

TEACHING AND LEARNING ACTIVITIES FOR TEACHING NATURAL SCIENCES

GRADE 7

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*

| TERM 1 WEEKS | TEACHING AND LEARNING ACTIVITIES | ASSESSMENT | RESOURCES |
|-----------------|---|--|---|
| Weeks: 1-3 | <p>LIFE AND LIVING TOPIC: DIFFERENT FOOD TYPES LO 1 AS: 1, 2 and 3 LO 2 AS: 1, 2 and 3 LO 3 AS: 1 and 2</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> Investigate the different food sources of the following food types: proteins, carbohydrates, minerals, fibre, vitamins, fat and water. State the functions of each food types. Design food menu containing different food types such that you have a balanced diet. <p>TOPIC: FOOD ABSORPTION LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> The learners identify the parts of the digestive system on a chart/diagram. Discuss, label, matching using flashcards, explanation. State the function of each organ of the digestive system (tongue, teeth, pharynx, oesophagus, liver, stomach, large and small intestines and gall bladder). Research how food absorption takes place. | <p>Assignment: Your friend is HIV/AIDS positive and needs a nutritious diet. Design a menu for each day i.e. from breakfast to supper including the snack in between main meals.</p> <p>Learners label the diagram that shows the digestive organs of a human being and also state the functions of each organ.</p> <p>Written notes on how food absorption takes place.</p> | <p>Books, pictures, different types of food Brochures Charts Pamphlets Models Text books</p> |

| | | | |
|-------------------------|--|--|--|
| <p>Week: 4-6</p> | <p>MATTER AND MATERIALS TOPIC: SOLUTIONS , SOLUBILITY LO 1 AS: 1, 2 and 3 LO 2 AS: 1, 2 and 3 LO 3 AS: 1 and 2 ACTIVITIES:</p> <ul style="list-style-type: none"> • Learners recall information on solutes, solvents and solutions and discuss the solubility of different substances. • Teacher explains saturated and unsaturated solutions and solubility. • Demonstrate experiments to find out factors affecting solubility • Teacher explains how crystals are formed. • Learners investigate the formation of salt crystal using saturated salt solution. | <p>Write notes on factors affecting solubility. Complete observation sheet.</p> <p>Investigation: growing of a crystal and its presentation.</p> | <p>Different types of solutions Heating equipments Beaker Salt Sugar Copper sulphate etc.</p> |
| <p>Week:7-8</p> | <p>ENERGY AND CHANGE TOPIC: ENERGY TRANSFER AND SYSTEMS LO 1 AS: 1, 2 and 3 LO 2 AS: 1, 2 and 3 LO 3 AS: 1 and 2 ACTIVITIES:</p> <ul style="list-style-type: none"> • Learners list forms of energy and their uses. • Teacher explains each of the following forms of energy: electrical, mechanical, chemical, nuclear, solar, light, biomass and gravitational energy and give examples. • Investigate the systems that use the following types of energy: electrical, mechanical, | <p>Research Project: Learners draw energy wheel- showing energy transformations. Learners</p> <ul style="list-style-type: none"> • collect (in groups) information about systems that use energy and the ways of conserving it thereof from libraries, computer laboratories and representatives from the local electrical service provider and community members • make group presentation in class • design (in groups) different types of models of different energy | <p>Books Newspaper Internet Magazines</p> <p>TV set Bunsen burner Paraffin stoves Pictures Torch cells Light bulbs Connectors</p> |

| | | | |
|-------------------|--|---|---|
| | <p>chemical, nuclear, solar, light, biomass and gravitational energy.</p> <ul style="list-style-type: none"> • Do experiment to find out transfer of energy. E.g. electrical, light etc • Learners identify the energy transformations from the given system (e.g. a TV set that has been just switched on; heating water using fire wood; grass/plant growth; water stored in dams and released to turn turbines etc.) | systems. | |
| Week: 9-10 | <p>EARTH AND BEYOND TOPIC: SOLAR SYSTEM LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1 ACTIVITIES:</p> <ul style="list-style-type: none"> • Teacher revises the topics on planets, moon and its shapes (question – answer method) • Learners discuss phases of moon. • Do a research on tides and its link to the phases of moon. • Learners investigate on lunar and solar eclipses. • Teacher explains how eclipses occur. | <p>Written report on tides and eclipse.</p> <p>Test an examinations</p> | <p>Charts Pictures Models Videos DVDs</p> |

