CONTENT OVERVIEW
GRADE 7

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 collects 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: *AS 1. Understands science as a human endeavour* *2. Understands sustainable use of the earth's resources*	**LO 3. Science, Society and Environment:** *AS 1. Understands science as a human endeavour* *2. Understands sustainable use of the earth's resources*	**LO 3. Science, Society and Environment:** *AS 1. Understands science as a human endeavour.* *2. Understands sustainable use of the earth's resources.*	**LO 3. Science, Society and Environment:** *AS 1. Understands science as a human endeavour* *2. Understands sustainable use of the earth's resources*
<u>Life and living</u> Different food types-proteins, fats, carbohydrates, minerals, vitamins, water. Absorption of food. Requirements for photosynthesis. Storage organs in plants-roots, stem, leaves.	<u>Life and living</u> Interaction in the environment-ecosystems-food chain, food web. Classification of animals-vertebrates and invertebrates-different classes & Characteristics	<u>Life and living</u> Cell-animal and plant cell - structure and functions. Life processes-breathing system, excretion-elimination of waste. Importance of water-kidney, skin, stomata.	<u>Life and living</u> Circulatory system-structure and functions. Reproduction in plants-pollination fertilization, fruits and seeds

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 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). Earth and beyond Solar system Celestial motion Phases of moon Eclipses Tides and phases of moon and eclipse.	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 Energy and change Atmosphere –layers of the atmosphere Atmospheric gases Properties of atmosphere at different elevations to protect earth from harmful radiations	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	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.

Grade: 7 Lesson: 1		Learning Area: Natural Sciences
Strand: Life and Living		
Duration: 2 weeks (weeks 1&2)		**Content : Cell-Animal and Plant cell**
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	**Teaching & Learning Activities**	**Details of assessment**
LO 1: SCIENTIFIC 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	**Activity: 1** Learners discuss in groups the different parts of a plant/the external structure of a plant. **Activity: 2** Teacher uses charts and pictures to introduce the concept- cell as a unit of life, explains what a cell is. **Activity: 3** Learners observe a prepared wet mount of a plant and an animal cell under the microscope and make drawings of plant and animal cells. **Activity: 4** Teacher use charts and drawings to explain the structure of plant and animal cell and the functions of plant and animal cell. **Activity: 5** Learners compare the plant and animal cell; write down the similarities and differences between plant and animal cells. **Resources: Charts, pictures, text books**	Draw diagrams of plant and animal cells. Make a model of a plant or an animal cell. Write down the similarities and differences between plant and animal cells. Describe the functions of plant and animal cell.

Cell is the basic unit of all life. All living things are made up of cells. Some organisms consist of only one cell. Plants and animals are made up of many cells. Most cells are so small they can be seen only with a microscope. Some one-celled organisms lead independent lives. Others live in loosely organized groups. The cells in plants and animals are specialists with particular jobs to do.. Muscle cells attached to your eyeballs are moving your eyes across the page. Nerve cells, muscle cells, and other specialized cells group together to form tissues, such as nerve tissue or muscle tissue. Different kinds of tissues form organs, such as the eyes, heart, and lungs. All the specialized cells together form you-or some other complete organism. All cells have some things in common, whether they are specialized cells or one-celled organisms. A cell is alive-as alive as you are. It "breathes," takes in food, and gets rid of wastes. It also grows and reproduces (creates its own kind). And, in time, it dies. A thin covering called a membrane encloses every cell. The complete contents of a cell are called the protoplasm. Most cells have a structure called the nucleus. The nucleus contains the cell's genetic program, the master plan that controls almost everything the cell does. The part of the protoplasm outside the nucleus is called the cytoplasm. Just as all living things are made up of cells, every new cell is produced from an existing cell. Cells reproduce by dividing, so that there are two cells where there once was only one cell. When a cell divides, each of the two newly produced cells gets a copy of the genetic program.

Shapes of cells. Cells may be shaped like boxes, coils, corkscrews, cubes, octopuses, rods, saucers, stars, or blobs of jelly. Many unicellular (one-celled) organisms look like tiny balls. They include some yeasts and certain algae. The ameba, another unicellular organism, has no particular shape at all. It is a flattened jellylike mass that changes its shape to move about. Bacteria are shaped like balls, rods, or coils. Diatoms are one-celled algae that occur in a wide range of shapes, including cubes, spheres, and pyramids. Most cells of multicellular (many-celled) plants are shaped like cubes or many-sided boxes. The greatest variety in cell shapes occurs in human beings and other multicellular animals. Animal cells may be spherical or flat-sided, or they may have other shapes. Some muscle cells are long, thin, and pointed at each end. Some nerve cells, with their long branches, resemble trees.

A cell's shape is related to its needs or to the job it does. For example, the long, thin muscle cells can contract to do work. The long, many-branched nerve cells relay messages throughout the body.

Cells differ greatly in size, in shape, and in the special jobs they do. But all cells have certain features, and each cell can be thought of as a tiny chemical factory. It has a control centre that tells it what to do and when. It has power plants for generating the energy it needs to function, and it has machinery for making its products or performing its services.

A thin covering called the **cell membrane** or plasma membrane encloses the cell and regulates substances that pass through it. Membranes consist of a double layer of fatty substance called phospholipids. Outside the membrane, many cells have a special covering that helps protect them or hold them to neighbouring cells. In plant cells, this covering is called the cell wall.

Within the cell membrane, all cells except bacteria have two main parts: (1) the nucleus and (2) the cytoplasm. Cells with a nucleus are called eukaryotic, which means having a true nucleus. All multicellular animals and plants consist of eukaryotic cells, as do the fungi and such unicellular organisms as amoebas and diatoms. Bacteria cells lack a nucleus. They are called prokaryotic, which means before the nucleus.

The nucleus is the control centre that directs the activities of the cell. A nuclear membrane surrounds the nucleus and separates it from the cytoplasm. The nucleus contains two important types of structures, chromosomes and nucleoli.

Chromosomes are long, threadlike strands of a substance called chromatin. Chromatin consists of DNA and certain proteins. DNA makes up the genes, the basic units of heredity. Genes control the passing on of characteristics from parents to offspring. Each gene consists of part of a DNA molecule. The chemical structure of the DNA that makes up the genes determines that a dog will give birth to a dog instead of a fish or some other organism. This chemical structure determines your blood type, the colour of your eyes, the texture of your hair, and thousands of other characteristics.

Nucleoli are round bodies that form in certain regions of specific chromosomes. Each nucleus may contain one or more nucleoli, though some cells have none. Nucleoli help in the formation of ribosomes, the cell's centres of protein production. Nucleoli are made up of proteins and RNA (ribonucleic acid). RNA is chemically similar to DNA and plays important roles in making proteins.

The **cytoplasm** is all the material enclosed by the cell membrane, except for the nucleus. Thus, in prokaryotes, which do not have a nucleus, the cytoplasm includes everything inside the cell membrane. The cytoplasm of all cells contains ribosomes. Proteins manufactured on ribosome make it possible for the cell to grow, repair itself, and perform the thousands of chemical operations that are required during the cell's lifetime.

The cytoplasm of eukaryotic cells also contains many other small structures called organelles. Each organelle has a particular job to do. The organelles include the mitochondria, endoplasmic reticulum, and Golgi complex. Some cells have other organelles, such as lysosomes, vacuoles, or chloroplasts.

Mitochondria are the power plants of the cell. A cell may contain hundreds or even thousands of mitochondria. These structures convert the

chemical energy contained in food into a form of energy the cell can use to grow, divide, and do its work.

The endoplasmic reticulum is a complex network of membranes. This network forms a system of pouches that store proteins and help channel substances to various parts of the cell. Some parts of the endoplasmic reticulum have a smooth surface. Other parts of the membrane have many ribosomes attached to their surface. Many of the cell's proteins are made on these ribosomes.

The Golgi complex, also known as the Golgi apparatus, consists of a stack of flat membrane sacs. These sacs process proteins and other substances produced in the cell.

Lysosomes are round bodies containing enzymes that can break down many substances. For example, lysosomes inside white blood cells can destroy harmful bacteria. In plant cells and certain unicellular organisms, large, fluid-filled vacuoles usually perform the same function as lysosomes. In some plant cells, a single vacuole can take up most of the space in the cytoplasm.

Chloroplasts are organelles found in the cells of plants and algae. They contain a green substance called chlorophyll. During a process called photosynthesis, chlorophyll captures the energy of sunlight. Chloroplasts then use this energy to make sugars that are rich in chemical energy . All living things directly or indirectly depend on these sugars for the energy to make all the other chemical substances in cells. For example, animals get energy by eating plants or by eating animals that have eaten plants.

Grade: 7 Lesson: 2		Learning Area: Natural Sciences
Strand: LIFE AND LIVING		
Duration: 2 weeks (weeks 3&4)	**Content : Life processes- Breathing system**	
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	**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: **AS:** Categorizes information: **AS:** Interprets information **AS:** Applies knowledge	**Activity: 1** Learners brainstorm the characteristics of living things (breathe, excrete, eat, grow, reproduce, die, rot, feel) **Activity: 2** Teacher probes the learners' understanding of breathing. Teacher uses a chart with different organs of the breathing system to explain the organs and their functions.(see annexure) Teacher explains the breathing process –inhale and exhale. **Activity: 3** Learners make a model of the breathing system.	Make a drawing of the breathing system and label the parts. Describe the process of breathing. Make a model of the lungs.

