NATURAL SCIENCES LESSON EXEMPLARS

SENIOR PHASE

GRADES 7-9

4TH TERM

AUGUST 2009

OVERVIEW
GRADE 7

TERM 1	TERM 2	TERM 3	TERM 4
LEARNING OUTCOMES AND ASSESSMENT STANDARDS **LO 1. Scientific Investigations:** *AS 1. Plans Investigation* *2. Conducts investigation and collects data* *3. Evaluates data and communicate findings* **LO 2. Constructing Science knowledge:** *AS 1. Recalls meaningful information* *2. Categorises information* *3. Interprets information* *4. Applies knowledge* **LO 3. Science, Society and Environment:** *AS 1. Understands*	**LEARNING OUTCOMES AND ASSESSMENT STANDARDS** **LO 1. Scientific Investigations:** *AS 1. Plans Investigation* *2. Conducts investigation and collects data* *3. Evaluates data and communicate findings* **LO 2. Constructing Science knowledge:** *AS 1. Recalls meaningful information* *2. Categorises information* *3. Interprets information* *4. Applies knowledge* **LO 3. Science, Society and Environment:** *AS 1. Understands science as a human endeavour*	**LEARNING OUTCOMES AND ASSESSMENT STANDARDS** **LO 1. Scientific Investigations:** *AS 1. Plans Investigation* *2. Conducts investigation and collects data* *3. Evaluates data and communicate findings* **LO 2. Constructing Science knowledge:** *AS 1. Recalls meaningful information* *2. Categorises information* *3. Interprets information* *4. Applies knowledge* **LO 3. Science, Society and Environment:** *AS 1. Understands science as a human endeavour*	**LEARNING OUTCOMES AND ASSESSMENT STANDARDS** **LO 1. Scientific Investigations:** *AS 1. Plans Investigation* *2. Conducts investigation and collects data* *3. Evaluates data and communicate findings* **LO 2. Constructing Science knowledge:** *AS 1. Recalls meaningful information* *2. Categorises information* *3. Interprets information* *4. Applies knowledge* **LO 3. Science, Society and Environment:** *AS 1. Understands science as a human endeavour*

science as a human endeavour *2. Understands sustainable use of the earth's resources*	*2. Understands sustainable use of the earth's resources*	*2. Understands sustainable use of the earth's resources*	*2. Understands sustainable use of the earth's resources*
Life and living Different food types-proteins, fats, carbohydrates, minerals, vitamins, water. Absorption of food Requirements for photosynthesis Storage organs in plants-roots, stem, leaves Matter and materials Different types of solutions Solubility-solvent, solute. Phases of matter-properties-physical changes-melting, evaporation, condensation, solidification, diffusion, and heating by conduction crystalline structure/ compressibility/ non-compressibility Energy and change Energy transfer and	Life and living Interaction in the environment-ecosystems-food chain ,food web Classification of animals-vertebrates and invertebrates-different classes, Characteristics Matter and materials Acids and bases, indicators Household acids and bases, salts and neutral solutions Reactions and changes of materials-acids and bases-characteristics, Household acids & bases Indicators Neutralization Products of neutralization Energy and change Fossils, fossil fuels Renewable (wind, sun and water) and non renewable (fuels, coal, gas and oil) sources of energy.	Life and living Cell-animal and plant cell - structure and functions Life processes-breathing system, excretion-elimination of waste, Importance of water-kidney, skin, stomata Matter and materials Origin of raw materials. Radiation-dark coloured and light coloured substances Conductors, Resistors Pure substances and mixtures Methods of separation of mixtures-physical separation-filtration, distillation, evaporation, chromatography Energy and change Wood as a source of energy and its renewability Earth and beyond Mining-in different provinces Significance of mining to man	Life and living Circulatory system-structure and functions. Reproduction in plants-pollination fertilization, fruits and seeds Matter and materials Magnetism-magnetic fields, polarity Energy and change Heat transfer-conduction, convection, radiation Earth and beyond Mining- Advantages and disadvantages Safety and environmental impacts.

systems Types of energy-potential energy, kinetic energy Uses of energy, examples of energy transfer and systems-electrical, gravitational, mechanical, chemical, nuclear, solar, biomass, optical (light). <u>Earth and beyond</u> Solar system Celestial motion Phases of moon Eclipses Tides and phases of moon and eclipses.	<u>Energy and change</u> Atmosphere –layers of the atmosphere Atmospheric gases Properties of atmosphere at different elevations to protect earth from harmful radiations.		

Grade: 7	Learning Area: Natural Sciences	
Strand: Life and Living		
Duration: Weeks 1-2	**Content in context: Circulatory System - Structures and Function**	
Integration: Language: LO 5 Mathematics: LO 4 & 5		
Los and Ass	**Teaching & 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:: L O 3: SCIENCE, SOCIETY AND THE ENVIRONMENT AS: Understands science and technology in the context of history and indigenous knowledge.	**Activity 1** Learners discuss in groups how they think blood is transported in human body and identifies the different parts of the blood circulatory system and the function of the heart. Teacher asks learners to listen to the next persons heart beat, count for a minute and takes the average value of responses from different learners. The teacher uses an analogy (Transport system: taxis, buses, etc.) to explain the circulatory systems in human beings. Teacher explains the composition and function of blood. **Activity 2**: With the help of charts/ models the teacher explains different parts of the circulatory system which are heart and blood vessels. Learners identify the parts of the circulatory system. Make a drawing of the circulatory system. Teacher engages the learners in the discussion of the structure and functions of the heart and different blood vessels. **Activity 3**: The learners do research on the risk factors of heart related diseases and have to present it to the class. **Activity 4**: Discuss health risks and heart diseases and the relationship to have a healthy diet. [The special arteries that bring blood and oxygen to the heart muscle can clog up. They can clog up with clumps of fat called plaque. Blood cannot	Assessment Task Research Project Learners visit nearby Health centres to do a research on the risk factors of Cholesterol, High Blood Pressure, Hypertension, Asthma, and other Heart related diseases. Write a written report based on the information collected under the heading risk factors, causes, preventive measures. Make a model of the heart.

	flow through clogged arteries. Clogged arteries can cause heart attacks. Exercise is one way to keep your heart healthy. Eating fruits, vegetables, and low-fat meats is another way to keep your heart healthy. You should have regular physical checkups. The main way to keep your heart healthy, however, is not to smoke. Heart Related Diseases are normally found from people who sometimes fail to take precautionary measures and they can prove to be fatal at times].	
Resources: Model of heart, Charts, Posters, Models of transport modes		
EXPANDED OPPORTUNITY: Learners visit libraries and other centres to find necessary precautions to prevent Heart Related Diseases.	**Teacher Reflection** What improvement to be made for a more successful lesson.	