| TERM: 2 WEEKS | TEACHING AND LEARNING ACTIVITIES | ASSESSMENT | RESOURCES |
|------------------|---|---|--|
| WEEKS:1-4 | <p>LIFE AND LIVING TOPIC:INTERACTIONS IN THE ENVIRONMENT LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • Learners investigate different ecosystems. e.g. school garden, vegetable garden, dam, pond, stream, river etc. • Observe food relationships in at least three of the above ecosystems. • Draw food chains to show food relationships. • Teacher explains a food web • Learners draw food web(s) <p>TOPIC: DIFFERENT CLASSES OF VERTEBRATES AND INVERTEBRATES LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • Learners recall information on the characteristics of vertebrates and invertebrates, give examples. • Learners classify the animals into vertebrates and invertebrates. • Teachers explains how invertebrates are classified into different groups/classes based on difference in their characteristics e.g. arthropods (insects, crustaceans), | <p>Draw food chains and food webs.</p> <p>Classify animals into invertebrates and vertebrates. Write short notes on characteristics of vertebrates and invertebrates.</p> <p>Class test.</p> | <p>Pictures, charts</p> <p>Pictures Charts Zoo Field trip Newspapers Magazines Books</p> |

| | | | |
|------------------|---|---|--|
| | <p>earthworms, molluscs, millipedes and centipede.</p> <ul style="list-style-type: none"> • Discuss the characteristics of different classes of invertebrates. • Discuss different classes of vertebrates using charts/pictures/models/live animals. • Classify animals into vertebrate classes-fish, amphibians, reptiles, birds and mammals. • Visit a zoo/a field trip to observe different animals in their habitats. | | |
| WEEKS:5-7 | <p>MATTER AND MATERIALS TOPIC: ACIDS AND BASES LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1 ACTIVITIES:</p> <ul style="list-style-type: none"> • Categorise substances as acids or bases using various tests. • Use household cleaning materials to test alkalinity and acidity. • Make indicators from household substances. • Test the acidity or alkalinity of substances using their own indicators. • Investigate the use of household acids and bases. • Teacher explains properties of acids and bases by demonstrating tests with various acids and bases. | <p>Investigate the use of household acids and bases and its effects on humans and on materials.</p> <p>Making a poster showing the acidic and alkaline substances in every day use.</p> <p>Class test</p> | <p>Chemical kit Household materials Indicators</p> |

| | | | |
|---------------------------|---|--|---|
| <p>WEEKS : 8-9</p> | <p>ENERGY AND CHANGE TOPIC: RENEWABLE AND NON-RENEWABLE RESOURCES LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • Teacher discusses the terms “renewable” and “non-renewable” sources of energy using question – answer methods • Create a list of materials and substances that fit each category. • Explain the world we live in as “renewable” or “non-renewable” world • Discuss the distinctions between “recyclable” and “renewable?” [Do they mean the same thing?] • Where would you place these energy resources in your list? –Nuclear, Natural Gas, Solar, Wind, Coal, Water (Hydropower), Oil etc. • Discuss the concept “Energy is in everything and used to do everything” • Use of non-renewable sources as the main source of energy and the environmental problems caused by this. • Investigation on renewable resources and its effect on the environment • Discuss the importance of sustainable use of natural resources. • Discuss ways to conserve natural resources. • Make a presentation on the effects of non-renewable resources such as coal, gas and oil on the lives of humans | <p>Conduct a research on one non-renewable source of energy.</p> <p>Consider these questions as you complete your research:</p> <ul style="list-style-type: none"> • What are the benefits of this energy source? • What are the drawbacks and social ramifications of using this source? • What are the cost benefits or drawbacks? • Why some renewable resources aren’t widely accepted today? • What is meant by the terms “environmental costs” and “social costs?” <p>Challenge your school to an “energy efficient” week. Determine what each individual and each class can do to conserve energy.</p> <p>Research on the impact of deforestation Debate on the rights to have resources in the lives of humans and its impact.</p> | <p>Books Magazines Wood Coal Paraffin</p> |
|---------------------------|---|--|---|

| | | | |
|--------------------------|--|---|--|
| <p>WEEK:10-11</p> | <p>PLANET EARTH AND BEYOND TOPIC: ATMOSPHERE LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • Using a chart/diagram the teacher interacts with the learners showing them the layers of the atmosphere and their importance to the living organisms. • Learners find out from the books and/or internet the gases that are present in the atmosphere. (Oxygen, carbon dioxide, nitrogen, water vapour, hydrogen and rare gases) and the importance. • Teacher explains the composition of the atmospheric gases and the influence of human activities on the atmosphere. | <p>Learners illustrate by means of a diagram the layers of the atmosphere and their constituents.</p> <p>Investigate Global warming and the effect of Green house gases.</p> <p>Research on the depletion of ozone layer. Present a written presentation.</p> | <p>Charts Diagrams Books Internet</p> |
|--------------------------|--|---|--|