L O 3: SCIENCE, SOCIETY AND THE ENVIRONMENT **AS:** Understands science as a human endeavour. AS: Understands sustainable use of the earth's resources	**Activity: 4** Learners identify the different parts of the breathing system. Describes the function of the different parts. **Activity: 5** Learners investigate the health hazards of smoking, how it affects the breathing system. Learners make a presentation on the harmful effects of smoking.	Description of the functions of the different parts. Oral presentation.
Resources: Charts, pictures, models, books, newspapers		
EXPANDED OPPORTUNITY: Research on different types of lung diseases.	**Teacher Reflection** What improvement to be made for a more successful lesson……	
Lung is the breathing organ of mammals, birds, and reptiles. Most adult amphibians also have lungs. The main job of the lungs is to exchange gases. As blood flows through the lungs, it picks up oxygen from the air and releases carbon dioxide. The body needs oxygen to obtain energy from food, and it produces carbon dioxide as a waste product. Human beings have two lungs--a left lung and a right lung--which fill up most of the chest cavity. A lung has a spongy texture and may be thought of as an elastic bag filled with millions of tiny air chambers called alveoli. If the walls of the alveoli could be spread out flat, they would cover about half a tennis court. The somewhat bullet-shaped lungs are suspended within the ribcage. They extend from just above the first rib down to the diaphragm, a muscular sheet that separates the chest cavity from the abdomen. A thin, tough membrane called the visceral pleura covers the outer surface of the lungs. The heart, large blood vessels, and esophagus (the tube connecting the		

mouth and stomach) lie between the two lungs.

The lungs are designed to receive air, which enters the body through the mouth or nose. The air passes through the pharynx (back of the nose and mouth) and the larynx (voice box) and enters the bronchial tree--a system of tubes that leads to the alveoli. The largest of these tubes is the trachea (windpipe), which divides into two smaller tubes called bronchi. Each bronchus leads to one lung. Within the lung, the bronchus divides further into smaller and smaller tubes, much as a tree limb divides into branches and twigs. The final "twigs" are tiny tubes called bronchioles. The smallest bronchioles, called terminal bronchioles, lead to the respiratory units of the lung. The respiratory units are made up of many alveolar ducts. Each duct supplies about 20 alveoli. The very thin walls of each alveolus contain networks of extremely small blood vessels called pulmonary capillaries. Gas is exchanged between the blood in these capillaries and the gas in the alveoli. Three to five terminal bronchioles and the alveoli that they supply with air form a lobule. Many lobules unite to form the major subdivisions of the lung, called lobes. The left lung has two lobes, and the right lung has three. Each lobe has its own branches of bronchi and blood vessels, so a diseased lobe may be removed without sacrificing the usefulness of the other lobes. Blood reaches the lung through two routes. Almost all of the blood comes through the pulmonary circulation. This blood has already circulated through the body tissues, where it has given up oxygen and picked up carbon dioxide. A small amount of blood reaches the lungs through the bronchial circulation. This blood is rich in the oxygen and nutrients that the airway tissues--like all other body tissues--need.

Gas exchange in the lungs. To supply oxygen to the blood and remove carbon dioxide from it, the lungs need to draw in fresh gas and expel stale gas. Fresh gas is drawn in when the diaphragm and other muscles in the chest wall contract. This action--called inspiration or inhalation--makes the chest volume larger and causes the lungs to expand. The expansion lowers the pressure in the lungs, and air from the atmosphere flows in. When the muscles relax, the lungs return to a smaller volume, and gas flows out into the atmosphere. This action is called expiration or exhalation. Blood entering the lungs through the pulmonary circulation is dark-coloured, low in oxygen, and high in carbon dioxide. It is pumped by the right side of the heart into the pulmonary arteries, which lead to the lungs. The pulmonary arteries divide into smaller and smaller blood vessels, ending with pulmonary capillaries in the walls of the alveoli. The alveolar walls are so thin that oxygen and carbon dioxide move through them easily. Oxygen passes from the alveoli to the blood in the capillaries. At the same time, carbon dioxide leaves the blood and enters the alveoli. As this exchange takes place, the blood becomes bright red. It then enters the pulmonary venous system. In this system, small vessels join to form larger vessels. The largest vessels, the pulmonary veins, carry blood to the left side of the heart. The oxygen-rich blood is then pumped by the left side of the heart back to the body tissues.

Other jobs of the lungs. Because the lungs must inhale the air from the environment, they are exposed to bacteria, viruses, dust, and pollutants that are mixed with the air. A sticky fluid called mucus lines the airways and traps most of these foreign substances. Tiny, hair like structures called cilia move together in a wavelike manner that pushes the mucus upward into the throat. There, the mucus and its trapped "invaders" are coughed up or harmlessly swallowed. Some substances do not get caught in the mucus and thus enter the alveoli. There, special cells called alveolar macrophages engulf the particles and, in most cases, destroy them. The lungs also help clean the blood of certain harmful substances. Blood flowing through the capillaries of the lung is filtered so that particles such as blood clots and fat globules are removed. Special cells and enzymes then break up and remove the trapped material. Because lung diseases can result from many different causes, they are usually grouped by how they affect lung functions. Obstructive lung diseases, such as emphysema, asthma, and chronic bronchitis, cause the airways to become partly blocked or narrower, making it more difficult for air to move through them. Cigarette smoking and air pollution are major causes of these diseases. Restrictive lung diseases make it harder for the respiratory system to expand. They can cause a stiffening of the lung or chest wall or make the respiratory muscles unable to respond to nerve signals from the brain. Breathing substances such as asbestos, silica, and coal dust can cause some types of restrictive disease. Pulmonary vascular diseases affect the circulation of blood in the lungs. For example, in pulmonary hypertension, the small blood vessels of the lung become narrower, making it difficult for the right side of the heart to pump blood. Some diseases are difficult to categorize because they can harm the lungs in a number of ways. Some pollutants--particularly cigarette smoke--affect the cilia, causing the upward movement of mucus to slow or stop. Smoking cigarettes is also a major cause of lung cancer. Infectious lung diseases, such as tuberculosis and pneumonia, are caused by bacteria, viruses, or other organisms.

Grade: 7 Lesson: 3		Learning Area: Natural Sciences
Strand: Life and Living		
Duration: 1 week (week 5)	**Content : Excretion**	
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	**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: **AS:** Categorizes information: **AS:** Interprets information **AS:** Applies knowledge **L O 3: SCIENCE, SOCIETY AND THE ENVIRONMENT**	**Activity: 1** Teacher poses questions about the body waste products and the organs responsible for the waste products. Learners discuss the different organs involved in the process of excretion. Write notes on excretory products in humans. **Activity: 2** Teacher displays a chart of the organs of excretion and the learners, using flash cards, labelling these organs. Teacher explains the process of excretion in humans. **Activity: 3** Learners explore the life processes involved in plants viz. photosynthesis, respiration and transpiration.	Compare life processes in plants and animals. Research on the functions of excretory organs in plants and animals. Write notes on the importance of water in the process of excretion Draw labelled diagrams of the different organs responsible for excretion in plants and animals.

AS: Understands science as a human endeavour. AS: Understands sustainable use of the earth's resources	**Activity: 4** Teacher explains the process of elimination of waste through different organs in plants and animals. E.g. kidney, skin in humans and stomata in plants. • Kidney eliminating excess water and minerals as urine in humans • Skin eliminating excess water and salt in the form of sweat in humans • Plants give out excess water and carbon dioxide through the stomata. **Activity: 5** Teacher draws learners' attention to the importance of water as a medium of excretion and transportation. Learners discuss the importance of water in plants and animals Write notes on the importance of water as a medium for excretion and transportation.	
Resources: Charts, pictures, books, models		
EXPANDED OPPORTUNITY: Make a poster showing the importance of water as a medium for excretion and transportation.	**Teacher Reflection** What improvement to be made for a more successful lesson…….	

Kidney is a complex organ in human beings and all other vertebrates. The two kidneys perform many vital functions, of which the most important is the production of urine. This fluid carries various waste materials out of the body. If the kidneys fail to function, poisons build up in the body, eventually causing death. The kidneys look like purplish-brown kidney beans and are about the size of an adult's fist. They lie below the middle of the back on each side of the spine. The right kidney, located under the liver, is a little lower than the left one. Some people are born with only one kidney. However, they are able to lead a normal life.

How the kidneys produce urine. Human kidneys consist of three layers. These layers are, in order, the cortex on the outside of the organ, the medulla, and the pelvis. Blood flows into the medulla through the renal artery. In the medulla and cortex, the renal artery branches into increasingly smaller arteries. Each of these arteries ends in a blood filtration unit called a nephron. Two healthy kidneys contain a total of about 2 million nephrons, which filter about 500 gallons (1900 litres) of blood daily.

Other functions of the kidneys. In addition to producing urine, the kidneys secrete a hormone called erythropoietin, which controls the production of red blood cells. The kidneys convert vitamin D from an inactive to an active form. The active form is essential for normal bone development. The kidneys also help maintain the blood pressure of the body by releasing an enzyme called rennin (see HYPERTENSION (Causes)).

Kidney diseases. If one kidney is lost in an accident or by disease, the other may enlarge and do the work of both. But if both kidneys are damaged or lost, waste materials accumulate in the body, causing death.

The kidneys also can be damaged by antibodies produced to fight bacteria or viruses elsewhere in the body. Such reactions lead to inflammation of the glomerulus. This type of inflammation is called glomerulonephritis, formerly known as Bright's disease.

Long-term or severe high blood pressure can seriously damage the kidneys, as can diabetes. Cysts, kidney stones, and tumours may block the flow of urine. The blocked urine can damage the kidneys by exerting pressure upon them, or it may lead to pyelonephritis. Kidney disorders may also result from birth defects, injuries, or poisoning, or as a side effect of certain medications.

Many people who have lost their kidneys or have suffered kidney damage are kept alive by a dialysis machine. A tube connects this machine to an artery in the patient's arm. Blood flows into the machine, which removes wastes. Another tube carries the blood back into a vein in the arm. Patients generally undergo this process, called haemodialysis, for several hours, three times a week.

