, SOCIETY AND THE ENVIRONMENT** **AS:** Understands science and technology in the context of history and indigenous knowledge. **AS:** Understands the impact of science and technology	**Activity 1** Learners brainstorm sources of energy (coal, paraffin, candle, electricity, wood, gas and petrol)/ renewable and non-renewable resources. Learners brainstorm the dangers involved in the use of each energy source. **Activity 2** Use pictures/charts/ diagrams to identify different unsafe ways of using energy sources and find the correct methods/ways of using various energy sources. **Activity 3** Learners collect information about safety measures for using the above mentioned energy sources by referring to books, going to ESKOM, municipality and from their homes **Activity 4** Learners make a presentation on the dangers of using energy sources and how it can be used safely.	**Discussion** Learners brainstorm sources of energy and their dangers thereof. **Assignment** Learners (individually) complete the questionnaire on the dangers of the sources of energy. Write notes on the safety measures to be taken when using different energy sources e.g. Electricity, coal, paraffin, gas, petrol etc. **Presentation** Learners make a presentation on the dangers of using energy sources and how can it be used safely.

AS: Understands bias in science and technology	The teacher consolidates the learners' presentation.	
Resources: Charts, pictures, magazines, books, libraries, ESKOM, Municipality and elderly people.		
EXPANDED OPPORTUNITY: Learners dramatise dangers of energy sources and the safety measures. They can refer to case studies on the dangers of energy sources (fires due to explosion of paraffin stoves, candles left unattended, fires caused from electric appliances left unattended, fires caused by faulty electric circuits, etc.).	**Teacher Reflection** What improvement to be made for a more successful lesson.	

Grade: 5	**Learning Area: Natural Sciences**	
Strand: Earth and Beyond		
Duration: 2 Weeks(weeks5-6) **Content in context: Weathering of rocks**		
Integration Language: LO2: Speaking, LO3: Reading, LO5: Thinking and reasoning, AS: Collects and records information in different ways. Technology: LO1: Technological processes and skills, AS: Investigations. Social Sciences: LO2: Geographical knowledge and understanding.		
Selected LOs and ASs	**Learning Activities**	**Details of assessment**
LO 1: SCIENTIFIC INVESTIGATIONS **AS:** Plans investigations: **AS:** Conducts investigation and collects data in science and technology	**Activity 1** Discuss the formation of soil particles as a result of weathering of rocks. The teacher explains the concept of weathering. Discuss the causes of weathering of rocks. **Activity 2** Learners bring different types of rocks and samples of soil in class. They group the rocks according to the observable features. They are asked to crush the rocks and match them with the samples of soil. Learners use their fingers to feel the texture of different types of soil. Teacher explains soil formation as a result of weathering of rocks, using the crushed samples of rocks. **Activity 3** Learners conduct practical investigation to examine the composition of soil. Learners feel the soil texture and then heat the soil and observe what happens. They pour water in the sample of soil in a container and observe what happens. They shake, let it settle for a while and observe layers- water, silt, fine sand, coarse sand and stones and pebbles. (when soil is heated water vapour could be observed, when mixed with water bubbles of air will be observed as well as floating of some organic substance and when they touch the soil type the rock particles will be felt). The teacher explains learners' observations.	**Discussion:** Learners explain weathering of rocks and state the different causes of it **Practical activity:** Learners conduct an experiment to investigate the composition of soil. They write a report on their observations.

	Activity 4 Teacher explains" water retention" The learners conduct a practical investigation to find out water retention in different types of soil. Samples of different soil types, stop watches, measuring cylinders, cans with holes at the bottom and water are brought to the class and the learners are required to pour equal volumes of water into the different cans filled with the different types of soil and observe the time taken by water to drain out of the holes. They record their findings in a tabular form and represent the data collected graphically. Learners discuss the possible properties of soil. Teacher summarises the features of soil types in relation to the drainage of water.	**Investigation:** Learners conduct an investigation on water retention. They record their findings in a tabular form. **Translation activity:** Learners represent the information they have recorded on retention of water in the form of a graph.
Resources: Water, different types of rocks, soil samples, cans, measuring cylinder, stop watches.		
Expanded opportunities: Investigation on the improvement of the quality of sand and clay soil.	**Teacher reflection:** • The teacher notes highlights. • States limitations of the lesson. • What improvements to be made for a more successful lesson.	