Grade: 7	**Learning Area: Natural Sciences**	
Strand: Life and Living		
Duration: Week 3	**Content in context:** Reproduction in plants – pollination, fertilization – fruit and seed	
Integration: Language: LO 5, Mathematics: LO 4,5, Technology: LO 1, Social Sciences (Geo) : LO 3		
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.	**Activity:1** Discuss the formation of new plants, by answering questions like how do plants spread? What do plants need to survive and grow well? How do we get plants of the same kind Teacher brings to class two different types of plants and asks the learners to spot the differences between those plants and also ask them to identify other plants that are grown in the fields with the same or different features that they observed **Activity: 1** Teacher explains a classification of plants using a flow diagram (pg 39 – Science for all- Gr.7) Definition of phyla, multicellular, spirogyra, filament, spores etc. The teacher explains the following terms: • Reproduction: Monocotyledons & Dicotyledons • Pollination : Flowering plants • Fertilization. conifers The teacher supplies a worksheet of examples of monocots and dicots and instructs them to classify them according to leaf structure, root type, stem types, etc.	**Assessment Task** Assignment: Learners complete the worksheet supplied by the teacher to classify different types of plants. Practical activity Learners dissect flowers and observe different parts of a flower. Make a drawing of a flower and label the parts.. Learners writes a test in the topic.

	Activity 2: Angiosperms The general structure of the flower. Learners will bring real flowers and dissect them, looking at the different parts, draw and label them. Make a list of the parts and fill in their functions. Parts of the flower. • **Pistil:** *is the female part of the reproductive system of the flower.* • **Stamen:** *is the male part of the reproductive system of the flower.* Activity 3: The learners have to complete a test based on classification and reproduction of plants.	
Resources: Different types of plants, flowers		
EXPANDED OPPORTUNITY: The learners will be discussing the agents of pollination and how do they support the pollination.	**Teacher Reflection** What improvement to be made for a more successful lesson.	

Grade: 7	**Learning Area: Natural Sciences**	
Strand: Matter and materials		
Duration: Week 4	**Content in context: Magnetism –magnetic fields , polarity**	
Integration: Language: LO5, Technology: LO1, 2, Social Sciences(Geo): LO2		
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.	**Introduction:** Magnetism is an invisible force. Magnetic force can *attract* (pull toward) or *repel* (push away). Magnetism comes from magnets. Magnets make things move without touching them. Some magnets are weak. Other magnets are much stronger. Some magnets are shaped like the letter *U.* Some magnets are shaped like bars. Magnets can also be thin disks, squares, or rectangles. Other magnets are round or have irregular shapes. The important thing to remember about a magnet is that it has two ends called poles. One end is called the north pole, and the other end is the south pole. The south pole of one magnet will attract and stick to the north pole of another magnet. The south pole of a magnet will repel, or push away, the south pole of another magnet. North poles will also repel each other. **Activity: 1**. Learners investigate which objects are attracted and those that are not attracted by a magnet. • Polarity of magnets $ forces that exist between the poles of a magnet. • Classification of objects as magnetic and non-magnetic • Practical activity using bar magnet and iron fillings to create the magnetic field.	**Assessment Task** Investigation- Learners carry out an investigation on different metals and their behaviour to magnetism. Completing a worksheet about polarity of magnets. Learners float magnets in water by tying cork underneath the magnet so that it can float, observe the direction of the North Pole. Project – Designing a crane that

	• Learners are exposed to other materials (metals) which can be magnetised (putting them near very strong magnets) • Metals which keep their magnetism (permanent magnets) • Metals which do not keep their magnetism for a long time are temporal magnets. • Using magnets to show direction. • Using compass to show direction of the magnetic field lines. **Activity 2**. Making electromagnet. The everyday life uses of electromagnets e.g. industries, scrap yards , harbour etc.	uses electromagnetism to pick-up objects.
Resources: Compass, torch cell, copper wire , magnets, cork, water, Bowl, Nails , wires , Paper clips ,Objects that are not attracted, etc.		
EXPANDED OPPORTUNITY: Visiting industries and harbours to see how electromagnetism works.	**Teacher Reflection** What improvement to be made for a more successful lesson.	

Grade: 7	**Learning Area: Natural Sciences**	
Strand: Energy and Change		
Duration: week 5	**Content in context: Heat transfer –conduction ,convection and radiation**	
Integration: Language: LO5, Mathematics: LO 4& 5,		
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.	**Introduction:** Heat energy can move in three ways. These three ways are called **Conduction, Convection, and Radiation**. **Conduction** carries heat through things that are solid. The frying pan heats the bacon through conduction. The frying pan sits on a flame. Heat from the flame makes atoms at the bottom of the pan move faster **Convection** heats liquids and gases. A radiator heats air in a room by convection. Air near the radiator gets hot. Hot air rises. Cooler air replaces the heated air. This air gets hot and also rises. The air keeps going around and around from cooler to hotter. The way the air moves is called convection current. **Radiation** can send heat across empty space. This is how heat from the Sun travels to Earth. Heat rays from the Sun strike the surface of Earth and make it warm. **Activity: 1**. The teacher explains to the learners that all	Practical investigation on conduction, convection and radiation. Class work Home work Class test

	matter is made of particles, when they are heated them excited either vibrate or move e.g. when the solids are heated the particles **vibrate** because they are closely packed. The uses the models, charts and pictures to explain the arrangement of particles of matter. **Activity:** 2 Learners conduct an investigation on how heat is transferred in different substances e.g. radiation – gases, Convection –liquids, Conduction –solids. **Activity: 3** Learners conduct an investigation to find out which substances are good conductors and good insulators in **liquids.** **Activity: 4** Learners are doing an investigation to find the relationship between the length of the matter and heat transfer. **Experiment:** Place an eight centimetre rod, with drawing pins mounted with petroleum jelly at 1 cm apart. Mount the rod on the stand as a safety precaution**.** Expose one end of the rod to the flame. Observe and record the results.	**Assessment Activity: Investigation:** Learners investigate how heat is transferred in these three ways. Learners record and present their findings. Complete table which classifies substances into good conductors and good insulators. Learners investigate the relationship between the length of matter (Metal rod) and heat transfer
Resources: Metal rod, petroleum jelly, Bunsen burner, drawing pins, water, basin, stainless steel spoon, wooden spoon, plastic spoon, roll of aluminium foil, charts and models of particles of matter.		
EXPANDED OPPORTUNITY: Learner conduct an investigation of heat transfer through liquids to illustrate the concept of convectional current.	**Teacher Reflection** What improvement to be made for a more successful lesson.	

<table>
<tr><td colspan="3">Grade: 7 Learning Area: Natural Sciences</td></tr>
<tr><td colspan="3">Strand: Earth and Beyond</td></tr>
<tr><td colspan="2">Duration: week 6</td><td>Content in context: Mining – Advantages and Disadvantages</td></tr>
<tr><td colspan="3"><u>Integration</u>:
Language: LO 5, Mathematics: LO4 & 5</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:
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.</td><td>Introduction:
Mining provides us with raw materials for industry, creates jobs and brings money into the country. However, it also can harm the environment and people’s health. Working conditions in mines are often unpleasant and can also be dangerous.