Other kidney patients have their diseased kidneys replaced with healthy ones in a kidney transplant. A replacement organ from a close relative is desirable because it closely matches the patient's tissues. But most replacement organs come from unrelated individuals who have died in accidents or from other causes. The patient's body always attempts to reject these "foreign" organs. However, modern medicines are usually able to control the rejection process and protect the transplanted kidney.

Grade: 7 Lesson: 4	Learning Area: Natural Sciences
Strand: MATTER AND MATERIALS	
Duration: 1 week (week 6)	**Content: Origin of raw materials.**

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	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: **AS:** Categorizes information: **AS:** Interprets information **AS:** Applies knowledge **L O 3: SCIENCE, SOCIETY AND THE ENVIRONMENT** **AS:** Understands science as a human endeavour.	**Activity: 1** Teacher explains the origin of raw materials. Give examples.	**Assignment /Translation** Flow diagram of refining crude oil Investigate how fractional distillation takes place. Research on extraction of at least two metals from its raw material. • Name of provinces

Substances	Properties and uses	Mining and processing
Copper	Good electrical conductors, soft and easy to shape, to make electric wires, water and gas pipes.	Mined in opencast and underground mines. Copper ore is heated and then refined using electrolysis.
Lead	Soft and easy to shape, melts at a low temperature than most metals. Used in car batteries. Added to make petrol fuel burn better in car engines. Used to make bullets and in paints and chemicals.	Mined in opencast mines. Found in ores together with zinc and also copper. Ore is first heated and then smelted with coke in a blast furnace to get pure lead metal.
Platinum	Valuable precious metal. Used for jewellery and in car exhausts to reduce pollution	Mined in underground mines. Crushed ores are smelted and then refined.
Zinc	Does not breakdown easily.	Mined in opencast and

<table>
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<td>AS: Understands sustainable use of the earth's resources</td>
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<tr><td></td><td>Used to cover steel to prevent rusting, also in dry cells and batteries for radios, torches.</td><td>underground mines. Zinc ore is smelted with coke to get zinc metal.</td></tr>
<tr><td>Asbestos</td><td>Long strong fibres. Does not burn and it is a good insulator Fibres are mixed with cement to make fibre cement building materials e.g. roof sheets, large water pipes etc</td><td>Mined in open cast mines Ore is broken up to release the fibre.</td></tr>
<tr><td>Silicon</td><td>Second most abundant material in the earth. It forms a compound with oxygen called silica used to make glass</td><td>Silica is mined in opencast mines, found as fine sand which is crushed to use.</td></tr>
<tr><td>Granite</td><td>Hard beautiful stones used for buildings</td><td>Mined in quarries, cut into blocks and sliced into thin sheets and polished.</td></tr>
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Learners discuss the meaning and examples of raw and refined materials.

The teacher explains how iron is extracted from iron ore, petrol from crude oil, etc.
Learners categorise materials into raw and refined materials (crude oil, iron ore, sugar, candle, petrol, plastic, sugar cane etc)
Groups are given examples of raw material(s) and are requested to investigate the process of refining the material(s) into final products.
</td>
<td>
• Uses
• The processes

Design and draw a flow chart to explain the refining of crude oil to get petrol and other useful substances.
• Get information about the processes involved
• Identify all the substances that is used
• Give a title
• Use arrows to link the processes in the correct order
• Use boxes and arrows to show how one step leads to the next
• Present your flow chart.
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<tr><td colspan="3">Resources: Charts, pictures, books, models, Water, Methylated Spirits, Thermometer, Conical flask, Tripod stand, Wire gauze Spirit lamp/Bunsen burner, Beaker</td></tr>
<tr><td colspan="2">EXPANDED OPPORTUNITY: Research on the extraction of precious metals in SA.</td><td>Teacher Reflection: What improvement to be made for a more successful lesson</td></tr>
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Grade: 7 Lesson: 5		Learning Area: Natural Sciences
Strand: MATTER AND MATERIALS		
Duration: 1 week (week 7)	**Content: Radiation(Dark coloured and light coloured substances)**	
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	**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: **AS:** Categorizes information: **AS:** Interprets information **AS:** Applies knowledge	**Activity: 1** Teacher ask learners to stand outside in the sun for few minutes and describe how they feel, ask why people stand in the sun when it is cold etc Teacher select learners with light coloured and dark coloured clothes to describe how they felt while standing in the sun. Conduct an investigation to find out which objects radiate heat more (dark-coloured or shiny light-coloured objects). **Activity: 2** Learners use different coloured objects to determine which colours will absorb or reflect heat- different types of clothes, coloured papers, foil paper, different types of pots or pans etc. **Activity: 3** Teacher explains the term radiation. As solar radiation strikes the surface of a material three things can happen> The radiation can be reflected, absorbed and transmitted. Solar radiation absorbed by a substance is converted to thermal energy (heat energy).	Investigation on radiation in different surfaces- Conduct an investigation to find out which objects (dark-coloured or light coloured surfaces) get hotter faster when exposed to a radiating source.

	This heat can be used to cook food, to boil water.	
L O 3: SCIENCE, SOCIETY AND THE ENVIRONMENT **AS:** Understands science as a human endeavour. AS: Understands sustainable use of the earth's resources	**Activity: 4** The teacher supplies learners with a shinny tin, a black painted tin, two thermometers and a stopwatch. Each thermometer is placed into each tin and the tins are put outside and orientated such that they receive the equal amount of heat from the sun. Learners complete worksheets recording, at intervals, the temperature readings in each of the containers. Learners present the information graphically: temperature versus time. **Activity: 5** Teacher explains that dark coloured substances absorb more heat than white coloured substances.	Completion of worksheet. Drawing of graph.
Resources: Black painted and shinny similar tins, Thermometers, Stop watch, Ruler, Graph papers		
EXPANDED OPPORTUNITY: Investigate the use of solar energy in everyday life. Invent a device/resource hat will effectively use solar radiation to generate thermal (heat) energy.	**Teacher Reflection** What improvement to be made for a more successful lesson…….	

Grade: 7 Lesson: 6		**Learning Area: Natural Sciences**
Strand: MATTER AND MATERIALS		
Duration: 1 week (week 8)	**Content : Conductors and insulators**	
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	**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: **AS:** Categorizes information: **AS:** Interprets information **AS:** Applies knowledge **L O 3: SCIENCE, SOCIETY AND THE ENVIRONMENT** **AS:** Understands science as a human endeavour.	**Activity:1** Learners bring materials like steel nails, iron nails, tin lids, aluminium cup, copper wire, teaspoons, forks, knives, wood, glass, plastic, cork, wool, water, brick etc to identify good conductors and insulators. **Activity: 2** Teacher explains what are conductors and insulators. Teacher demonstrates a simple circuit with its components (a cell, a switch, light bulb and connectors. **Activity: 3** Teacher provides each group with the similar circuit components to connect and let them close the switch. • Learners record their observations. • Teacher instructs learners to connect each of the materials they brought in the simple circuits and observe and record your results in a table. Learners sort the materials they have collected into **conductors** and **insulators.**	Identify and explain conductors and insulators. Test different materials like graphite rod, glass rod, plastic, asbestos, cotton, rubber, porcelain etc and group them into conductors and insulators in the form of a table, entering each material under the appropriate heading.

AS: Understands sustainable use of the earth's resources		
Resources: Cell, a switch, light bulb, connectors, steel wool, cotton, thread, steel nails, iron nails, tin lids, aluminium cup, copper wire, teaspoons, forks, knives ,wood, glass, plastic, cork, wool, water, brick etc		
EXPANDED OPPORTUNITY: Learn about the use of conductors and insulators.	**Teacher Reflection** What improvement to be made for a more successful lesson.	

Categorise the materials into conductors and insulators.

Record your finding in the table given below.

Material	**Conductor**	**Insulator**
1. Wood 2. Nail 3. Glass 4. Copper 5. Cardboard 6. Rubber 7. Plastic		

Grade: 7 Lesson: 7		Learning Area: Natural Sciences
Strand: MATTER AND MATERIALS		
Duration: 1 week (week 9)		**Content: Resistors**
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	**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: **AS:** Categorizes information: **AS**: Interprets information **AS:** Applies knowledge	**Activity: 1** The teacher provides learners in groups with a simple circuit and 2 additional light bulbs then demonstrate how to connect the second bulb (in series) into the circuit. Learners predict what will happen. Learners make connections, observe, compare their prediction with their observation and record the result. Learners repeat the same process with the third light bulb and record their findings. Learners come to the conclusion that more light bulbs in series decrease the light intensity of the light bulb	Draw diagrams on series connections and write short notes and explain resistors.
L O 3: SCIENCE, SOCIETY AND THE ENVIRONMENT **AS:** Understands science as a human endeavour. AS: Understands sustainable use of	**Activity: 2** The teacher explains that all conductors are resistors but some are more resistant that others. The opposition that a metal wire, conductor or light bulb offers to the flow of charge, is called the resistance of the	Investigate the effect of one, and two, three resistors (or light bulbs) in series on the current.

the earth's resources	wire, conductor or light bulb. A substance that offers resistance to the flow of an electric current, such as a wire, is called a resistor. A light bulb also offers resistance to the current and is therefore a resistor.	
Resources: Torch cells, Connectors, Light bulbs, Switches, Insulators and conductors		
EXPANDED OPPORTUNITY: Identify different resistors.	**Teacher Reflection** What improvement to be made for a more successful lesson.	

Worksheet: 1

To investigate the effect of one, two, and three resistors (or light bulbs) in series on the current.