| TERM 3 WEEKS | TEACHING AND LEARNING ACTIVITIES | ASSESSMENT | RESOURCES |
|-----------------|---|--|--|
| WEEKS:1-2 | <p>LIFE AND LIVING TOPIC: CELL- ANIMAL AND PLANT CELL LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 ACTIVITIES:</p> <ul style="list-style-type: none"> • Teacher uses charts and pictures to introduce the concept- cell as a unit of life. • Teacher explains what a cell is. • Learners observe a prepared wet mount of a plant and an animal cell under the microscope. • Teacher use charts and drawings to explain the structure of plant and animal cell. • Learners compare the plant and animal cell. • Teacher explains the function of the cell. | <p>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.</p> | <p>Charts, pictures, books, models</p> |
| WEEK:3-4 | <p>LIFE AND LIVING TOPIC: LIFE PROCESSES-BREATHING SYSTEMS LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 ACTIVITIES:</p> <ul style="list-style-type: none"> • Learners brainstorm the characteristics of living things (breathe, excrete, eat, grow, reproduce, die, rot, feel) • 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. • Teacher explains the breathing process – inhale and exhale. | <p>Make a drawing of the breathing system and label the parts. Describe the process of breathing.</p> | <p>Charts, pictures, books, models</p> |

| | | | |
|----------------|---|---|--|
| | <ul style="list-style-type: none"> Learners make a model of the breathing system. | | |
| WEEK: 5 | <p>LIFE AND LIVING TOPIC: EXCRETION LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> Teacher poses questions about the body waste products and the organs responsible for the waste products. 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. Learners explore the life processes involved in plants viz. photosynthesis, respiration and transpiration. 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. Teacher draws learners' attention to the importance of water as a medium of excretion and transportation. | <p>Compare life processes in plants and animals. Research on the functions of excretory organs in plants and animals.</p> <p>Write notes on the importance of water in the process of excretion.</p> | <p>Charts, pictures, books, models</p> |

| | | | |
|-----------------------|---|---|---|
| <p>WEEKS:6</p> | <p>MATTER AND MATERIALS TOPIC: ORIGIN OF RAW MATERIALS LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • Teacher explains the origin of raw materials. Give examples. • 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. | <p>Assignment /Translation</p> <p>Flow diagram of refining crude oil</p> <p>Investigate how fractional distillation takes place.</p> <p>Research on extraction of at least two metals from its raw material.</p> | <p>Charts, pictures, books, models Books Water Methylated Spirits Thermometer Conical flask Tripod stand Wire gauze Spirit lamp/Bunsen burner Beaker</p> |
| <p>WEEKS:7</p> | <p>MATTER AND MATERIALS TOPIC: RADIATION (DARK COLOURED AND LIGHT COLOURED SUBSTANCES) LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • 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 | <p>Investigation on radiation in different surfaces.</p> | <p>Black painted and shiny similar tins Thermometers Stop watch Ruler Graph papers</p> |

| | | | |
|----------------|--|---|--|
| | <p>they felt while standing in the sun.</p> <ul style="list-style-type: none"> • Teacher explains the term radiation. • The teacher supplies learners with a shiny 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. • Teacher explains that dark coloured substances absorb more heat than white coloured substances. | | |
| WEEK: 8 | <p>MATTER AND MATERIALS TOPIC: CONDUCTORS AND INSULATORS LO 1 AS: 1, 2 AND 3 LO 2 AS: 1, 2, 3 AND 4 LO 3 AS: 1 ACTIVITIES:</p> <ul style="list-style-type: none"> • 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. • Teacher explains what are conductors and insulators. • Teacher demonstrates a simple circuit with its components (a cell, a switch, light bulb and connectors). • Teacher provides each group with the similar circuit components to connect and let them | <p>Identify and explain conductors and insulators.</p> <p>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.</p> | <p>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</p> |

| | | | |
|----------------|---|---|--|
| | <p>close the switch.</p> <ul style="list-style-type: none"> • 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. | | |
| WEEK: 9 | <p>MATTER AND MATERIALS TOPIC: RESISTORS LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • 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. • Then ask them to 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. • The teacher explains that all conductors are resistors but some are more resistant than others. | <p>Draw diagrams on series connections and write short notes and explain resistors.</p> | <p>Torch cells Connectors Light bulbs Switches Insulators and conductors</p> |

| | | | |
|-------------------------|---|--|--|
| <p>Week : 10</p> | <p>MATTER AND MATERIALS TOPIC: PURE SUBSTANCE AND MIXTURES LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • Discusses pure substances (substances that cannot be broken into smaller substances by physical means. Give examples 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) • 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) • 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. • Fractional distillation(two liquids like water and alcohol which mix – based on the difference in boiling points), etc • Learners present their observations. | <p>Investigate how filter-beds work in the purification of drinking water and write a report on your findings.</p> <p>Identify examples of filtration processes that are used in everyday life to separate mixtures.</p> <p>Investigate the application of fractional distillation in industry like SASOL.</p> | <p>Water, table salt, soil, magnets. Coins, copper, sulphur.</p> |
|-------------------------|---|--|--|