Activity 1: The teachers explain what mining is all about, e.g. Raw materials, creating jobs, minerals, impact on the environment, etc. The teachers give examples of minerals that are mined and where they are mined.

Learners are supplied with a case study on mining reflecting advantages and disadvantages.

Illustrate the advantages and disadvantages on a poster and present it to the class,</td><td>Assessment Task
Case Study:
See Appendix number 1 below

Poster Presentation
Learners design and make two posters which reflects the following:
FEATURES OF THE POSTER
1. A scenario of a mine that does not comply with Health and Safety Asbestos Mining Regulations
2. A scenario of a mine that complies with Health and Safety Asbestos Mining Regulations
• Human Health
• Environment –Water, Air, Soil</td></tr>
<tr><td colspan="3">Resources: Newspapers, TV, radio, posters, magazines.</td></tr>
<tr><td colspan="2">EXPANDED OPPORTUNITY: Learners are to visit the library or use any resource to get the information and discuss other mining impacts to the environment.</td><td>Teacher Reflection
What improvement to be made for a more successful lesson.</td></tr>
</table>

Appendix 1: Case Study

Recently, a Large number asbestos mining company agreed to pay out more than R460 million to miners and their families who have suffered as a result of asbestos – related diseases. But is this compensation enough? Many say it is too little, too late.

Asbestos dust has been given name “killer dust” because exposure to asbestos fibres can cause a fatal and painful kind of cancer. Breathing in even small amounts of asbestos fibres can prove fatal.

Even though the asbestos mines have closed, the effects of asbestos mining and asbestos use will be felt by people in the area for a long time to come. No money has been set aside for cleaning up and making the environment safe from harmful effects of asbestos. In some villages in the Northern Cape and Limpopo, people live in the buildings made of asbestos. Over time, this asbestos breaks down into fibre. It has also been found that children have been playing on dumps of asbestos fibres. Asbestos fibres can travel up to 100 km in the wind. Also, floodwater has washed waste material, from asbestos mine dumps and processing plants, into the water system, polluting rivers and drinking water.

ACTIVITY

1. Which disease were these people suffering from?

2. What were they compensated for?

3. If these mines are closed down, will the people be safe and healthy. If you say NO, what can be done to make sure that they are safe?

4. What is the safest way of disposing the asbestos?

5. Why is it risky to build the house using asbestos

OVERVIEW
GRADE 8

TERM 1	TERM 2	TERM 3	TERM 4
LEARNING OUTCOMES AND ASSESSMENT STANDARDS **LO 1. Scientific Investigations:** *AS 1. Plans Investigation* *2. Conducts investigation and collects data* *3. Evaluates data and communicate findings* **LO 2. Constructing Science knowledge:** *AS 1. Recalls meaningful information* *2. Categorises information* *3. Interprets information* *4. Applies knowledge* **LO 3. Science, Society and Environment:** *AS 1. Understands science as a human endeavour* *2. Understands sustainable use of the earth's resources*	**LEARNING OUTCOMES AND ASSESSMENT STANDARDS** **LO 1. Scientific Investigations:** *AS 1. Plans Investigation* *2. Conducts investigation and collects data* *3. Evaluates data and communicate findings* **LO 2. Constructing Science knowledge:** *AS 1. Recalls meaningful information* *2. Categorises information* *3. Interprets information* *4. Applies knowledge* **LO 3. Science, Society and Environment:** *AS 1. Understands science as a human endeavour* *2. Understands sustainable use of the earth's resource*	**LEARNING OUTCOMES AND ASSESSMENT STANDARDS** **LO 1. Scientific Investigations:** *AS 1. Plans Investigation* *2. Conducts investigation and collects data* *3. Evaluates data and communicate findings* **LO 2. Constructing Science knowledge:** *AS 1. Recalls meaningful information* *2. Categorises information* *3. Interprets information* *4. Applies knowledge* **LO 3. Science, Society and Environment:** *AS 1. Understands science as a human endeavour* *2. Understands sustainable use of the earth's resource*	**LEARNING OUTCOMES AND ASSESSMENT STANDARDS** **LO 1. Scientific Investigations:** *AS 1. Plans Investigation* *2. Conducts investigation and collects data* *3. Evaluates data and communicate findings* **LO 2. Constructing Science knowledge:** *AS 1. Recalls meaningful information* *2. Categorises information* *3. Interprets information* *4. Applies knowledge* **LO 3. Science, Society and Environment:** *AS 1. Understands science as a human endeavour* *2. Understands sustainable use of the earth's resources*

Life and living Photosynthesis, Importance of photosynthesis, Requirements for photosynthesis, Process of photosynthesis **Matter and materials** The particle model of matter-neutrons and electrons atoms and molecules Introduction to periodic table Elements and compounds **Energy and change** Heat transfer -source of heat energy, light energy transfer of energy through conduction, convection and radiation How to control conduction, convection and radiation to reduce wasteful heat transfer How to improve conduction, convection and radiation to increase useful heat transfer **Earth and beyond** Gravity and the position of planets in the orbit Sun as a major source of energy, how it affect plant growth. Wind, Oceans, Water currents.	**Life and living** Life processes-nutrition, digestion, respiration, excretion, circulation, Healthy living, Obesity Diseases Energy flow in an ecosystem Food relationships-food chains and food webs **Matter and materials** Chemical reactions-metals non-metals. Equations Elements from compounds-decomposition of compounds Acidic and alkaline solutions Corrosion of iron Reaction of oxygen with food **Energy and change** Electricity generating systems and connections Generation of electricity **Earth and beyond** Atmosphere and weather Human activities altering the composition of atmosphere-companies, technologies, building dams. Pollution-water, air ,land Change in weather patterns Long term changes in rainfall and climate	**Life and living** Competition, predators Balance of ecosystem Decomposition Animal behaviour patterns-feeding, reproduction Taking care of the environment-plants, vegetables, Medicinal plants **Matter and materials** Gases-oxygen, nitrogen, hydrogen-reactions with other elements, chemical equations **Energy and change** Impacts of electricity generation on the environment Advantages & disadvantages **Earth and beyond** Global warming-cause and effect Greenhouse effect Depletion of Ozone layer Relationship between climate and atmosphere Natural events-Elnino, tsunami , earthquakes etc	**Life and living** Adaptation of organisms in the ecosystems- vertebrates, invertebrates **Matter and materials** Magnetism- electromagnetism magnetic fields, polarity, magnetic substances, electrically charged materials, (electrostatics **Energy and change** Electrical connections, costs, importance **Earth and beyond** Climatic conditions affecting plants and animals in different regions