- Connect three cells which are connected in series, in series with a light bulb and an ammeter (An ammeter measures the amount of electric charge that goes past a point in every second).
- Read the current strength on the ammeter.
- Add a second light bulb in series with the first
- Once again read the current strength on the ammeter
- Add a third light bulb in series with the previous two.
- Read the current strength on the ammeter.
  1. The current with one light bulb=…A
  2. The current with two light bulbs=…A
  3. The current with three light bulbs=...A
- What is your conclusion?
- Is the current strength in the circuit greater or smaller as the resistance increases? Draw a circuit diagram.

Worksheet: 2

Connecting resistors in parallel.

- Is the amount of current the same everywhere in a parallel circuit?
- Connect three cells which are connected in series, in series with a light bulb and an ammeter.
- Read the current strength on the ammeter.
- Add a second light bulb in parallel with the first
- Once again read the current strength on the ammeter
- Add a third light bulb in parallel with the previous two.
- Read the current strength on the ammeter.

Record your measurements in the table.

Number of bulbs in parallel	Current in the circuit(in Amperes)
One	
Two	
Three	

- What is your conclusion?
- Is the current strength in the circuit greater or smaller as the resistance increases?
- In what way did the total current in the circuit **change** when you **increased** the number of bulbs in parallel?
- Draw a circuit diagram.

Grade: 7 Lesson: 8		**Learning Area: Natural Sciences**
Strand: MATTER AND MATERIALS		
Duration: 1 week (week 10)		**Content: Pure substances and mixtures**
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	**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: **AS:** Categorizes information: **AS:** Interprets information **AS:** Applies knowledge **L O 3: SCIENCE, SOCIETY AND THE ENVIRONMENT**	**Activity: 1** Discusses pure substances (substances that cannot be broken into smaller substances by physical means and mixtures (substances that can be separated into their components by physical means e.g. sodium chloride solution, mixture of soil and water, sulphur and iron filings, mixture of different colours) **Activity: 2** The teacher demonstrates: separation of mixtures using magnetic properties, (e. g. copper and nickel coins, observe what happens when you bring a strong magnet into contact with them) Learners in groups do the different experiments to separate mixtures. Write down the observation in their books. Filtration: Separation of mixtures by means of differences in solubility, e.g. separation of table salt and sulphur. Distillation: separation of table salt solution into table salt and water.	Investigate how filter-beds work in the purification of drinking water and write a report on your findings. Identify examples of filtration processes that are used in everyday life to separate mixtures.

AS: Understands science as a human endeavour. AS: Understands sustainable use of the earth's resources	Fractional distillation(two liquids like water and alcohol which mix – based on the difference in boiling points), etc Learners present their observations	
Resources: Water, table salt, soil, magnets. Coins, copper, sulphur.		
EXPANDED OPPORTUNITY: Investigate the application of fractional distillation in industry like SASOL.	**Teacher Reflection** What improvement to be made for a more successful lesson.	

Grade: 7 Lesson: 9		Learning Area: Natural Sciences
Strand: ENERGY AND CHANGE		
Duration: 1 hour (week 11)	**Content : Wood as a source of energy and its renewability**	
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	**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: **AS:** Categorizes information: **AS:** Interprets information **AS:** Applies knowledge **L O 3: SCIENCE, SOCIETY AND THE ENVIRONMENT** **AS:** Understands science as a human endeavour.	**Activity:1** The teacher asks learners about ways in which people use natural resources, what sources of energy they use for cooking. **Activity: 2** Learners visit households to find out what source of energy the community use. **Activity: 3** Learners read through the case study and extract the information from the case study on: sources of wood, types of wood (indigenous and alien), and functions of wood and sustainable use of wood. **Activity: 4** Teacher explains wood as a source of energy. Explain the concepts of reforestation and sustainable use of resources. **Activity: 5** Write a report on how people suffer when habitats are destroyed.	Investigate how to sustain non-renewable sources such as wood. Debate on deforestation that leads to turning forest into deserts and the effect of global warming

AS: Understands sustainable use of the earth's resources		

Resources: Charts, pictures, newspaper cuttings, magazines, books	
EXPANDED OPPORTUNITY: Explain the difference between deforestation and reforestation. Name the regions where these occurs.	**Teacher Reflection** What improvement to be made for a more successful lesson.

Deforestation

Human activities have had tremendous impact on modern forests. Large forest areas have been cleared for farms and cities. The destruction and degrading of forests is called deforestation. Severe deforestation now occurs around the world, even in the most remote rain forests and boreal forests. Industrial pollution is a chief cause of deforestation. Factories often release poisonous gases into the air and dangerous wastes into lakes and rivers. Air pollutants may combine with rain or other precipitation and fall to earth as acid rain. Acid rain and polluted bodies of water can restrict plant growth or even kill most plants in a forest. Massive deforestation has made many remaining forest tracts small, isolated islands. As forests become smaller, their ability to sustain the full variety of plant species decreases. Many forests are so seriously degraded by logging activities that they fail to regenerate replacement forests. Loss of forests has helped create many ecological problems. For example, rain water normally trapped by the forests is causing more floods around the world. In addition, as forest areas decrease or degrade, the production of oxygen from photosynthesis also decreases. Oxygen renewal is vital to the survival of oxygen-breathing organisms. At the same time, as less carbon dioxide is taken up by photosynthesis, the amounts of carbon dioxide released into the air increases. Thus more heat from the sun is trapped near the earth's surface instead of being reflected back into space. Many scientists believe that this greenhouse effect is causing a steady warming that could lead to threatening climatic conditions. The destruction of forest ecosystems also destroys the habitats of many living creatures. Countless species of animals and plants have been wiped out by deforestation, and more are killed each year at an increasing rate. To combat these problems, people and governments have been seeking out and protecting old growth forests that remain undisturbed by humans. Such protection enables scientists to conduct long-term research on how old growth forests sustain the variety of plants and animals that live there.

1. Read the extract and make a summary of the importance of protecting our forests.

2. Debate on the importance of reforestation.

Grade: 7 Lesson: 10		Learning Area: Natural Sciences
Strand: PLANET EARTH AND BEYOND		
Duration: 1 hour 30min (week 11)	**Content: Mining in different provinces& significance of mining to man.**	
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	**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: **AS:** Categorizes information: **AS:** Interprets information **AS:** Applies knowledge **L O 3: SCIENCE, SOCIETY AND THE ENVIRONMENT** **AS:** Understands science as a human endeavour. AS: Understands sustainable use of the earth's resources	**Activity: 1** Use the map of South Africa to locate the mining industries in various provinces. **Activity**: 2 Learners identify the mineral resources, oil and coal that are mined. Learners find out how the African warriors extracted minerals and used them to make weapons and ornaments. **Activity: 3** Teacher supplies the learners with a case study, from which to compare the indigenous and modernised mining processes. **Activity: 4** From the case study, learners classify the minerals according to their values and uses. Learners investigate why certain minerals are more valuable economically than others. **Activity: 5** Learners debate on the negative and positive impacts of minerals and extraction of minerals to man.	Write notes on mining in South Africa. Make a list of the mineral resources that are mined. Name the provinces that have got the most mines. Debate on the impact of mining on the environment. Make a written presentation on the impact of mining on the health of miners. Make a presentation on mining and its effect on economy and social life.
Resources: Books, Physical map of S.A. Charts ,newspaper, magazines, etc		

CONTENT 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 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 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 Lesson: 1		Learning Area: Natural Sciences
Strand: Life and Living		
Duration: 3 weeks (weeks 1, 2 & 3)	**Content: Animal behaviour-patterns-feeding, reproduction, competition, predation, balance of the ecosystem, decomposition and taking care of the environment- plants, vegetables and medicinal plants.**	
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**	**Activity: 1** Learners discuss behaviour patterns of various animals.e.g domestic animals, birds. Learners go on a field-trip to a game park, e.g. Addo Elephant Park and find out the following: ➢ Animal behaviour ➢ Feeding patterns ➢ Conservation Discuss the feeding pattern and conservation of wild animals in Game parks. Collect information on feeding patterns. Write a written report on feeding habits. **Activity: 2** The learners will research medicinal plants and their uses	Investigate different ecosystems. Observe animal behaviour. Identify predators in an ecosystem. Learners complete an observation sheet Posters to be presented and consolidation is done in the form of a worksheet.

THE ENVIRONMENT **AS:** Understands science and technology in the context of history and indigenous knowledge.	for different aliments. Talk to elders in the community to find out the use of locals plants used as medicines-e.g. aloe for stomach problems, umhlonyana for flu, impepho used as incenses etc They will make a poster to illustrate this. Teacher discusses the importance of medicinal plants and indigenous knowledge. **Activity 3:** Teacher explains how animals and plants interact in the ecosystem. Learners will complete an assignment on relationships of organisms Terms explained and examples were given: ➢ Mutualism ➢ Commensalism ➢ Parasitism ➢ Predation ➢ Competition ➢ Migration ➢ Decomposition **Activity 3:** Research on one example of a predator and a migratory bird and make a written presentation.	Learners complete an assignment on relationships of organisms. Learners will hand in a research project on the traditional use of medicinal plants -where do you find the plant. Its habitat, how it look like, a description of the pant, the plant part that is used for medicine, its effect/importance, How do we grow the plant? Hand in a written report and do an oral presentation.
EXPANDED OPPORTUNITY: Study the relationships existing in various ecosystems.	**Teacher Reflection** What improvement to be made for a more successful lesson.	