OVERVIEW

GRADE 6

TERM 1	TERM 2	TERM 3	TERM 4
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. 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.	**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. 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.	**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. 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.	**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. 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.

AS 1. Recalls meaningful information; 2. Categorises information. **3.** Interprets information **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; 2. Understands the impact of science and technology	AS 1. Recalls meaningful information; 2. Categorises information. **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; 2. Understands the impact of science and technology	AS 1. Recalls meaningful information; 2. Categorises information. **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; 2. Understands the impact of science and technology	AS 1. Recalls meaningful information; 2. Categorises information. **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; 2. Understands the impact of science and technology
Life and living Explore ecosystem-different types of ecosystems eg grass land, Karoo, valley bush-veld, rocky shore, pond, dam, rivers How animals move-vertebrates	**Life and living** Nutrition in animals-heterotrophs-herbivores, carnivores, omnivores, saprophytes, parasites **Matter and materials**	**Life and living** Digestive system in humans-different parts/organs and functions **Matter and materials** Solubility of substances-solvents,	**Life and living** Animals living together in a variety of social patterns-colonies(bees, ants) packs, prides, troops, herds **Matter and materials**

and invertebrates-locust, snail, earthworm, crab. **Matter and materials** Heating effect of substances Temporary changes and permanent changes Contraction, and expansion **Energy and change** Systems which store energy-Electric cells, stretched springs Food and chemicals **Earth and beyond** Weather in different parts of the country, seasons in relation to the rotation of earth Effect of different climate on habitats	Melting, evaporation condensation and solidification **Energy and change** Transfer of energy-resistors-bulbs, heating wires, solenoids, motors Electric circuit Conductors, non-conductors, cells, main supply **Earth and beyond** Shape and position of moon-cultural beliefs, traditions and special occasions Stars-position over the year Recognition of stars by different cultures Names of star patterns Stars for navigation and for calendars	solutes Rate of solubility(heating, mixing) Properties of materials-hardness, flexibility, thermal conductivity & electrical conductivity **Energy and change** Energy transfers through-expansion, contraction, melting, evaporation, condensation, solidification. **Earth and beyond** Different types of rocks-igneous, sedimentary and metamorphic types Origin of rocks History of rocks	The density of substances-mass, volume, units of measurements **Energy and change** Sound-transfer of energy by vibration through solid, liquid or gas. **Earth and beyond** Water resources Catchment areas Care and management of catchment areas Factors affecting the quality of water resources and catchment areas

<table>
<tr><td colspan="2">Grade: 6</td><td>Learning Area: Natural Sciences</td></tr>
<tr><td colspan="3">Strand: Life and Living</td></tr>
<tr><td>Duration: Weeks 1-2</td><td colspan="2">Content: Animals living together in a variety of social patterns-colonies (bees, ants,) packs, prides, troops, herds.</td></tr>
<tr><td colspan="3"><u>Integration</u>:
1.Language
LO2: Speaking
LO3: Reading
LO5: Thinking and reasoning
AS: Collects and records information in different ways.</td></tr>
<tr><td>Selected Los and Ass</td><td>Learning Activities</td><td>Details of assessment</td></tr>
<tr><td>LO 1: SCIENTIFIC INVESTIGATIONS
AS: Plans investigations:
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AS: Evaluates data and communicates findings

LO2: CONSTRUCTING SCIENCE KNOWLEDGE:
AS: Recalls meaningful information:
AS: Categorises information