Grade: 8	**Learning Area: Natural Sciences**	
Strand: Life and Living		
Duration: 2 weeks (weeks 1&2)	**Content in context: ADAPTATIONS OF ANIMALS IN THE ECOSYSTEM**	
Integration: Language: LO 5 (Thinking and reasoning), Social Sciences: LO 3 (Exploring issues)		
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*: AS: Interprets information AS: *Applies knowledge* **L O 3: SCIENCE, SOCIETY AND THE ENVIRONMENT** **AS:** Understands science and technology in the context of history and indigenous knowledge. **AS**: Understanding sustainable use of resources	**ACTIVITIES:** **Activity 1**: Teacher provides examples of how some animals are adapted to live in a specific environment. E.g. fish, frog, reptiles, birds and mammals. • Teacher explains that adaptation is a characteristic that helps organisms to survive and reproduce successfully in their environment • Those animals with the best adaptation to the environment will produce offspring that will be best suited to that environment • Other organisms without that adaptation will die out and not transfer it's genes to the next generation, (i.e. *survival of the fittest*) • Examples such as camouflage, reproductive strategies, etc. **Activity 2:** Learners investigate how the five classes of	Worksheet Tests Translations Written work on adaptation of vertebrates.

	vertebrates have adapted to their environments under the following headings: • Body shape, b) Reproduction, c) Body covering, d) Diet • The Learners report on their findings in a tabulated form. **Activity 3**: Teacher explains how Arthropods and Molluscs have adapted to their environments. E.g. the locust and snail. • Teacher explains that over millions of years the locust developed a hard exoskeleton to protect it's soft inner organs • Locusts developed compound eyes and antennae to allow for better vision to detect food and enemies • The bodies of different locusts are camouflaged to blend in the surrounding vegetation • Other locusts have distinctive colours to warn predators that they are poisonous to eat • Locusts' eggs hatch as the summer rains fall in time for the hatchlings to have an ample supply of food. • Learners complete worksheets on the above.	Investigation Translation Worksheets Tests Class work Home work
Resources: Encyclopaedias, pictures, books, locusts, molluscs.		
EXPANDED OPPORTUNITY: Collect information on adaptations of five other animals seen elsewhere.	**Teacher Reflection** What improvement to be made for a more successful lesson.	

Grade: 8	**Learning Area: Natural Sciences**	
Strand: MATTER AND MATERIALS		
Duration: 2 week (weeks 3&4)	**Content in context: MAGNETISM AND ELECTROMAGNETISM**	
Integration: Language: : LO 5 (Thinking and reasoning), Technology: LO 2 (Technological 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* AS: *Evaluates data and communicates findings* **LO2: CONSTRUCTING SCIENCE KNOWLEDGE:** AS: *Recalls meaningful information*: AS*: Categorizes information*: *AS: Interprets information* *AS: Applies knowledge* **L O 3: SCIENCE, SOCIETY AND THE ENVIRONMENT** AS*: Understands science and technology in the context of history*	**ACIVITIES:** **Activity 1**: The Teacher explains and shows the following about magnetism: o Magnetic fields o Polarity o Magnetic substances - Around magnets there is an invisible field that can be seen when using iron fillings, paper and a magnet - The magnet has a north pole and a south pole - Opposite poles attract and like poles repel one another, e.g. North attract South and North repels North and South repels South - The teacher demonstrates these properties of magnets in the class. **Activity 2**: Teacher explains that **electromagnetism** explains the fact that a changing magnetic field produces an electric field and an electrical current or changing electrical	**Formal Assessment Task** **Investigation** Worksheet Translation Tests

and indigenous knowledge. AS*: Understanding sustainable use of resources*	field produces a magnetic field. - Learners are supplied with connecting-wires, a battery and a 15 cm steel nail - Learners wrap the connecting-wire around the nail several times, (i.e. coils), and connect the ends to the poles of the battery - Learners compare the number of coils and the strength of the electromagnet, (i.e. the nail), by seeing how many drawing-pins it can pick up - Twenty coils should pick up more drawing-pins that ten coils - Learners tabulate their findings, label drawings of the above experiment and explain their predictions.	**<u>Formal Assessment Task</u>** **Case study**: ***(LO2 AS3 and AS4) and LO3 AS1 and AS 2)*** A) *Explain the history of electromagnets*. B) *Build an electromagnet and explain its uses in our everyday lives.* **(See addendum)**
Resources: Batteries, connecting-wires, steel nails and drawing-pins, magnets, iron-fillings and paper, Information sheet		
EXPANDED OPPORTUNITY: Study about electromagnets used in industries	**Teacher Reflection** What improvement to be made for a more successful lesson.	

- **Addendum**

CASE STUDY -THEME: MATTER and MATERIALS

Electromagnetism is the branch of physics that studies the relationship between electricity and magnetism. Electromagnetism is based on the fact that (1) an electric current or a changing electric field produces a magnetic field, and (2) a changing magnetic field produces an electric field.

In 1820, the Danish scientist Hans Oersted discovered that a conductor carrying an electric current is surrounded by a magnetic field. When he brought a magnetized needle near a wire in which an electric current was flowing, the needle moved. Because a magnetized needle is moved by magnetic forces, the experiment proved that an electric current produces magnetism.

In 1820, Danish physicist Hans Oersted discovered that an electric current produces a magnetic field. In 1825, English electrician William Sturgeon showed that an iron core strengthens a coil's magnetic field. American physicist Joseph Henry built the first practical electromagnet in the late 1820's.

During the 1820's, the French physicist Andre Marie Ampere declared that electric currents produce all magnetism. He concluded that a permanent bar magnet has tiny currents flowing in it. The work of Oersted and Ampere led to the development of the electromagnet, which is used in such devices as the telegraph and the electric bell. Most electromagnets consist of a coil of wire wound around an iron core.

The electromagnet becomes temporarily magnetized when an electric current flows through the wire. If the direction of the current changes, the poles of the electromagnet switch its places.

Magnetism produces an electric current by means of electromagnetic induction. The English scientist Michael Faraday and the American physicist Joseph Henry discovered electromagnetic induction independently in the early 1830's. In electromagnetic induction, a changing magnetic field sets up an electric field within a conductor. For example, a magnet moving through a coil of wire causes the voltage to vary from point to point along the wire. An electric current flows along the wire as long as the magnetic field passing through the wire is changing.

Electromagnetic induction is the basis of the electric generator. An electric motor reverses the process. A current sent through the wire causes the wire to move in a magnetic field.

In 1864, James Clerk Maxwell, a British scientist, used the earlier experiments to deduce that electric and magnetic fields act together to produce electromagnetic waves of radiant energy. The German physicist Heinrich R. Hertz proved Maxwell correct about 20 years later when he discovered electromagnetic wave.