Grade: 8 Lesson: 2	Learning Area: Natural Sciences	
Strand: MATTER AND MATERIALS		
Duration: 2weeks (week 4&5)	**Content : Gases-oxygen, nitrogen, hydrogen-reactions with other elements, chemical equations**	
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	**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: **AS:** Categorizes information: **L O 3: SCIENCE, SOCIETY AND THE ENVIRONMENT** **AS:** Understands science and technology in the context of history	**Activity: 1** Learners identify different types of gases in the atmosphere. Learners use the periodic table to find out the arrangement of elements in the periodic table. Teacher introduces elements in the Periodic Table and helps the learners to identify the gases-Oxygen, nitrogen, hydrogen, etc. **Activity: 2** **Preparation of gases** Teacher demonstrates and explains the preparation of oxygen. By heating a mixture of potassium chlorate and manganese dioxide in the ratio 4 to 1 in a hard-glass test tube or by heating potassium permanganate. Preparation of hydrogen is explained/demonstrated using zinc granules and dilute sulphuric acid **Activity: 3- Chemical reactions** During **chemical reactions** one or both of the following changes	Assignment: Describe the preparation of oxygen and hydrogen as observed. Write chemical reactions using word equations. Learners balance chemical equations on a worksheet.

and indigenous knowledge.	happen: joined atoms can break apart. Atoms can join together in new ways. This will form new molecules or new ions. This breaking apart and joining together of atoms forms new substances. **For example**: hydrogen molecules must break apart to form separate atoms. Oxygen molecules must break apart to form separate atoms. **Water** molecule form when two hydrogen atoms join to each oxygen atom. The substances that react together in a chemical reaction are called reactants and the new substances formed in a chemical reaction are called products. Oxygen and hydrogen are reactants and water is the product of this reaction. We use **word equations** to show chemical reactions. A word equation is a way of writing down a chemical change using words together with plus signs and arrows. 1. The reaction between hydrogen and oxygen can be written as follows:- **Hydrogen+oxygen⟶water** 2. Combustion as reaction with oxygen-do experiments by burning substances in air and in oxygen; compare the burning of candle in pure oxygen and in air. 3. Investigate the combustion of hydrogen in oxygen(Hydrogen combines with oxygen to form water) 4. Investigate the combustion of carbon (charcoal), sulphur, magnesium and iron (steel wool) in oxygen. Burn these metals in oxygen and write down the observations. **Activity: 4** Learners write word equations showing reactions of the following	Written Test

	gases with other elements: ➢ Oxygen ➢ Hydrogen ➢ Nitrogen **Activity: 5** Learners are shown how to write equations using symbols. Teacher explains how to balance chemical equations. Examples: $2H_2$ + O_2 ---------→ $2\ H_2O$ N_2 + $6\ H$ ---------→ $2\ NH_3$ Learners are told that the number in front of the element/molecule/compound is used to balance the equation. The numbers in lower case cannot change to balance the chemical equation. **<u>WORKSHEET: Reactions of Oxygen with Metals</u>**. The learners replace the words with the correct symbols using the Periodic table and balance the chemical equations. A: Potassium + Oxygen -----→ Potassium oxide ……. + ……. ----------→ ……... B: Sodium + Oxygen --------→ Sodium oxide …… + …….. ----------→ …….. C: Calcium + Oxygen ----------→ Calcium oxide …… + ……. ----------→ …….. D: Magnesium + Oxygen ----------→ Magnesium oxide	

	….. + …… ----------→ …… E: Iron + Oxygen ----------→ Iron(II) oxide ……. + ……. ----------→ …… **Activity 2: Class Test**	
Resources: Science kit		
EXPANDED OPPORTUNITY: Research on reactions of oxygen with metals.	**Teacher Reflection** What improvement to be made for a more successful lesson.	

Grade: 8 Lesson: 3		Learning Area: Natural Sciences
Strand: ENERGY AND CHANGE		
Duration: 3weeks(Weeks 6&8)	**Content: Electricity and Impacts of electricity generation on the environment.**	
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	**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: **AS:** Categorizes information: **L O 3: SCIENCE, SOCIETY AND**	**Activity: 1** Basic Electricity- Learners draw Circuit diagrams and make simple Series and Parallel connections and discuss what happens when bulbs are connected in series and in parallel. **Actvity:2** 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. **Activity: 3** The teacher explains the benefits and the disadvantages of parallel connections. The teacher explains the benefits and the disadvantages of series connections.	**Formal Assessment Task:** Case Study **Forms:** interviews translation activities presentation

THE ENVIRONMENT **AS:** Understands science and technology in the context of history and indigenous knowledge.	**Activity: 4** 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. **Activity: 5** Teacher provides information on various ways in which electricity is generated in South Africa and in the rest of the world. Learners research on the generation of electricity in South Africa. Learners present a written report on electricity generation in SA. **Activity: 6** Learners do a research on electricity use and list the advantages and disadvantages of electricity in our lives. ➢ Teacher instructs learners to find out how electricity is utilized by people in South Africa and in the rest of the world ➢ Learners have to submit a written report on their findings and they have to report their findings in class. **Activity: 7** The Teacher provides information on the bad environmental effects of electricity generation.	Learners complete an assignment. Learners are divided into two groups to debate the advantages and the disadvantages.

	➢ Power stations burn fossil fuels, i.e. coal to generate electricity. ➢ Sulphur oxides and nitrogen oxides are released when coal is burned. ➢ These gases combine with water vapour in the atmosphere and forms acid rain, e.g. H_2SO_4. ➢ This acid rain returns to earth in the form of precipitation which destroys animal and plant life, statues and metal bridges. ➢ Acid rain also enters the soil, lakes and rivers in the form of precipitation and kills fish and marine organisms and plants. ➢ Teacher explains the low efficiency of coal burning to generate electricity since most of the energy is lost as heat. **Activity: 8** The learners will debate on the advantages and disadvantages of alternate ways of generating electricity.	
Resources: Books, pictures, charts, magazines, internet.		
EXPANDED OPPORTUNITY: Research on alternate ways of generating electricity.	**Teacher Reflection** What improvement to be made for a more successful lesson.	

Grade: 8 Lesson: 4		Learning Area: Natural Sciences
Strand: PLANET EARTH AND BEYOND		
Duration: 3 weeks (weeks 9,10&11)	**Content : Natural catastrophes' caused by global warming**	
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	**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: **AS:** Categorizes information: **L O 3: SCIENCE, SOCIETY AND THE ENVIRONMENT** **AS:** Understands science and	**ACTIVITIES:** **Activity 1:** Teacher provides Learners with case studies, pictures and articles on climate change. ➢ These pictures will show how glaciers have melted, how the vegetation has changed and how the ocean temperatures have changed. ➢ The articles will deal with the Kyoto Protocol and other recent agreements to limit carbon dioxide emissions into the atmosphere. **Activity 2**: Learners (divided into groups) research and collect information about the following:	Learners complete case study

technology in the context of history and indigenous knowledge.	➢ Causes of global warming, ➢ The impact of global warming and ➢ Limiting global warming **Activity 3**: The Learners research articles on the effect of La Nina and El Nino on the Earth's weather patterns. **Activity:4** Learners research and discuss on the depletion of the ozone layer.	Learners report back on their research and provide suggestions how to combat global warming and climate change.
Resources: Pictures, charts, magazines, books, newspapers, articles.		
EXPANDED OPPORTUNITY: Study the effect of global warming in different parts of the world.	**Teacher Reflection**	

CONTENT OVERVIEW
GRADE 9

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:**	**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:**	**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:**	**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*	*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-	**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.	**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	**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.

mechanical, magnetic, electric, electrostatic and gravitational forces. Characteristics and effect of the above forces Measurement of force-use of spring balance Newton's laws with regard to forces **Earth and Beyond** 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	Chemical reactions-exothermic and endothermic reactions. **Energy and Change** Systems made to transfer energy-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 **Earth and beyond** 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	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 cost Alternative sources of energy Wood as a source of energy Planting of trees for sustainable use of energy **Earth and Beyond** Mining –local examples-coal for energy, raw materials for industries, legislation controls of mining, safety, economic and environmental effects	**Life and Living** Maintenance of ecosystem Food chains and food webs Role of bacteria in biological changes Adaptation of different organisms in the ecosystems Recycling of matter in the ecosystems.

<table>
<tr><td colspan="2">Grade: 9 Lesson: 1</td><td>Learning Area: Natural Sciences</td></tr>
<tr><td colspan="3">Strand: Life and Living</td></tr>
<tr><td colspan="2">Duration: 2 weeks (weeks 1&2)</td><td>Content in context: Malnutrition and Deficiency Diseases</td></tr>
<tr><td colspan="3"><u>Integration</u>:
Language: LO 2 : Speaking
LO 3: Reading
Mathematics: LO 5: Data Handling
AS: Design simple Questionnaires
Technology: LO 1: Technological processes and skills</td></tr>
<tr><td>Selected LOs and Ass</td><td>Teaching & 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</td><td>Activity 1:
Learners discuss in groups about, the food they eat, healthy food, junk food and nutrition.
Teacher explains the term “malnutrition”, cause of malnutrition and its effect on the body.
Malnutrition is caused by eating the wrong ratios/ portions of food. The teacher describes deficiency diseases and give examples
• Kwashiorkor – a disease that occurs in people who eat too many carbohydrates and too few proteins.
• Obesity – This over nourishment when too much food is consumed, leads to carbohydrates being stored in the form of fat.
• Anorexia – Extreme case of undernourishment
• Blindness, deformities of the skeleton, scurvy and nervous diseases are caused by the shortage of essential minerals and vitamins.</td><td>Make a food diary indicating what you eat over a week. Present it to the class. Compare the different diaries and decide on a balanced diet/ healthy diet.