| | | | |
|-----------------------|---|---|--|
| <p>WEEK:11</p> | <p>ENERGY AND CHANGE TOPIC: WOOD AS A SOURCE OF ENERGY AND ITS RENEWABILITY LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • The teacher asks learners about ways in which people use natural resources, what sources of energy they use for cooking. • Learners visit households to find out what source of energy the community use. • 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. • Teacher explains wood as a source of energy. • Explain the concepts of reforestation and sustainable use of resources. • Write a report on how people suffer when habitats are destroyed. | <p>Investigate how to sustain non-renewable sources such as wood.</p> <p>Debate on deforestation that leads to turning forest into deserts and the effect of global warming</p> | |
|-----------------------|---|---|--|

| | | | |
|-----------------------|---|--|--|
| <p>WEEK:11</p> | <p>PLANET EARTH AND BEYOND TOPIC: MINING IN DIFFERENT PROVINCES SIGNIFICANCE OF MINING TO MAN. LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • Use the map of South Africa to locate the mining industries in various provinces. • 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. • Teacher supplies the learners with a case study, from which to compare the indigenous and modernised mining processes. • 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. • Learners debate on the negative and positive impacts of minerals to man. | <p>Write notes on mining in South Africa</p> <p>Make a list of the mineral resources that are mined.</p> <p>Name the provinces that has 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.</p> <p>Make a presentation on mining and its effect on economy and social life.</p> | <p>Books Physical map of S.A. Charts ,newspaper, magazines, etc</p> |
|-----------------------|---|--|--|

| TERM 3 WEEKS | TEACHING AND LEARNING ACTIVITIES | ASSESSMENT | RESOURCES |
|-------------------|--|--|---|
| WEEKS: 1-2 | <p>LIFE AND LIVING TOPIC:CIRCULATORY SYSTEM LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • Teacher introduces the need for circulation of blood using the analogy of transport system which transports goods from one place to another as there is a need for it. • Learners investigate the composition of blood, materials transported by blood and blood vessels (capillaries, arteries and veins). • Teacher draws attention of the learners to the importance of the heart as a blood pumping organ of the circulatory system. • Learners draw diagram of the heart and trace the path of blood in and out of the heart. • Learners list and classify all the components of the blood. | <p>Write notes on the importance of circulatory system.</p> <p>Investigate on various heart diseases and its causes. Make posters/flyers to educate the community of the dangers of heart diseases.</p> | <p>Chart, drawings. Pictures models, books, etc.</p> |

| | | | |
|--------------------------|---|---|---|
| <p>WEEKS: 3-4</p> | <p>TOPIC: REPRODUCTIVE SYSTEM LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 ACTIVITIES:</p> <ul style="list-style-type: none"> • Learners discuss other characteristics of living thing -reproduction, the changes that take place from an infant to an adult. • Teacher uses charts/pictures to discuss the parts of the reproductive system and the functions of the different organs. <p>TOPIC: REPRODUCTION IN PLANTS LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • Learners collect flowers of different plants-observe the different parts. • Make a drawing of a flower. • Teacher explains flower as the reproductive part of the plant. • Classify plants into flowering and non-flowering plants. • Learners have a closer look at the structure of a flower focusing mainly on the reproductive organs (male and female). • Teacher explains types of pollination, fertilization, formation of fruits and seeds. • Learners investigate the process of pollination, fertilisation and seed dispersal. • Learners plant some seeds and observe germination of seeds and formation of a new plant from seed. | <p>Research on human population and cause of infant mortality in SA and in other African countries.(causes and its effect on the population)</p> <p>Draw a labelled diagram of a flower. Classify plants into flowering and non-flowering plants. Write notes on pollination, fertilization, formation of fruits and seeds.</p> | <p>Pictures, charts, books, magazines, clinics, hospitals etc</p> <p>Different types of flowers, charts, pictures, books.</p> |
|--------------------------|---|---|---|

| | | | |
|-----------------------|---|---|--|
| <p>WEEK: 5</p> | <p>MATTER AND MATERIALS TOPIC: MAGNETISM LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • Teacher introduces magnetism as a natural phenomenon (the loadstone history). • Learners explore characteristics of magnetism (magnetic field and polarity). • Learners investigate the magnetic and non magnetic substances. • Learners using a piece of paper and iron filings, investigate field lines and polarity of a bar magnet. | <p>Identify magnetic and non-magnetic substances.</p> <p>Draw diagrams to show magnetic field</p> | <p>Magnets, iron filings</p> |
| <p>WEEK: 6</p> | <p>TOPIC: HEAT TRANSFER-CONDUCTION, CONVECTION , RADIATION LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • Do experiments on conduction, convection and radiation • Discuss differences the three modes of heat transfer • Investigate examples of heat transfer through conduction, convection and radiation In nature. | <p>Tabulate the differences between conduction, convection and radiation</p> | <p>Metals, liquids, heating utensils</p> |

| | | | |
|-------------------------|--|--|------------------------------------|
| <p>WEEK: 8-9</p> | <p>TOPIC: MINING- ADVANTAGES AND DISADVANTAGES, SAFETY AND ENVIRONMENTAL IMPACTS. LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • Discuss the advantages and disadvantages of mining, give examples. • Discuss the dangers and safety measures in mining industries. • Research on recent mining accident occurred in South Africa mines and its causes. • Discuss what the government and industries could do to keep the mines safer. | <p>Research project to find out which minerals are mined in different provinces.</p> | <p>Books, newspaper, internet.</p> |
|-------------------------|--|--|------------------------------------|