Electromagnet is a temporary magnet formed when electric current flows through a wire or other conductor. Most electromagnets consist of wire wound around an iron core. This core is made from magnetically soft iron that loses its magnetism quickly when the electric current stops flowing through the wire.

Electromagnets drive electric doorbells, buzzers, and relays. They also produce the magnetic fields needed to make electric motors and generators work. Powerful industrial electromagnets lift heavy pieces of scrap iron. Specially designed electromagnets create the very strong magnetic fields that guide atomic particles along desired paths in particle accelerators.

The magnet you stick to your refrigerator may not seem related to electricity. But magnetism and electricity are actually closely related. Just as an electric field surrounds an electric charge and produces a force that affects other charges, so a magnetic field surrounds a magnet and produces forces that act on other magnets. Like an electric charge, a magnet will attract or repel another magnet. Moreover, magnetism is the result of electric currents. In materials called permanent magnets, the currents come from the motions of electrons in some of the atoms. The electrons spin on their axes like tops, and they also circle the atomic nuclei.

Together, magnetism and electricity make a fundamental force of the universe called electromagnetism. Electromagnetism is based on the fact that the motion of electric charges can produce magnetic fields, and changing magnetic fields can produce electric currents.

For example, passing an electric current through a coil of wire makes the coil a temporary magnet called an electromagnet. The electric current creates a magnetic field around the coiled wire. As long as the current flows, the coil will be a magnet.

Magnetism can, in turn, produce an electric current by means of electromagnetic induction. In this process, a coil of wire moves near a magnet. This action causes an electric current to flow in the wire. The current flows as long as the movement continues. Generators produce electric current through this process.

Together, changing electric and magnetic fields make electromagnetic waves, also called electromagnetic radiation. These waves carry energy known as electromagnetic energy at the speed of light. Light, radio and TV signals, and microwaves all consist of electromagnetic waves. So do the infrared rays that you feel as heat when you stand near a hot stove, and the ultraviolet rays that cause sunburn. The X rays that doctors use to see inside your body are electromagnetic waves. The gamma rays that come from nuclear reactors and from outer space are also electromagnetic waves.

QUESTIONS:

1. Who build the first practical electromagnet? (1)
2. Explain in simple terms what an electromagnet is. (2)
3. Explain how magnetism can produce electrical current. (2)
4. What all did Hans Oersted discover in his experiments? (5)
5. How can a person change the poles of an electromagnet? (1)
6. On which 2 facts is electromagnetism based? (2)
7. Where do we use electromagnets? (Name three). (3)
8. When changing electric and magnetic fields, what do we create and where is this phenomenon used? (4)

With the knowledge you have gained from the case study, build your own electromagnet and prove that it can work. (10)

Grade: 8	**Learning Area: Natural Sciences**	
Strand: ENERGY AND CHANGE		
Duration: Week 5	**Content in context: ELECTRICITY IN OUR HOMES**	
Integration: Language: : LO 5 (Thinking and reasoning), Technology: LO 2 (Technological 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* AS: *Evaluates data and communicates findings* **LO2: CONSTRUCTING SCIENCE KNOWLEDGE:** AS: *Recalls meaningful information*: AS: Categorizes information: AS: *Interprets information* AS: *Applies knowledge* **L O 3: SCIENCE, SOCIETY AND THE ENVIRONMENT** **AS:** Understands science and	**ACTIVITIES:** **Activity 1:** The Learners must use terms such as parallel and series connections - The Teacher explains and shows how the circuits are connected in our homes, i.e. stoves, lights and other appliances - All appliances are connected in parallel in our homes to ensure that if one breaks the others still work in the house - The teacher explains the benefits and the disadvantages of parallel connections - The teacher explains the benefits and the disadvantages of series connections **Activity 2**: The learners can do a survey of the electrical consumption in their homes, i.e. which appliances are left on permanently and which are operating periodically Learners can calculate the electricity consumption in their homes and explain how costs can be reduced.	Assignments Worksheet Case-study

technology in the context of history and indigenous knowledge. AS: *Understanding sustainable use of resources*		
Resources: Encyclopaedias, electricity accounts, pictures and information from ESKOM		
EXPANDED OPPORTUNITY:	**Teacher Reflection** What improvement to be made for a more successful lesson.	

Grade: 8	**Learning Area: Natural Sciences**	
Strand: LIFE AND LIVING		
Duration: Week 6	**Content in context: ADAPTATIONS OF ANIMALS AND PLANTS IN SOUTH AFRICA**	
Integration: Language: LO 5 (Think and reasoning), Social Sciences: LO 3 (Exploring issues)		
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***: **AS**: Interprets information **AS**: Applies knowledge **L O 3: SCIENCE, SOCIETY AND THE ENVIRONMENT**	**ACTIVITIES:** **Activity 1**: **Learners name different groups of plants that they have studied thus far**: a) Monocotyledonous, (maize) b) Dicotyledonous, (bean) c) Non-flowering plants, (Conifers, cone-bearing plants e.g. the pine-tree) d) Learners find out how Algae have adapted to their environments in ponds and the oceans by reading articles given by the teacher and the learners report verbally on their findings in their groups. **Activity 2**: **Teacher explains to the learners how the following plants have adapted to their environments**: **Hydrophytes**: (The waterlilly) - ***The roots*** of hydrophytes are small since they grow in slow flowing water and do not have to anchor themselves to any substrate. The xylem are not well-developed since these plants grow in the water and do not have to search for water but they still have to take in water and mineral salts	Question and Answer Worksheets Research Worksheet

AS: ***Understands science and technology in the context of history and indigenous knowledge***. **AS**: Understanding sustainable use of resources	- ***The stems*** are adapted to grow horizontally under the water and are known as rhizomes. The rhizome have vegetative buds which develop into new plants - Stems have many airspaces between the cells so as to improve buoyancy so that the plant floats on the surface of the water - The stems release antiseptic slime to protect the plant in the water against injury since it is structurally weak - ***The leaves*** have long and thin petioles so that they can float on the water surface - The leaves are round and flat to assist floatation and have no stomata - The leaves are supported structurally by having thick veins. 1. The learners complete a worksheet about the Hydrophytes based on the above information. 2. Other assessment tasks can be a test or a case study regarding problematic alien hydrophytes found in South African dams. Activity 3: Learners do a research study on the adaptations of Mesophytes under the headings: • *Leaves* • *Stems* • *Roots* • *Names of Mesophytes found in South Africa*	Test Translations Research study Translations