<u>Formal Assessment Task</u>
Case study on malnutrition and deficiency diseases.
- Identify a disease caused by malnutrition.
-Conduct an interview (as described in Activity 5)
- and write a report.
-Make a presentation.</td></tr>
</table>

technology in the context of history and indigenous knowledge.	**Questions** 1. Why is antibiotic resistance a problem? 2. What are two diseases identified during the 1900's? 3. How can a regular medical check up help prevent disease? 4. What are genes? How are genes involved in disease? 5. How do viruses reproduce? 6. Why do children with the disease kwashiorkor fail to grow? 7. What are two of the body's weapons against infections? 8. How does talking to a patient help a doctor diagnose disease? 9. What is an epidemic? 10. How are communicable diseases spread? **Activity 2:** Teacher gives an extract showing pictures, symptoms and signs, of a person suffering from malnutrition. Learners identify features of malnutrition **Activity 3:** Learners identify a case in their environment (community) e.g. an individual suffering from malnutrition. Design a questionnaire to interview that affected individual **Activity 4**: Gather information on how to prevent or treat the condition by visiting the clinics and nearby hospital and social workers. **Activity 5**: The learners analyse the information and make a summary of causes and preventive measures of the diseases.	Collect data regarding the diseases from different people/ community; draw a graph using that information. The learners will submit a complete Questionnaire. Group Assessment Presentation of their findings to the class. A rubric is used for assessment - Teacher assessment

	Activity 6: Balanced Diet- The teacher supplies the learners with an information sheet on nutrition and the importance of it to the body. ➢ ***Carbohydrates:*** *Provide energy* ➢ ***Proteins:*** *Repair damaged cells and for growth* ➢ ***Fibre and roughage:*** *it helps to prevent constipation* ➢ ***Minerals:*** *(Iron- help the body to make red blood cells, calcium- (build strong bones and hair)* ➢ ***Fats:*** *Store energy for later use* ➢ ***Vitamins:*** *Fight off infections e.g. Vitamin C – boost the immune system.* ➢ ***Water:*** *For flushing the system and to speed up chemical reactions such as digestion etc.* The learners now discuss the problems around deficiency diseases. They compare this to people who appear healthy. Consolidation of differences between deficiency diseases and healthy people.	The learners complete an observation sheet and use it to determine whether they are having balanced meals. Rubric is used for assessment
Resources: Pen , paper, questionnaire, health workers, affected community member, tape recorder, and camera , graph sheet		
EXPANDED OPPORTUNITY: Research on malnutrition and deficiency diseases in the community	**Teacher Reflection** What improvement to be made for a more successful lesson.	

Questionnaire in interviewing health professionals

Deficiency Diseases	Causes	Symptoms	Treatment
Kwashiorkor			
Obesity			
Scurvy			
Anorexia			
Blindness			
Anaemia			

Food Diary

DAY	MEAL	TYPES OF FOODS
	1. 2. 3. 4.	

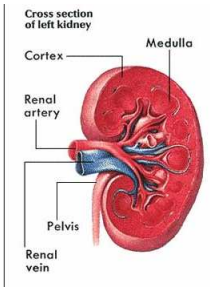
Information sheet on nutrition

FOODS	FUNCTIONS IN THE BODY
Carbohydrates	
Proteins	
Minerals	
Fibre and Roughage	
Fats	
Vitamins	
Water	

Grade: 9 Lesson: 2		Learning Area: Natural Sciences
Strand: Life and Living		
Duration: 1 week (week 3)		**Content in context:** Respiratory System
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	**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: **AS:** Categorizes information: **L O 3: SCIENCE, SOCIETY AND THE ENVIRONMENT** **AS:** Understands science and	**Activity 1**: Discuss respiratory organs, their functions and importance of the process. The main parts of the respiratory system: ➢ Nose ➢ Trachea (windpipe) ➢ Bronchi (lung pipes) ➢ Lungs ➢ The diaphragm and the intercostals muscles play an important role in the breathing mechanism. **Activity 2**: Learners identify the parts, on the model/ sample of sheep lungs, of the respiratory system. ➢ Larynx ➢ Trachea ➢ Intercostals muscles ➢ Left lung ➢ Right lung ➢ Diaphragm	Labelled drawing of respiratory system with a brief explanation of the functions of the important parts of the system. Answer questions Assignment-identify parts of respiratory system and their functions.

technology in the context of history and indigenous knowledge.	➢ Bronchi ➢ Branch of Pulmonary vein ➢ Bronchiole ➢ Alveoli ➢ Capillary network ➢ Branch of pulmonary artery **Activity 3**: Make drawings of the respiratory system and label the parts, use coloured pens/pencils to indicate direction of flow of gases through the medium of blood. **Activity 4**: Teacher explains and discusses the gaseous exchange in the lungs and the respiratory sites in the cells (mitochondria).Reaction of oxygen with food releases energy in the cells of living things. Explains how the process occurs in the cytoplasm and in the mitochondria. **Activity 5:** Discuss respiratory diseases caused by pollution ➢ Smoking - the effects of nicotine on the lungs and on a person's health. ○ *A teacher smoking can blow a mouthful of smoke through a handkerchief or cotton wool (Do this outside the classroom).Repeat this three or four times.* *What can you see?* *What can you deduce from this?* *What do you think the lungs of a person who has been smoking for 20 to 30 cigarettes a day for the past 10 years look like?*	Make a poster showing dangers of smoking.

	➢ **Mining** : lung related diseases ○ *Asbestosis – a asbestos induced lung cancer* ○ *Mesothelioma - is a non-curable cancer of the lung affecting its lining. It can take up to 40 years to show.* ○ *Silicosis – It is a progressive lung disease characterised by formation of lumps or nodules and fibrous scar tissue in the lungs. This disease is caused by inhalation of silica dust, a compound known as Silicon Dioxide (**SiO_2**).* ○ *Pneumoconiosis - a lung disease that miners contract due to the inhalation of mineral dust.*	Class test
Resources: Research books, internet, brochures, magazines, health institutions. Model, pencil, workbook, coloured pencils		
EXPANDED OPPORTUNITY: Investigate the different types of diseases affecting the lungs which are caused by human activities.e.g. Mining. Pollution, smoking etc.	**Teacher Reflection** What improvement to be made for a more successful lesson……..	

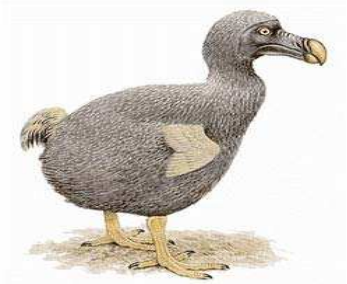
Grade: 9 Lesson: 3		Learning Area: Natural Sciences
Strand: Life and Living		
Duration: 1 week (week 4)		**Content in context:** Excretory System
Integration: **Language:** LO 2 : Speaking LO 3: Reading **Mathematics**: LO 5: Data Handling AS: Design simple Questionnaires **Technology**: LO 1: Technological processes and skills		
Selected LOs and ASs	**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: **AS:** Categorizes information: **L O 3: SCIENCE, SOCIETY AND THE ENVIRONMENT** **AS:** Understands science and	**Activity 1**: Teacher discusses the importance of excretion and the organs responsible for the process. 1. **The urinary system** – the organs are the kidneys The function of the kidneys is to : ○ Purify the blood from nitrogenous waste such urea and salts.  *Fig.1 : The cross section of a kidney* 2. **The alimentary system** – This system is responsible for the excretion of undigested food	Complete an assignment on how unwanted substances are excreted by the body. Teacher assesses by using a rubric.

technology in the context of history and indigenous knowledge.	through the anus. 3. **The lungs** – Are responsible for excreting carbon dioxide and water vapour. **4. The skin** – The sweat gland within the skin excretes water and salts which plays an important role in the regulation of body temperature. **Activity 2**: Learners identify organs (lungs, kidney, skin etc) responsible for excretion using the model or charts. The learners identify the parts: Cortex, calyx, medulla, renal sinus, renal papilla, pyramid, ureter, pelvis, renal artery, renal vein. **Instruction** ➢ Order a few sheep kidneys from the butcher. ➢ Examine and cut them longitudinally and see whether you can identify the parts mentioned. Learners draw diagrams of their observations. **Activity 3**: Class Test	Assignment: Identify parts of a dissected kidney. Make a drawing of the kidney.
Resources: Textbooks, internet, research books, models.		
EXPANDED OPPORTUNITY: Make a model of the urinary system.	**Teacher Reflection**	

Grade: 9 Lesson: 4		**Learning Area: Natural Sciences**
Strand: Life and Living		
Duration: 1 week (week 5)		**Content in context:** Variation in Organisms
Integration: **Language:** LO 2 : Speaking LO 3: Reading **Mathematics**: LO 5: Data Handling AS: Design simple Questionnaire		**Technology**: LO 1: Technological processes and skills
Selected 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: **AS:** Categorizes information: **L O 3: SCIENCE, SOCIETY AND THE ENVIRONMENT** **AS:** Understands science and technology in the context of history	**Activity: 1** Learners discuss in groups the habitats of different animals and write down the main features of animals seen in those habitats. They also share information on the difference in appearance of different animals in different regions. Learners use pictures, charts and textbooks. **Activity: 2** Teacher introduces variation that occurs in animals over the years due to different factors and explains how it leads to natural selection. Explains species as a group of organisms with the same characteristics and be able to produce offsprings. **Activity: 3** Field trip: The learners study different organisms in their natural habitats. Take note of their characteristics. ***Note:*** *Natural selection is a process in nature by which the organisms best suited to their environment are the ones most likely to leave offspring. This process has been called survival of the fittest.*	Collect and record data regarding organisms in their natural habitats. Teacher/ Group uses checklist to assess. Assignment: Write notes on organisms studied.

and indigenous knowledge.	*For example:- Speckled and dark forms of the peppered moth of the same species.*  *Fig. 1: Speckled and dark forms of the peppered moth resting on a lichen covered tree trunk.*  *Fig. 2: Speckled and dark forms of the peppered moth resting on a black tree trunk* **Questions** 1. Name the two colour variations of the peppered moth. (2) 2. What sudden change in the environment had an effect on the peppered moth population? (2) 3. Which type of moth is best camouflaged on dark tree trunks? Why? (2) 4. Which moth is best camouflaged on lichen-covered tree trunks? Why? (2)	Research on Speckled and dark forms of the peppered moths. Report the findings to the class. Complete activity by answering question in the previous column.