Lesson Plan

| | | | | |
|---|--|---|--------------|----------------|
| Grade: 7 | Learning Area: Natural Sciences | | Date: | Term: 2 |
| Duration: 2 hours | | | | |
| Strand: Matter and materials | | | | |
| Core knowledge and concepts: Acids and bases | | | | |
| <p>Integration: 1. Language LO2: Speaking LO3: Reading LO5: Thinking and reasoning AS: Collects and records information in different ways</p> <p>2. Technology LO1 AS 2: Designs</p> | | | | |
| Selected Los and ASs | Learning and teaching activities: | Details of assessment | | |
| LO 1: SCIENTIFIC INVESTIGATIONS AS: Plans investigations: AS: Conducts investigations and collects data AS: Evaluates data and communicates findings LO2: CONSTRUCTING SCIENCE KNOWLEDGE: AS: Recalls meaningful information: AS: Interprets information LO: 3 Science, Society and the environment: AS 1. Understands science as a human endeavour | <p>Activity:1 Learners identify different types of acids and bases from everyday life/ from household materials, explain why they categorise them into acids and bases.</p> <p>Activity: 2 Do experiments to find out what happens when indicators are added to solutions- observe the colour changes?</p> <p>Activity: 3 Teacher explains how to categorise acidic, basic and neutral solutions. Learners test different solutions and write their observations.</p> | Forms of assessment: Assignments and translations Test Investigation | | |

| | | |
|---|--|--|
| <p>2. Understands sustainable use of the earth's resources</p> | <p>Activity:4 Teacher demonstrates experiments to find out the effect of an acid on an alkali. Learners make observations. Teacher explains the reactions and the products. Activity: 5 Experiment to find out what happens when you put a metal into an acid. E.g. Does hydrochloric acid react with some metals like iron wool, magnesium? What are the products?</p> | |
| <p>Resources: Soap solution, litmus paper, Bromothymol blue, hydrochloric acid, steel wool, magnesium, water, test tube, beaker, dropper etc</p> | | |
| <p>Expanded opportunities:</p> | <p>Teacher reflection: Teachers will note</p> <ul style="list-style-type: none"> • how the Lesson Plan could have been presented differently • what impacted on experiments done • other examples that may have been used • what was good / weak about the Learning Unit | |

**PROPOSED ACTIVITIES FOR TEACHING AND LEARNING NATURAL SCIENCES
GRADE 8**

LEARNING OUTCOMES AND ASSESSMENT STANDARDS

LO 1. Scientific Investigations

- AS*
1. *Plans Investigations*
 2. *Conducts investigations and collects data*
 3. *Evaluates data and communicates 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*

| TERM: 1 WEEKS | ACTIVITIES | ASSESSMENT | RESOURCES |
|------------------|--|--|--|
| WEEK: 1-2 | <p>LIFE AND LIVING TOPIC: PHOTOSYNTHESIS LO1 AS: 1,2 and 3 LO 2 AS: 1 and 2</p> <ul style="list-style-type: none"> • Teachers explain the term Autotrophic and Photosynthesis • Learners collect different types of leaves and compare their shapes and sizes and different colours. • Teacher explains how the shape and size of leaves influence the process of photosynthesis. • The learners explain where plants fall in the food-chain • The teacher explains the requirements of photosynthesis and the products • Learners perform the starch test to investigate whether sunlight is necessary for photosynthesis. | <p>Translations Investigation (practical) requirements of photosynthesis and starch test</p> | <p>Pictures, books, real examples of leaves and iodine Plants Hand lenses Microscope Books Charts Magazines Internet</p> |
| WEEK: 3-4 | <p>MATTER AND MATERIALS TOPIC: CONSTRUCTION OF MATTER LO1 AS: 1,2 and 3 LO 2 AS: 1, 2, and 4</p> <ul style="list-style-type: none"> • Teacher discusses with learners the 3 states of matter (using ice blocks, water and steam), • Learners give examples of these states, viz. solids, liquids and gases • Teacher introduces the Periodic table • Learners find out constituents of an atom: protons, neutrons, and electrons | <p>Draw the structure of an atom.</p> <p>Written work on elements and compounds.</p> <p>Tests and Examinations</p> | <p>Pictures, books, real examples, Periodic table</p> |