	Activity 4: Teacher explains how plants have adapted to various biomes in South Africa especially the Karoo. **<u>Plants found in the Karoo</u>**: - Xerophytes are types of plants found in the Karoo that is extremely dry and receives very small amounts of water - Examples of Xerophytes are ***acacias, cactuses, aloes and " vygies"*** - **<u>The roots</u>** of Xerophytes are found close to the surface and branch out widely under the plant - Hence the slightest amount of moisture can be taken up by the roots before the heat can evaporate the water - The roots are extremely fibrous and therefore very absorbent, absorbing even the dew at night - **<u>The stems</u>** are relatively short with a corklike layer to reduce water-loss through transpiration - The xylem is well-developed to transport water to the leaves efficiently - Some Xerophytes store water in their stems such as the cacti - In the cacti the leaves are modified to form thorns to protect the stored water-supply. The stem replaces the role of the leaves by housing the pigments for photosynthesis and are green in colour - In the acacias some of the leaves are modified to form thorns that cover most of the branches to prevent most animals from robbing the plant of its	Worksheets Tests Worksheets

	water that is found in the leaves - **<u>The leaves</u>** of the acacias are narrow, (i.e. small) and elongated to prevent significant water-loss - The leaves of the aloe are thick and fleshly, storing large amounts of water with thorns arranged on the edges - The leaves of the Xerophytes are attached directly to the stem since the petioles are absent. It is thought that without the petioles it is more difficult to remove the leaves from the stem - The leaves of the aloe, acacias and "vygies " contain photosynthetic pigments and can perform photosynthesis, (i.e. the food-making process) - The leaves are covered with a waxy layer and are densely packed which reduces water-loss since it reflects the sunlight. Activity 4: Learners find out more about how the animals have adapted to the Karoo biome	Research study

Resources: Books, pictures, videos	
EXPANDED OPPORTUNITY: Learners can visit a game reserve with Karoo flora and fauna	**Teacher Reflection** What improvement to be made for a more successful lesson.

OVERVIEW
GRADE 9

TERM 1	TERM 2	TERM 3	TERM 4
LEARNING OUTCOMES AND ASSESSMENT STANDARDS	**LEARNING OUTCOMES AND ASSESSMENT STANDARDS**	**LEARNING OUTCOMES AND ASSESSMENT STANDARDS**	**LEARNING OUTCOMES AND ASSESSMENT STANDARDS**
LO 1. Scientific Investigations:	**LO 1. Scientific Investigations:**	**LO 1. Scientific Investigations:**	**LO 1. Scientific Investigations:**
AS 1. Plans Investigation	*AS 1. Plans Investigation*	*AS 1. Plans Investigation*	*AS 1. Plans Investigation*
2. Conducts investigation and collects data	*2. Conducts investigation and collects data*	*2. Conducts investigation and collects data*	*2. Conducts investigation and collec data*
3. Evaluates data and communicate findings	*3. Evaluates data and communicate findings*	*3. Evaluates data and communicate findings*	*3. Evaluates data and communicate findings*
LO 2. Constructing Science knowledge:	**LO 2. Constructing Science knowledge:**	**LO 2. Constructing Science knowledge:**	**LO 2. Constructing Science knowledge:**
AS 1. Recalls meaningful information	*AS 1. Recalls meaningful information*	*AS 1. Recalls meaningful information*	*AS 1. Recalls meaningful information*
2. Categorises information	*2. Categorises information*	*2. Categorises information*	*2. Categorises information*
3. Interprets information	*3. Interprets information*	*3. Interprets information*	*3. Interprets information*
4. Applies knowledge	*4. Applies knowledge*	*4. Applies knowledge*	*4. Applies knowledge*
LO 3. Science, Society and Environment:	**LO 3. Science, Society and Environment:**	**LO 3. Science, Society and Environment:**	**LO 3. Science, Society and Environment:**
AS 1. Understands science as a human endeavour *2. Understands sustainable use of the earth's resource*	*AS 1. Understands science as a human endeavour* *2. Understands sustainable use of the earth's resources*	*AS 1. Understands science as a human endeavour* *2. Understands sustainable use of the earth's resources*	*AS 1. Understands science as a human endeavour* *2. Understands sustainable use of the earth's resources*

Life & Living Photosynthesis-requirements and products of photosynthesis, the chemistry of photosynthesis, structure of leaves suitable for photosynthesis, Energy transfer in an ecosystem. Cell the basic unit of life: Structure and functions of different organelles in plant and animal cells, comparison of plant and animal cell, unicellular, multi-cellular-examples **Matter and Materials** Properties and uses of matter-states/phases Useful gases-oxygen, hydrogen, carbon dioxide. The particle model of matter-atoms and molecules. Balancing of equations **Energy and Change** **Forces:** different types of forces-mechanical, magnetic, electric, electrostatic and gravitational forces. Characteristics and effect of the above forces Measurement of force-use of spring balance	**Life & Living** Tissues, organs, and systems in plants and animals **Human Reproduction**: Fusion of sex cells, Development of foetus in mother's womb and parental care Sexually transmitted diseases including HIV and AIDS Diseases-diabetes, heart diseases, preventive measures Interactions in the environment-pollution-water, air, land Role of man in the environment, recycling of matter, nutrient cycles. **Matter and Materials** Compounds Acids and bases-reactions with metals and metal oxides, hydroxides and carbonates Reaction between oxygen and metals & non-metals Structure reactions and changes of materials. Chemical reactions-exothermic and endothermic reactions. **Energy and Change** Systems made to transfer energy-	**Life & Living** Malnutrition and deficiency diseases. **Systems in human body** Respiratory system Excretory system **Reaction of oxygen** with food releases energy in the cells of living things **Variation in organisms:** Species Natural selection and extinction-extinction of species through human activities and through natural events Conservation of wild life and protection of endangered species Loss of biodiversity Alien plants **Matter and Materials** Extraction of useful materials from raw materials: Iron, gold, platinum, copper methods of separation Reactions of acids with metals, metal oxides and carbonates **Energy and Change:** How to save energy Design of buildings and appliances Cost of electricity and how to reduce	**Matter and Materials** The reaction of oxygen: with metals, non-metals Formation of oxides, solubility of oxides: acidic or alkaline Corrosion of iron and its economic importance and prevention **Life and Living** Maintenance of ecosystem Food chains and food webs Role of bacteria in biological change Adaptation of different organisms in the ecosystems Recycling of matter in the ecosystem

Newton's laws with regard to forces **<u>Earth and Beyond</u>** Planet earth-structure-lithosphere, mantle Lithospheric plates Atmosphere and weather-composition, properties and role **Space Exploration programmes:** Earth-based telescopes (such as SALT in SA) Telescopes in orbits How man benefits from such programmes Robotic spacecrafts to collect data about planets, Research on Mars	electrical, mechanical & solar energy Transfer of light energy Light-absorption, refraction, reflection of light. Conservation of energy Sustainable use of energy Generation of electricity in South Africa: Thermal plants (coal, gas) Hydroelectric (falling water) Nuclear Reactors Solar Environmental implications Need to conserve electricity (cost and environmental implications **<u>Earth and beyond</u>** Impact of human in the atmosphere Geological events: Earthquakes, volcanic eruptions, Constructive forces, crustal formation, deposition of sediments, Destructive forces- weathering, erosion, land forms etc and their effect on earth Fossils Fossil fuels-how it is formed	cost Alternative sources of energy Wood as a source of energy Planting of trees for sustainable use of energy **<u>Earth and Beyond</u>** Mining –local examples-coal for energy, raw materials for industries, legislation controls of mining, safety, economic and environmental effects	