	5. Use your understanding of natural selection to write a paragraph explaining how a population of peppered moths living near a city became dark. **Activity: 4** The learners will prepare a poster to illustrate the adaptation mechanism used by few animals in a particular ecosystem. ***Camouflage:*** *The various ways animals blend with their surroundings* *(The ptarmigan, an Arctic bird, is brown in summer but becomes white in winter, when snow covers the ground.)* ***Mimicry:*** *The condition, in which one living organism closely resembles, or mimics, its surroundings or another animal or plant. It is usually the result of similar colour or construction.*  *Fig. 3: The Kallima escapes notice because the undersides of its wings resemble a dead leaf in colour and texture.* **Activity: 5** Learners do research on human activities that caused extinction of a certain species of living organisms.	Poster presentation on adaptation mechanisms of few animals in an aquatic habitat.

	Extinct species: Organisms that ceased to exist. e.g. the dodo, Cape lion, the quagga, blue,antelope, etc  *Fig. 4: The dodo an extinct bird* **Endangered species:** Organisms that is on the brink of extinction e.g. the black rhino, cheetah, blue whale etc.  *Fig. 5: A cheetah is an endangered animal* ***NOTE: Some of the causes of extinction due to human activities:*** ➢ ***Habitat loss****: People clear habitats such as grasslands, forests, and wetlands. They do this to*	Reports on human activities that caused extinction of certain species. Posters are displayed in the classroom and the learners engage in a gallery walk.

	make space for farming, factories. Roads, houses etc. Animals in these habitats are no longer able to live or breed. ➢ ***Pollution****: Pollutants released into habitats destroy and poison animals. Poisons may be concentrated in food webs and cause organisms to die.* ➢ ***Irresponsible hunting and farming****: Animals are hunted and killed and plants are gathered from their natural environment. When humans kill animals and plants faster than they can be replaced, the species starts to die out.* ➢ ***Alien species****: People introduce plants and animals to different countries. Some of these organisms are tough and compete with the indigenous species for food and space. This leads to decrease in biodiversity, as the indigenous species cannot survive.* ***NOTE: How can we prevent extinction of species?*** ➢ *Creating parks and reserves to protect their natural habitat.* ➢ *Passing laws which outlaw hunting and killing of endangered species* ➢ *Breeding endangered species in captivity.* ➢ *Using resources on a sustainable basis (e.g. if plants are cut down it must be replaced with seedlings)* ➢ *Reducing pollution in the environment.*	Debate on how to prevent extinction of species.
Resources: Notebook, pen/pencil, tape recorder, camera, poster, charts, coloured pencils, magazines, photographs, books. textbooks, cameras, photographs/pictures.		
EXPANDED OPPORTUNITY: Design brochures about national parks in different biomes/regions.	**Teacher Reflection** ……	

Grade: 9 Lesson: 5		Learning Area: Natural Sciences
Strand: Matter and Materials		
Duration: 1 week (week 6)	**Content in context:** Extraction of minerals from raw materials	
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	**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: **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** Brainstorm the processes taking place in a mine as extraction of pure metal from its ore. **Activity: 2** The teacher explains to the learners how minerals are extracted from naturally formed 'raw' materials E.g. Iron ore into iron, Copper ore into copper, etc. Methods of separation: 1. Heating/*Smelting removes most of the remaining impurities from the copper. In smelting, copper concentrate is dried, and then blown with air and pure oxygen into a flash smelting furnace. Such a furnace can smelt as much as 3,000 tons (2,700 metric tons) of copper concentrate per day. In the furnace, the concentrate burns and melts, releasing some impurities in the form of sulphur dioxide gas. The molten (melted) material falls to the bottom of the furnace, where it separates into slag and copper matte. Slag, which contains iron oxide, silica, and*	Explain reactions of acids with metals, metal oxides and carbonates. Completion of chemical equations for the reaction. Learners conduct simple experiments and record their findings.

	other impurities, rises to the surface. The slag is removed. Copper matte is heavier and collects under the slag. Copper matte contains from 50 to 75 percent copper. It also contains some impurities in the form of iron sulphide$FeSO_3$ and other metals 2. ***Electrolysis:*** *Electrolysis can also purify an impure substance. For example, impure copper can serve as the anode in an electrolytic cell, and pure copper can serve as the cathode. Chemical reactions at the anode transfer positively charged copper ions to the liquid. These ions are attracted to the cathode. The copper ions stick to the copper cathode, increasing the amount of pure copper. A kind of electrolysis called electroplating coats a metal object's surface with a thin layer of another metal. In electroplating, the metal that is to form the coating is dissolved in the liquid. The object to be coated is used as the cathode. This process can make an object appear more attractive or provide a surface that resists damage.* **Activity 3**: Class test	
Resources: Science kit, Chemicals, test tubes spirit lamp, spoon, goggles.		
EXPANDED OPPORTUNITY: Research about the best methods of separation of different minerals.	**Teacher Reflection:**	

Grade: 9 Lesson: 6	**Learning Area: Natural Sciences**	
Strand: Matter and Materials		
Duration: 1 week (week 7)	**Content in context:** How to save energy	
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	**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: **AS:** Categorizes information: **L O 3: SCIENCE, SOCIETY AND THE ENVIRONMENT** **AS:** Understands science and	**Activity: 1** Learners investigate how to save electricity. **1. Series connection:** ➢ ***Advantages***: One switch switches on all the light bulbs. ➢ ***Disadvantages***: If one bulb is fused or not working properly, all bulbs are not working. The more bulbs that are connected, the dimmer the light become. **2. Parallel connection:** ➢ **Advantages** It is possible for one switch to switch on all light bulbs. It is possible to switch on one bulb at a time Brightness does not decrease as more bulbs are connected in parallel. If one bulb burns out or is not functional properly it does not affect the other connected bulbs.	Investigation on the use of electricity and ways to reduce the consumption of electricity in households, presentation of the findings Rubric to assess presentation. Completing a questionnaire based on the topic of talk. Teacher assesses using a memo. Submit report on findings of different sources of energy (for a gallery walk). The teacher uses a checklist to assess.

technology in the context of history and indigenous knowledge.	➢ **Disadvantage:** As more bulbs are connected, the total current produced by the batteries increases. The batteries therefore will lose energy quickly. **Activity: 2** Teacher invites an expert from an electrical company to talk on how to save electricity and the cost of electricity. A worksheet is prepared for this exercise. **Activity: 3** Learners are divided into groups and are instructed to investigate a specific source of energy per group e.g. wind, water, geothermal, solar, nuclear etc. **Activity: 4** Teacher explains wood as a source of energy used in rural areas and farms. Learners investigate why wood, in our era, is no longer the only source of energy.	Complete the worksheet. Each group will complete the energy group they selected and will share their findings with other groups using the numbered head method. Investigate the use of wood as a source of energy and substitution for wood as the only source of energy. Teacher assesses using a checklist.
Resources: Notebooks, research books, magazines, newspapers, brochures, experts, tape recorders, questionnaire, models, internet, textbooks, magazines, community members, pen, paper, newspaper.		
EXPANDED OPPORTUNITY: Discuss alternative ways of generating energy.	**TEACHER REFLECTIONS**	

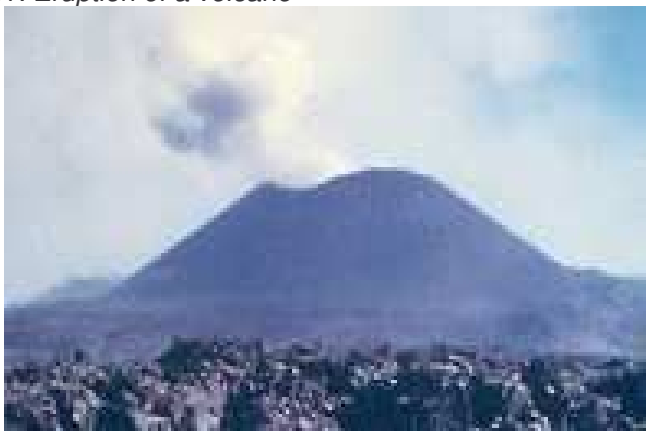
Information sheet: Advantages and disadvantages of different sources of energy

Energy source	Advantages	Disadvantages
Coal	Easy to mine, relatively inexpensive, most available energy source in SA.	Burning produces pollution(carbon dioxide and other greenhouse gases) limited supply
Oil	Currently readily available.	Burning produces air pollution Limited supply
Natural gas	Less polluting than other fossil fuels	Not always readily available
Solar energy	Unlimited supply, causes no air or water pollution	May not be cost effective, storage and backup are necessary, unreliable
Hydropower	Abundant , clean and safe, easily stored in reservoirs, relatively inexpensive way to produce electricity	Dams take energy to build, can be used only where there is water supply, best sites for dams for dams have already been developed
Wind energy	It is free, produces no air or water pollution	Requires constant and significant amounts of wind
Geothermal energy	Provides an unlimited supply of energy, no air or water pollution	Development cost can be expensive, maintenance can be a problem
Biomass	Abundant and renewable, can be used to burn waste products	Burning biomass results in air pollution
Nuclear power	Produces far more power per ton than any other energy source, does not contribute to air pollution, can produce energy for millions of years	Radioactive waste is hazardous to health, requires expensive storage for a very long time
Electricity	Easy to use	Needs to be produced from other energy sources.e.g. Coal, relatively expensive.