L O 3: SCIENCE, SOCIETY AND THE ENVIRONMENT

AS: Understands science and technology in the context</td><td>Animals that live in groups normally develop a social structure that keeps groups together and provide effective support for all the individuals in each group. Many animal social structures have striking similarities to some human social structures. Did human beings copy these patterns from the animal world? Or, are human beings too behaving as they should, like other animals?
ACTIVITY:1
Teacher describes the different social patterns.
E.g. (a)being solitary
(b)pairing for life
(c)living in packs
(d) Prides, herds, troops, colony.
Learners examine social patterns of animals in a habitat.
Learners list as many animals as they can and try to group them according to their social pattern.
They look at animals which occur in a common social pattern and suggest possible reasons for that.
Teacher explains the functions of individuals within a social pattern.</td><td>Research activity:
Research on social patterns exhibited by 4 groups of animals- bee, lion, baboon, and wildebeest.
Look at the behaviour of these animals collect information on the following:-
habitat
adaptation
hierarchy
communication
benefits to the environments
Compare the 4 groups of animals and describe the similarities shown by these groups.
Write a written presentation on</td></tr>
</table>

of history and indigenous knowledge. **AS:** Understands the impact of science and technology **AS:** Understands bias in science and technology	Teacher guides a brainstorming discussion about the social patterns-colonies in insects in order to link the theme with prior knowledge of the learners. Learners analyse the posters of ant hill, troop of baboons, herd of buffalo, pack of lions and look at the advantages of social patterns of the above animals and insects. **Activity: 2** Learners conduct a research on the impact of this type of behaviour on the environment. Learners compare 4 social structures (bee, lion, baboon, and wildebeest) under the following headings. • habitat • adaptation • hierarchy • communication • benefits to the environments **Activity: 3** Compare the four groups of animals-its habitat, adaptations and hierarchy in a table. Discuss division of labour in colonies of insects. Collect information from experts/farmers about bee colonies and describe the behavioural patterns. **Activity: 4** Discussion on what we can learn from these animals.	your research findings. Discuss what we can learn from these animal structures Observe different stages of development of butterfly –use charts or real specimens, identify different stages, label different stages in the given diagram. Observe body parts of an adult butterfly and label the parts on a diagram.

Resources: Charts with different animals, books, magazines, pictures, school yard, zoo, beach and forest.

EXPANDED OPPORTUNITY	**TEACHER REFLECTIONS**
Visit zoo, game parks and observe behavioural patterns of different packs of animals.	Reflects on highlights and limitations of the lesson. States how to overcome those limitations.

WORKSHEET:

Name of animal	Habitat	Adaptations	Hierarchy
1.			
2.			
3.			
4.			

Rubric to assess written presentation

Criteria	Level 1	Level 2	Level 3	Level 4	Level 5
1. Lay out	No structure	Items in point form	Limited structure	Good attempt simple introduction and conclusion	Good lay out
2. Content (Factual information)	Very few and mostly not correct	Reasonable amount of information with some mistakes	Sufficient content with little mistakes	Good amount of content with mostly correct facts	All areas covered with all correct facts
3 .Language	Many mistakes	Need assistance	Few spelling errors and presented the information reasonably well	Very few spelling errors. Most of the information presented well	Shows good command of language and the content presented very well with almost no mistakes/ errors.
4. Use of resources	Only text books used for information gathering	Text books and one other resource used	Different types of resources used	Many resources used effectively	More than required resources used effectively and referred to in the presentation

Grade: 6	**Learning Area: Natural Sciences**	
Strand: Matter and materials		
Duration: Weeks 3-4	**Content: The density of substances- mass, volume, units of measurement**	
Integration: 1**.Language** LO2: Speaking, LO3: Reading , LO5: Thinking and reasoning AS: Collects and records information in different ways 3**. Mathematics** LO 5: Data handling , AS 4: Organize and record data **Technology** LO 1: Technological Processes and Skills, AS 1: Investigations		
Selected LOs and Ass	**Learning Activities**	**Details of assessment**
LO 1: SCIENTIFIC INVESTIGATIONS **AS:** Plans investigations: **AS:** Conducts investigation and collects data **AS:** Evaluates data and communicates findings **LO2: CONSTRUCTING SCIENCE KNOWLEDGE:** **AS:** Recalls meaningful information: **AS**: Categorises information **L O 3: SCIENCE, SOCIETY AND THE ENVIRONMENT** **AS:** Understands science and	**ACTIVITY 1** 1.1 Learners observe and compare the sizes of different solids to compare the amount of space occupied by the solids - volume as the space occupied by objects, compare the relative sizes of different objects and the units used to express volumes - cm^3, m^3, etc. 1.2 Learners take note of and compare the amount of liquids in different bottles/ containers and the units used in expressing the amounts the containers can hold- capacity as the amount of content which the container can hold and the units like ml, litre, kilolitre, etc. 1.3 Learners feel and compare the masses of different objects – mass as the amount of matter in an object and take note of the units of mass such as g, kg, ton, etc.	**Practical activity:** Learners do experiments using water and oil to compare density Learners report on the practical activities.