Grade: 9		**Learning Area: Natural Sciences**
Strand: Matters and Materials		
Duration: Weeks 1-2	**Content in context:** Reaction of oxygen with metals and non-metals	
Integration: **Language:** LO 2 : Speaking LO 3: Reading **Mathematics**: LO 5: Data Handling AS: Design simple Questionnaires **Technology**: LO 1: Technological processes and skills		
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.	**Reaction of oxygen with metals/non-metals** **Formation of oxides** Oxygen is the **active** component of air ***Hint: Making oxygen****. Most commercial oxygen is distilled from liquid air. During the distillation process, the nitrogen boils before the oxygen does, because nitrogen has a lower boiling point. As the nitrogen boils away, the liquid air is left with a greater concentration of oxygen. Commercial oxygen is stored in steel tanks at a pressure of about 2,000 pounds per square inch (140 kilograms per square centimetre, or 14 mega Pascal), more than a hundred times the pressure of the atmosphere*. **Combustion** is the reaction of substances with oxygen. **Activity 1** The learners will investigate how certain substances react with oxygen in the following experiments:	**Assessment Task** Learners complete an activity on balancing of equations.

	Experiment Fill three cylinders/jars with oxygen and seal with glass disc and petroleum jelly/Vaseline. There must be a little water in the cylinders/jars. Put pieces of the following elements; sodium, magnesium, sulphur, phosphorus, carbon and iron on deflagrating spoons, hold the spoons in a Bunsen/spirit lamp flame, until the element ignites, then lower the into the cylinders/jars of oxygen. After the elements have reacted with oxygen, the product must be shaken with water to determine solubility. Litmus paper (red for metals, blue for non-metals, or both in each solution) is used to determine the pH of the solutions. **Activity 3:** The teacher consolidates pre-knowledge on equations and explains the balancing of equations.	
EXPANDED OPPORTUNITY: Investigation on the formation of oxides and the use of oxides in industries.		**Teacher Reflection:** What improvement to be made for a more successful lesson.

Activity 1: Recording sheet for observation

Substance burnt	Flame colour	Name of product	Nature of product	Colour of litmus in solution
Sodium (Na)	***daffodil yellow flame***		***solid white powder***	
Iron (Fe)		***magnetic iron oxide***		***dissolves slightly in warm water only)***
Magnesium (Mg)	***blindingly white flame***		***solid white powder***	
Sulphur (S)		***sulphur dioxide***		***red***
Phosphorus(P)				
Carbon(C)		***carbon dioxide***		***red***

Equations in above reactions
Sodium + Oxygen ⟶ Sodium oxide Na + O_2 ⟶ NaO
Iron + Oxygen ⟶ Iron oxide Fe + O_2 ⟶ FeO
Magnesium + oxygen ⟶ Magnesium oxide Mg + O_2 ⟶ MgO
Sulphur + Oxygen ⟶ Sulphur oxide S + O_2 ⟶ SO
Phosphorus + Oxygen ⟶ Phosphorus oxide P + O_2 ⟶ PO
Carbon + Oxygen ⟶ Carbon Dioxide C + O_2 ⟶ CO_2

Balancing of equations
Sodium + Oxygen ⟶ Sodium oxide **2** Na + O_2 ⟶ **2** NaO
Iron + Oxygen ⟶ Iron oxide **2**Fe + O_2 ⟶ **2**FeO
Magnesium + oxygen ⟶ Magnesium oxide **2**Mg + O_2 ⟶ **2** MgO
Sulphur + Oxygen ⟶ Sulphur oxide **2**S + **2**O_2 ⟶ **2**SO_2
Phosphorus + Oxygen ⟶ Phosphorus oxide **2**P + O_2 ⟶ **2**PO
Carbon + Oxygen ⟶ Carbon Dioxide **2**C + **2**O_2 ⟶ **2**CO_2

Activity 1.2: Do the balancing of equations on the reactions of metals and non-metals with oxygen

Grade: 9	**Learning Area: Natural Sciences**	
Strand: Matter and Materials		
Duration: Weeks 3-4	**Content in context: Corrosion of iron**	
Integration: **Language:** LO 2 : Speaking LO 3: Reading **Mathematics**: LO 5: Data Handling AS: Design simple Questionnaires **Technology**: LO 1: Technological processes and skills		
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.	**Activity: 1** **The reactions of oxygen with iron** Reaction of oxygen with iron was done (see above). A black solid magnetic iron oxide was the product of this reaction. To further investigate the reaction between iron and oxygen, the following must be done. **Experiment** **Method** Take five similar, clean glass jars. Put the following in the five jars: ➢ Jar A: a piece of oil-free, dry steel wool (Control) ➢ Jar B: a piece of moist, oil-free steel wool ➢ Jar C: a piece of dry, oil-free steel wool with the juice of a lemon. ➢ Jar D: a piece of steel wool, covered and smeared with motor oil. ➢ Jar E: Burn a candle in a closed jar. When the flame dies, quickly open the jar, put a piece of dry, oil-free steel wool in the jar and close. (Be very quick).	Assessment Task **Investigation** The learners do experiment and write down their observations on table provided. They also answer the questions as set out in activity 3.

<table>
<tr>
<td></td>
<td>1. Close all the jars and put next to one another. On the first day you will have to look at the jars every hour (if possible) to see whether you can spot any rust. On the second day you will most probably be able to spot rust.
2. Use the table (mark Activity 2) below to record your observations.

Activity 2: Draw a column graph (bar graph) to illustrate the tempo of rust development in the different jars.
Criteria for the column graph:
➢ Mark the X and Y- axes.
➢ Name the axes.
➢ Use a suitable scale.
➢ Space between columns
➢ Heading
➢ Neatness</td>
<td><u>Assessment Task</u>
Translation Task
Learners complete the graph on the graph paper provided.</td>
</tr>
<tr>
<td colspan="3">Resources: Steel wool, motor oil, water, glass jar, books, graph paper</td>
</tr>
<tr>
<td colspan="2">EXPANDED OPPORTUNITY:
Study about corrosion of iron using examples from everyday life.</td>
<td>Teacher Reflection: What improvement to be made for a more successful lesson</td>
</tr>
</table>

Activity 2: Record the observations

JAR	Were there any signs of rust?	When did you see the first signs of rust
A		
B		
C		
D		
E		

Activity 3: Answer the following questions.