| | | | |
|-----------------|---|---|--|
| | <ul style="list-style-type: none"> Learners choose an element and build its model to show its atomic structure Learners distinguish between elements and compounds and provide examples, e.g. water | | |
| WEEK:5-6 | <p>ENERGY AND CHANGE TOPIC: HEAT TRANSFER LO1 AS:1, 2 and 3 LO 2 AS: 2,3 and 4 LO 3 AS: 2</p> <ul style="list-style-type: none"> Teacher explains how heat is transferred The terms conduction, convection and radiation are explained with examples. Show convection by heating water with potassium permanganate crystal/ food colour concentrate. Learners tabulate thermal conductors and thermal insulators in our daily life. Learners do a project on how to improve conduction, convection and radiation in everyday heating appliances. Discuss the use of geysers Learners report their findings and display their models and posters. | <p>Research project on different processes that involves conduction, convection and radiation in everyday life.</p> <p>Do a research on the use of energy, conservation of energy, energy crisis around the world, in South Africa and efficient use of energy.</p> <p>Class test</p> | <p>Pictures, books, models and posters</p> |

| | | | |
|-------------------------|--|--|--|
| <p>WEEK: 7-9</p> | <p>TOPIC: OUR SOLAR SYSTEM LO1 AS:1, 2 and 3 LO 2 AS: 1 ,3 and 4 LO 3 AS: 1</p> <ul style="list-style-type: none"> • Teacher asks Learners to recall the names of the planets in the solar systems • Explains gravity and the position of planets in the solar system. • Learners are reminded that the sun is the ultimate source of energy, (food chains) • Learners research the following: <ul style="list-style-type: none"> • sun’s effect on plant growth • solar power in South Africa • Teacher explains how the sun affects, wind and ocean currents. | <p>Investigation on recent scientific discoveries around new planets and the solar system.</p> <p>Presentations on how and where solar power is made use of in SA.</p> | <p>Pictures, books, models and posters</p> |
|-------------------------|--|--|--|

| TERM: 2 WEEKS | TEACHING AND LEARNING ACTIVITIES | ASSESSMENT | RESOURCES |
|------------------|---|---|-----------------------------------|
| WEEKS:1-2 | <p>LIFE AND LIVING TOPIC: NUTRITION</p> <p>LO 1 AS: 2 and 3 LO 2 AS: 2 and 3</p> <p>ACTIVITIES</p> <ul style="list-style-type: none"> • Learners discuss types of food, balanced diet and the importance of good nutrition. • Teacher explains what diseases one can get when eating too much of certain foods, e.g. Obesity when eating too much carbohydrates. • The Learners read about other health problems that can occur when eating incorrectly, i.e. rickets, anorexia nervosa, etc. • The Learners <i>collect</i> pictures and articles depicting these eating disorders. • The Learners <i>design</i> a healthy eating plan to follow to prevent these diseases and disorders. | <p>Assignments-written work on eating disorders.</p> <p>Translation task- on drawing up a chart showing healthy eating plan for a week.</p> | <p>Pictures, books and videos</p> |

| | | | |
|-------------------------|--|---|------------------------|
| <p>WEEK: 3-4</p> | <p>LIFE AND LIVING TOPIC: BODILY PROCESSES LO 1 AS:2 and 3 LO 2 AS: 2 and 3 ACTIVITIES:</p> <ul style="list-style-type: none"> • Learners name the different systems and organs in the human body. • Teacher shows drawings of the heart and lungs and explains how the two work together. • The terms respiration, circulation and excretion are researched by the Learners. • Learners collect drawings, articles of the heart, lungs and the kidneys. • Learners draw and label these structures and explain their functions. | <p>Research Assignments Explain the functions of heart, lung and kidney.</p> <p>Translation task-draw and label the circulatory and respiratory systems.</p> | <p>Pictures, books</p> |
| <p>WEEK:5</p> | <p>LIFE AND LIVING TOPIC: ECOSYSTEMS LO 2 AS: 2 and 3 LO 3 AS: 2 ACTIVITIES:</p> <ul style="list-style-type: none"> • Learners are given a <i>case study</i> of how energy flows through an ecosystem, i.e. from the sun to the plants, to the secondary and tertiary consumers, (Based on their prior knowledge). • Learners read and interpret the article and explain the role of each organism in the ecosystem. • Discuss the role of sun in the ecosystem. • Teacher summarizes the Learners conclusions. | <p>Assignments-draw several food chains from an ecosystem. Written explanation on primary, secondary and tertiary consumers and identify each level in a food chain.</p> | <p>Pictures, books</p> |