Grade: 9 Lesson: 7		Learning Area: Natural Sciences
Strand: Earth and Beyond		
Duration: 1 week (week 8)	**Content in context:** Impact of human activities in the atmosphere	
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	**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: **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** Learners discuss the change in weather patterns. Discuss various human activities that people do everyday- burning wood, burning plastic, tyres, cutting down trees, clearing forests, etc. Discuss the effect of these activities on the atmosphere. **Activity: 2** Teacher uses pictures, articles, videos of the effect of factors that contribute towards Global Warming. (Global Warming is an increase in the average temperature of Earth's surface.) **Note: Factors that contribute towards Global Warming:** ➢ *Burning of fossil fuels for generating electricity.* ➢ *Emissions of greenhouse gases e.g. cars (monoxide)* ➢ *Developments: Destroying of natural vegetation*	Investigate the changes in weather patterns in recent years in SA and globally. Collect information on weather changes that occurred in the past five years in five different countries. ➢ Make a list of the same events in different countries. ➢ Find the causes of these events. Give a written report on your findings and suggest possible solutions to reduce global warming.

	➢ *Veld fires* ➢ *The effects of acid rains on the environment.* **Activity 3**: Learners discuss the influence of human activities on Global warming. *(See factors above)* ***The impact of human activity on the environment*** 1. *Harm to marine life.* 2. *Changing of habitats (Conflict)* 3. *Extreme weather phenomena* 4. *Rising sea levels (melting of glaziers and polar ice)* 5. *Threats to human health* 6. *Existence of new diseases* 7. *Changes in crop yields*. **Activity 4**: Teacher explains the impact of different human activities (See *factors above*) and learners must discuss ways to reduce/prevent these, to lessen the effect on the earth. They must make a poster, using pictures and writing, to illustrate the ways of reducing these effects.	Make flyers/ postcards to inform the public about the causes of Global warming. Learners prepare a poster and present this to the class.
Resources: Books, newspapers, Internet, magazines, TVs, radios, etc.		
EXPANDED OPPORTUNITY: Find out which countries negatively impact the atmosphere the most.	**Teacher Reflection** What improvement to be made for a more successful lesson.	

Grade: 9 Lesson: 8		Learning Area: Natural Sciences
Strand: Earth and Beyond		
Duration: 1 week (Week 9)		**Content in context:** Geological events- Earthquakes and volcanic eruptions
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	**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: **AS:** Categorizes information: **L O 3: SCIENCE, SOCIETY AND THE ENVIRONMENT** **AS:** Understands science and technology in the context of history	**Activity: 1** Learners recall information on geological events the causes, types and effects of earthquakes. **Activity:2** Learners use newspaper cuttings and magazines to collect information on volcanic eruptions and discuss recent volcanic eruptions. **Activity: 3** Teacher explains earthquakes, how it occurs, where it occurs and volcanic eruptions. Explains how volcanic eruption occurs, the causes, the lava, the different gases, the temperature variations, etc. **Activity: 4** Learners use pictures, charts, maps to identify volcanoes in different countries. **Activity: 5** Learners **investigate** about volcanoes focusing on the types of volcanoes and how they are formed.	**Formal Assessment Task** **Investigation on recent eruptions of volcanoes and write a report on its impact on human life.** **Use a rubric to assess.** The learners submit their models and present in groups. The teacher uses a rubric to assess.

and indigenous knowledge.	 *Fig.1: Eruption of a volcano*  *Fig. 2 : The cloud of smoke and gases is visible after the eruption*	A project for Activity 3 – 6. Data collection from research.

	Activity:6 Classification of volcanoes. Effect of volcanoes on the environment. **Activity: 7** Select one volcano and mark its location on the map and attach a picture. Describe the interesting characteristic of the chosen volcano. Compare and contrast two different volcanoes. **Activity: 8** Collect information on earth's active volcanoes. **Activity: 9** Learners do research on the history of volcanoes in Africa. **Translate** information on to a table.	Submit a model of a volcano and test whether it can erupt. Present this so that we know what substances were used for the eruption.
Resources: Research books, magazines, text books, notebooks, pen/pencils, internet, modelling clay/clay, paper, plank, coloured paint.		
EXPANDED OPPORTUNITY: Identify boundaries where volcanic islands are likely to be found.	**Teacher Reflection:**	

<table>
<tr><td colspan="2">Grade: 9 Lesson: 9</td><td>Learning Area: Natural Sciences</td></tr>
<tr><td colspan="3">Strand: Earth and Beyond</td></tr>
<tr><td colspan="2">Duration: 1 week (week 10)</td><td>Content in context: Destructive Forces</td></tr>
<tr><td colspan="3"><u>Integration</u>:
Language: LO 2 : Speaking
LO 3: Reading
Mathematics: LO 5: Data Handling
AS: Design simple Questionnaires
Technology: LO 1: Technological processes and skills</td></tr>
<tr><td>Selected LOs and Ass</td><td>Teaching & 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>Activity 1: Learners go on a field trip to observe the effects of weathering and erosion. Collect information from various sources and people.
 
Fig.1: Erosion
 
Fig. 2: Weathering
➢ Erosion: It is the loss/blowing away/ washing away of soil due to wind or water.
➢ Weathering: The breaking down of rock to form sand.
Activity: 2</td><td>Investigate local areas where erosion occurs and the reasons for it. Suggest ways to reduce erosion.

Assignment: Write notes on weathering.
Presentation of your findings on erosion.

Complete an observation sheet.

Written report on causes of</td></tr>
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<td>Teacher explains how weathering occurs, discusses soil erosion and how it affects the landscape.
Activity: 2
Learners observe different parts of the land and identify the type of erosion in that area. Talk to local people and authorities from forestry and collect information on ways of preventing soil erosion. Write a report on the causes of erosion. Discuss ways to reduce erosion in the local area/ around the school/ in the community.

Activity 3: Discuss ways to prevent erosion.
For examples:
➢ Use the correct cultivating / farming methods
➢ Plant trees in open spaces
➢ Alternate grazing fields for farm animals
➢ For every tree cut down plant a seedling.

<table>
<tr><th colspan="2">E R O S I O N</th></tr>
<tr><th>Causes</th><th>Ways of prevention</th></tr>
<tr><td></td><td></td></tr>
</table>
</td>
<td>erosion.

The learners will hand in a poster for causes and ways to prevent erosion.

Learners hand in a written report on the causes and suggestions to reduce erosion in a local area.

Make brochures/flyers to inform the public of the importance to reduce/prevent soil erosion.</td>
</tr>
<tr><td colspan="3">Resources: Camera, notebook, pen, observation sheet, A4 paper</td></tr>
<tr><td colspan="2">EXPANDED OPPORTUNITY:
Research about different types of weathering.</td><td>Teacher Reflection:</td></tr>
</table>

Grade 9 Lesson: 10		Learning Area: Natural Sciences
Strand: Earth and Beyond		
Duration: 1 week (week11)		**Content in context: Fossils and fossil fuels**
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	**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: **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** Learners discuss in groups fossils and fossil fuels. Make a list of fossil fuels; refer text books and news papers to collect information on fossil fuels. Share the information with the other groups. **Activity: 2** Teacher discusses how fossils and fossil fuels are formed. *Note: Fossil is the mark or remains of an organism that lived thousands or millions of years ago. Some of the best-known fossils include leaves, shells, or skeletons that were preserved after a plant or animal died. Others include tracks, trails, or burrows left by moving animals. Most fossils occur in sedimentary rocks. Such fossils formed from plant or animal remains that were quickly buried in sediments-the mud or sand that collects at the bottom of rivers, lakes, swamps, and oceans. Over time, these sediments became buried under other sediments. The upper sediments pressed down on the layers of mud and squeezed them into compact rock layers. Water that travelled slowly through the layers of sand deposited mineral cement around these particles, cementing the layers*	Assignment on different types of fossil fuels, its importance, how it is extracted and its economic importance.

	together to form rocks. A few fossils formed in other ways. For example, whole plants or animals became preserved in ice, tar, or hardened sap. ***Note:*** *Fossil fuels have this name because they were formed from the remains of plants and animals that lived millions of years ago. Over time, sediment buried these remains. These remains changed as a result of heat and pressure. Most of the world's coal is formed from plants that grew in hot, swampy forests about 300 million years ago. Oil and natural gas come from the remains of small creatures and plants in the sea rather than on land.* *Oil and coal is of utmost importance in South Africa for generating electricity.* **Activity: 3** Learners collect information on different fossil fuels that are in demand in South Africa, its uses and its importance. *Note: The importance of coal in the generation of electricity. How is electricity generated?* *To generate electricity the rotor in the generator has to be turned. A turbine does the turning. Steam is used to turn the turbines that turn the rotor. The steam is heated by fossil fuels.* **Activity 3**: Learners brainstorm around the alternative sources of energy. List of alternative sources of energy: ➢ Wind energy: Energy using wind to drive the turbines. ➢ Solar energy: Energy from the sun that is absorbed by a solar panel and convert it into electrical energy ➢ Water energy: (Hydro-electricity) Energy generated when moving water drives the turbines to turn the generators.	

	➢ Nuclear energy: energy generated, using the energy released in radioactive substances, such as uranium. Uranium atoms are split in a reactor and release energy. This heats water to make steam for driving turbines to turn generators. ➢ Geothermal energy: Energy from the core of the earth ➢ Biomass: Energy from dead plants and animals.	
Resources: Notebook, pens, pencils, cameras.		
EXPANDED OPPORTUNITY: Discuss different types of fossil fuels.	**Teacher Reflection:**	