1. Which factors promoted rust? /3/
2. What can you do to stop or minimize rust? /2/
3. Write down the chemical equation for the forming of rust./2/
4. Mention two differences in the conditions under which (a) magnetite and (b) rust are formed. /4/
5. Mention two other metals that can “rust” (oxidise) and two metals that do not rust at all or rust with difficulty. /4/
6. Write a paragraph on how rust (oxidation) can be prevented or minimised in the industry. /10/

Total: [25]

Grade: 9	**Learning Area: Natural Sciences**	
Strand: Life and Living		
Duration: Week 5	**Content in context: Maintenance of ecosystems**	
Integration: **Language:** LO 2 : Speaking LO 3: Reading **Mathematics**: LO 5: Data Handling AS: Design simple Questionnaires **Technology**: LO 1: Technological processes and skills		
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.	**Activity 1** Food chains and food webs The teacher explains the following terms: ➢ **Producers**: Plants use the energy in sunlight to make their own food. Plants store the energy in their leaves and stems. Plants are called primary producers in food	Learners record all information and notes in their notebooks.

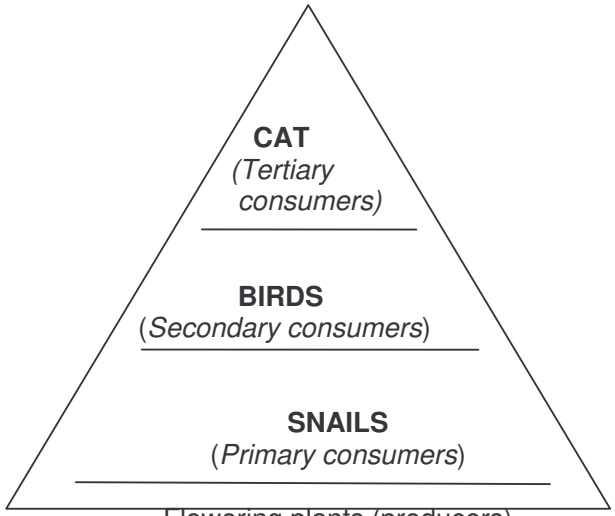
chain

Fig.1 : Green plants like this oak tree, are producers, because they can produce their own food from inorganic material

- **Consumers**
  - **Primary consumers:** Animals that eat plants are primary consumers.

Fig 2: A hippo grazing- eating grass (plants): primary consumer

	Secondary consumer: Animals that eat other animals are secondary consumers.  *Fig.3: A chameleon hunting insects. (secondary consumer)* ➢ **Predators:** Some animals that are high up on the food chain can kill larger animals.  *Fig.4: Hunting for Food. These lionesses feast on a buffalo they have hunted down at a game park in Kenya.*	Learners complete the table in activity 1(Definition of each term)

	Scavengers: Animals that eat dead creatures. **Decomposition:** Decomposers play important roles in some food webs. Micro-organisms (bacteria and fungi) are decomposers. Decomposers eat dead plants and animals and cause them to rot and decay. They also eat animal wastes. They break things down into chemical parts called nutrients. The nutrients go back into the soil. Plants take up water and nutrients to make food. Nutrients move through food webs over and over again. Bacteria and fungi, like slime mould, decompose (break down) dead plants and animals. This returns nutrients into the soil, helping plants grow and renewing the food chain. **Activity 2** The learners brainstorm around the terms: food chain and food web. Illustrate it on a chart and present it to the class. **Activity 3 : An example of a food pyramid**  	

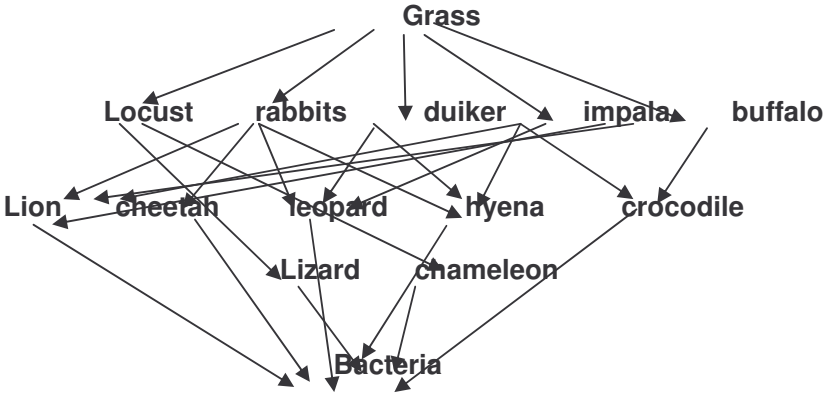
	Activity 3 Study the following organisms below and design a food web **List:** *Mouse, locust, rabbit, wheat, snake, frog, secretary-bird, jackal, decomposer, hawk, owl, decomposers, dragon-fly.*	
Resources: Charts, pictures, books		
EXPANDED OPPORTUNITY: Extra activities for enrichment or to consolidate information not properly understood.	**Teacher Reflection** What improvement to be made for a more successful lesson.	

What is a food chain?
A food chain is the way energy goes from one living organism to another through food. Plants are the first step in most food chains.
An example of a simple food chain

Grass (producers) → **wildebeest** (Primary consumer) → **lion** (secondary consumer) → **bacteria** (decomposers)

What is a food web?
A food web is made of many food chains in a community of plants and animals.
There are many tiny animals near the beginning of a food web.
There are fewer but larger animals higher up in a food web.

An example of a food web.



Activity 1: Definitions

TERM	DEFINITION	EXAMPLE
Predator		
Carnivore		
Omnivore		
photosynthesis		
decomposer		
herbivore		
Primary consumer		
Producer		
Secondary consumer		
Scavenger		

Grade: 9	**Learning Area: Natural Sciences**	
Strand: Life and Living		
Duration: Week 6	**Content in context:** Adaptation of different organisms in the ecosystem.	
Integration: **Language:** LO 2 : Speaking LO 3: Reading **Mathematics**: LO 5: Data Handling AS: Design simple Questionnaires **Technology**: LO 1: Technological processes and skills		
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.	**Activity: 1** The teacher explains the term adaptation with special reference to various habitats. For example: Adaptation of dentals, beaks, skulls claws, body cover on animals. *Teacher explanation.* The way in which plants and animals survive in that particular system or habitat. Learners are provided with a worksheet on adaptation of animals in different habitats. **Activity 2** Adaptation of plants Adaptation in terms of: roots, leaves, stems, barks, flowers, etc. Learners are provided with a worksheet on adaptation of plants.	**Assessment Task** Learners complete the worksheet provided. Learners' complete worksheet provided. **Informal Assessment Task** The learners will present their posters

	Activity 3: Learners must design a poster to show adaptation of a plant or animal. Provide the diagram with labels of adaptations	to the class. Class work Home work Class test.
Resources: Pictures, models, charts, posters, worksheets.		
EXPANDED OPPORTUNITY: Find adaptations of plants in various ecosystems	**Teacher Reflection** What improvement to be made for a more successful lesson.	