| | | | |
|----------------------|---|--|---|
| <p>WEEK:6</p> | <p>MATTER AND MATERIALS TOPIC: CHEMICAL REACTIONS LO 1 AS: 2 and 3 LO 2 AS: 2,3 and 4</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • Discusses the use of chemicals in household as an introduction to the topic to focus on chemical reactions • Teachers explain how chemicals react to form new products, give examples. • Teacher shows how metals and non-metals react with water, acids and bases. <ul style="list-style-type: none"> ○ e.g. reaction of metals with water- Sodium with water, ○ reaction of a metal with acid-magnesium and hydrochloric acid, ○ reaction of acid with an oxide- copper oxide with sulphuric acid, ○ reaction of an acid with carbonate-calcium carbonate with hydrochloric acid etc. • Write equations using words and symbols to show the reactions. | <p>Assignment- Collect names of materials that uses acids and bases in household cleaning materials and find out how they are used in everyday life.</p> | <p>Books, Copper sulphate, beakers, water, sodium, magnesium, copper oxide, calcium carbonate, hydrochloric acid, sulphuric acid, copper sulphate, connecting wires, electrodes, test tubes etc</p> |
|----------------------|---|--|---|

| | | | |
|---------------|--|--|---|
| WEEK:7 | <ul style="list-style-type: none"> Learners <i>observe</i> demonstrations and fill in and complete worksheets. Learners see how copper sulphate can be decomposed into elements using electricity. Teacher explains how rust can occur and how to prevent it. Learners do an experiment to find out what happens to an iron nail if it is placed in water or in oil. | Investigation on corrosion, rusting etc that happens to materials that are used in buildings and factories. | |
| WEEK:8 | <p>MATTER AND MATERIALS TOPIC: DECAY AND PRESERVING FOODSTUFFS NS LO 1 AS: 2 and 3 NS LO 2 AS: 2 and 4</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> Learners discuss what happens to food stuffs when it is not refrigerated. Teacher shows different examples and explains how foodstuffs can go bad when exposed to air. Learners do research on how foodstuffs can be preserved, e.g. pasteurization. Learners find out food preservation methods of the past. Learners report on and display their findings on a poster. | <p>Research project- visit a diary farm and collect information on the process of pasteurisation.</p> <p>Complete worksheets on food preservation in the past by talking to farmers and elders in the community.</p> | Pictures, books, old bread and decaying canned food |

| | | | |
|----------------------|---|--|------------------------|
| <p>WEEK:9</p> | <p>ENERGY AND CHANGE LO 1 AS: 2, 3 and 4 LO 2 AS: 2 and 3 LO 3 AS: 2 TOPIC: Electricity</p> <ul style="list-style-type: none"> • Teacher explains how electricity can be generated. • Learners investigate how electricity is generated in South Africa, e.g. <ul style="list-style-type: none"> • Hydro-electricity • Coal • Nuclear • Wind power • Learners do a case study on how coal generated electricity affects the environment. | <p>Completion of worksheet on different types of electricity generation.</p> <p>Investigation on the impact of electricity generation from various resources on the environment.</p> <p>How ESKOM do generate enough electricity for South Africa's needs.</p> <p>Explore the problems associated with electricity generation and consumption and possible ways to reduce consumption.</p> | <p>Pictures, books</p> |
|----------------------|---|--|------------------------|

| | | | |
|-----------------------|--|---|------------------------|
| <p>WEEK:10</p> | <p>PLANET EARTH AND BEYOND NS LO 1 AS: 2 and 3 NS LO 2AS: 2 NS LO 3 AS: 1 TOPIC: GLOBAL WARMING</p> <ul style="list-style-type: none"> • Teacher explains the phenomenon of global warming • Learners collect information on greenhouse gases(water vapour, carbon dioxide, methane etc • Teacher explains how weather patterns can be changed by Man’s industrial activities, e.g. temperature, rainfall and pollution. • Learners collect information on green-house gases. • Teacher explains how El nina and El nino causes weather changes across the earth. • Find information on recent floods, fires and drought that happened in various parts of SA. • Debate on the effect of Global warming on earth. • Suggest solutions to reduce its effect in their community or the immediate environment. • Make the community aware of Global warming and its effect. | <p>Question and Answer</p> <p>Assignments and Translations Build a model of greenhouse.</p> <p>Research on the amount of carbon dioxide produced at home and suggests actions to reduce carbon dioxide.</p> <p>Presentation-Collect information on the sources and contributions of the main Greenhouse gases to Global warming.</p> | <p>Pictures, books</p> |
|-----------------------|--|---|------------------------|