technology in the context of history and indigenous knowledge.	**Activity 2** The learners are divided into 3 groups. Each of the group can be divided into smaller groups again to manage them effectively. Each group in turn is given practical task to measure 2.1 the volume of different objects 2.2 different amount of liquid 2.3 different masses of objects/ masses of different objects **Activity 3** Learners feel the masses of different objects of the same volume/ size (sponge, rubber, wood, iron or any metal piece) Learners should discuss the reason for different masses and conclude that different objects have different composition – the way matter is packed in a certain volume. Teacher introduces the term density as the amount of matter in unit volume: density = mass/ volume. The formula to calculate density is: ***density = mass / volume. Therefore its units are grams/cubic cm.*** The learners will do a practical activity on measuring and calculating density of substances. • Liquid (explain error of parallax) ***Remember ml = cm^3.*** This method is used to measure the volume of irregular shaped objects. • Rectangular blocks of wood/ glass/ metals using the formula: ***length x breadth x height (l x b x h)*** **Activity 4** The learners will also put substances into water to see whether it floats or sinks. They must complete a table to	They record the sizes, volumes, capacity and the masses of different objects they measured. Learners write their observations regarding the size and masses of the various objects and write their conclusion regarding the relation between the size and volume of objects. Learners make a table showing the densities of different elements and also calculate the densities of different items given with mass and volumes.

	categorize substances that float and substances that do not float. They must come up with an explanation why this is the case. They will now compare the densities of these substances. ***Remember: A substance that has a density greater than that of water will sink and those with a lower density than that of water will float.***	From the table showing the densities identify the objects which can float or sink. Give reasons for their choice.
RESOURCES: Books, posters, charts, pictures, beakers, water, nail, coins, pieces of paper, measuring cylinder, juice bottles, coke bottles.		
EXPANDED OPPORTUNITIES Learners investigate why a piece of iron sinks in water, but ships made of iron and other heavy metals do not sink	**TEACHER REFLECTIONS** • How the lesson plan could have been presented differently • What impacts on practical activities done • Other examples that may have been used • What was good/weak about the lesson • Concepts that have not been dealt with effectively	

Grade: 6	Learning Area: Natural Sciences	
Strand: Energy and Change		
Duration: week 5	**Content: SOUND: Transfer of energy by vibrations through solid, liquid and gases.**	
Integration: Language: LO2: Speaking, LO3: Reading, LO5: Thinking and reasoning, AS: Collects and records information in different ways. Mathematics: LO: 5 Data handling. Technology: LO1: Technological processes and skills, AS: Choose possible solutions.		
Selected LOs and Ass	**Learning Activities**	**Details of assessment**
LO 1: SCIENTIFIC INVESTIGATIONS **AS:** Plans investigations: **AS:** Conducts investigation and collects data **AS:** Evaluates data and communicates findings **LO2: CONSTRUCTING SCIENCE KNOWLEDGE:** **AS:** Recalls meaningful information: **AS**: Categorises information **L O 3: SCIENCE, SOCIETY AND THE ENVIRONMENT** **AS:** Understands science and technology in the context of history and indigenous knowledge. **AS:** Understands the impact of science and technology **AS:** Understands bias in science and technology	**ACTIVITY 1** Learners hold a long ruler on the table, so that two thirds of the ruler is jutting off the table. Pull down on the free end of the ruler and let go. Learners observe the vibration of the ruler and hear the sound produced. The teacher leads the learners to relate the generation of sound as a result of the vibration of the ruler. Learners can tie a string tight on two hooks and pluck it gently to observe the string vibrating and listen to the sound produced. Learners should be allowed to feel the vibration of the speaker of a radio when it works. Learners should be asked to think about how the sound is produced when they talk: When mouth is shut no sound, while talking the tongue and lips move (vibrate) and sound is produced. (All these activities should be used to make the learners realize that sound is produced by vibration)	**Investigation** Learners investigate how sound is produced. Writes a report on how a musical instrument (string or any other vibrating instrument) produces musical sounds. .

	Activity: 2 Strike a tuning fork gently to show how it produces sound when it vibrates. Let the learners observe what happens when the sounding tuning fork is held over water in a basin. Use the formation of the ripples to illustrate that vibration produces sound as well as energy is transmitted as a result of vibration. Explain how we hear sound. **Activity: 3** Pair the learners. Ask one of the learners to tap a pencil at one end of a long table and the other listen to the sound standing at the other end. Let the second learner keep his ear very close to the table/ on the table while the first learner taps at the other end and take note of the sound. Let the learners swap the tapping and listening to the sound. Ask them to explain what they have noticed about the loudness of the sound in the two cases. Let them explain the possible reason for the difference in the loudness in the two cases. The teacher, together with the learners discusses the speed of sound in air, water and solid and possible reason for the difference in speed.	
Resources: Books, ruler, pencil, water, solid wood, beaker.		
EXPANDED OPPORTUNITY: Investigate how sound travels through different media, use examples from everyday life.	**Teacher Reflection** • .How the lesson plan could have been presented differently • What impacts on practical activities done • Other examples that may have been used • What was good/weak about the lesson • Concepts that have not been dealt with effectively.	

Grade: 6	**Learning Area: Natural Sciences**	
Strand: Earth and beyond		
Duration: week 6	**Content : Water Resources**	
Integration: Language: LO2: Speaking, LO3: Reading, LO5: Thinking and reasoning, AS: Collects and records information in different ways. Social Sciences: LO2; Geographical knowledge and understanding Technology: LO1: Technological processes and skills, AS: Choose possible solutions.		
Selected LOs and Ass	**Learning Activities**	**Details of assessment**
LO 1: SCIENTIFIC INVESTIGATIONS **AS:** Plans investigations: **AS:** Conducts investigation and collects data **AS:** Evaluates data and communicates findings **LO2: CONSTRUCTING SCIENCE KNOWLEDGE:** **AS:** Recalls meaningful information: **AS**: Categorises information **L O 3: SCIENCE, SOCIETY AND THE ENVIRONMENT** **AS:** Understands science and technology in the context of history and indigenous knowledge. **AS:** Understands the impact of science and technology	**Activity 1** Learners : • Explore issues of access to water. • Discuss ways in which the learners get water in their homes • Make a list of various sources of water in their area • Discuss the importance of having clean water in the community • Critically look at the need to keep the water clean in dams and rivers • Investigates water use using audits. • Think critically about the use of water by the families and the community **Activity: 2** Let the learners • Visit a nearby dam and make an audit on the quality of water, the pollutants in that area, the activities that are taking place in that area. • Talk to municipality/water authority about care and maintenance of catchments areas	**Research** -Causes of water pollution and water scarcity in South Africa. Suggest ways to reduce water pollution. The Impact of water pollution on the immediate environment. **Written work** Write a paragraph on the importance of clean water in the community and ways to keep the water clean in dams and rivers.

AS: Understands bias in science and technology	• Inform community about the need to have clean environment. **Activity: 3** Learners during their visit to the nearby water resources observe , record and present the possible factors that affect the quality of water. Teacher assists the learners in identifying the causes of those factors. Teacher explains the cause of water born diseases and how to prevent them. (e.g. Cholera in Limpopo Province). Discuss the importance of making the community aware of the need for keeping the sources of water clean as well as reducing water wastage) Make community aware of the need to have clean water and the rights and responsibilities to access clean water by making flyers/posters and through debates.	**Assignment**: Describes how own cultural group has, through history, found safe ways to collect and use water to drink. Suggests why having running water in a home might make people's lives easier. Write the names of main dams in South Africa used as source of drinking water. Make a report on how water is purified in one of the dams in South Africa.
Resources: Newspapers magazines, TV, radio, community, Internet, books		
EXPANDED OPPORTUNITY: Make a study on water resources and catchment areas in SA	**Teacher Reflection** What improvement to be made for a more successful lesson.	