| TERM:3 WEEKS | TEACHING AND LEARNING ACTIVITIES | ASSESSMENT | RESOURCES |
|-----------------|--|---|------------------------------------|
| WEEK:1 | <p>LIFE AND LIVING LO 2 AS:1 and 2 LO 3 AS:1</p> <p>TOPIC: Animal behaviour ACTIVITIES:</p> <ul style="list-style-type: none"> • Teacher explains how animals and plants interact in the ecosystem. <p>Terms explained:</p> <ul style="list-style-type: none"> • Predation • Competition • Migration • Decomposition • Discuss examples of each group of animals. • Research on one example of a predator and a migratory bird and make a written presentation. | <p>Assignments and worksheets</p> <p>Make observations on migration of birds due to seasonal changes and do presentations.</p> <p>Make a compost heap at school/home.</p> | <p>Pictures, books</p> |
| WEEK:2 | <p>LIFE AND LIVING TOPIC: ANIMAL BEHAVIOUR LO1 AS: 2 and 3 LO 2 AS: 1,2,3 and 4</p> <ul style="list-style-type: none"> • Learners go on a field-trip to a game park, e.g. Addo Elephant Park and find out the following: <ul style="list-style-type: none"> • Animal behaviour • Feeding patterns • Conservation • Discuss the feeding pattern and conservation of wild animals in Game parks. | <p>Translations Observation sheet Test</p> <p>Case study on the use of traditional medicines in South Africa and the world.</p> | <p>Pictures, books, field-trip</p> |

| | | | |
|-----------------------|--|---|--|
| <p>WEEK:3</p> | <p>MATTER AND MATERIALS TOPIC: CHEMICAL REACTIONS LO1 AS: 2 and 3 LO 2 AS: 3 and 4</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • Teacher demonstrates how the following gases react with other elements: <ul style="list-style-type: none"> ○ Oxygen ○ Hydrogen ○ Nitrogen • Learners are shown how to balance chemical equations. • Learners balance chemical equations in a worksheet. | <p>Completion of worksheet on explanation of reactions of metals with oxygen, hydrogen, nitrogen etc.</p> <p>Completion of worksheet on balancing equations.</p> <p>Short test</p> | <p>Pictures, books, relevant chemicals</p> |
| <p>WEEK: 4</p> | <p>MATTER AND MATERIALS TOPIC: IMPACTS OF ELECTRICITY GENERATION ON THE ENVIRONMENT LO1 AS: 2 and 3 LO 2 AS: 1,2,3 LO 3 AS: 2</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • The Learners gather information on electricity and list the advantages of electricity in our lives. • The Teacher provides information on the bad environmental effects of electricity generation. • The learners will then debate on the advantages and disadvantages of electricity generation. | <p>Research Task on advantages of electricity in our lives and the adverse environmental effects of electricity generation.</p> <p>Debate on conservation of energy/ on the advantages and disadvantages of electricity generation.</p> | <p>Pictures, books</p> |

| | | | |
|-----------------------|---|--|------------------------|
| <p>WEEK: 5</p> | <p>TOPIC: NATURAL CATASTROPHES CAUSED BY GLOBAL WARMING LO1 AS: 2 and 3 LO 2 AS: 2,3 and 4 LO 3 AS: 2</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • The Teacher provides Learners with case studies, pictures and articles on climate change. • The Learners research articles on the effect of El nina and El nino on the Earth's weather patterns • Learners complete worksheets and label drawings on the above topic. • Learners provide suggestions how to combat global warming and climate change. | <p>Translations Worksheets Case study</p> | <p>Pictures, books</p> |
| <p>WEEK: 6</p> | <p>LIFE AND LIVING TOPIC: ADAPTATIONS OF ANIMALS IN THE ECOSYSTEM LO1 AS: 1,2 and 3 LO 2 AS: 1 and 2 ACTIVITIES:</p> <ul style="list-style-type: none"> • Teacher provides examples of how some animals are adapted to live in a specific environment. E.g. fish, frog, reptiles birds and mammal. • Learners investigate how the five classes of vertebrates have adapted to their environments. • Teacher explains how Arthropods and Molluscs have adapted to their environments. E.g. locust and snail. • Learners complete worksheets on the above. | <p>Investigation Write notes on adaptations of animals-fish, frogs, reptiles etc.</p> <p>Completion of Worksheet</p> <p>Tests</p> | <p>Pictures, books</p> |

| | | | |
|-----------------------|--|---|---|
| <p>WEEK: 7</p> | <p>MATTER AND MATERIALS TOPIC: MAGNETISM AND ELECTROMAGNETISM LO1 AS: 2 and 3 LO 2 AS: 3</p> <p>ACIVITIES:</p> <ul style="list-style-type: none"> • The Teacher explains and shows the following about magnetism: <ul style="list-style-type: none"> ○ Magnetic fields ○ Polarity ○ Magnetic substances • Learners make their own electromagnet • Learners complete worksheets and label drawings of the above content | <p>Translational tasks-draw a magnetic field. List magnetic and non-magnetic substances.</p> <p>Worksheets and Tests</p> | <p>Pictures, books, long nail, connecting wire and drawing pins</p> |
| <p>WEEK: 8</p> | <p>ENERGY AND CHANGE TOPIC: ELECTRICITY IN OUR HOMES LO1 AS: 2 and 3 LO 2 AS: 1,2, and 4</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • The Learners must use terms such as parallel and series connections • The Teacher explains and shows how the circuits are connected in our homes, i.e. stoves, lights and other appliances • 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 | <p>Worksheets and Translations</p> <p>Complete a table showing different appliances and the amount of electricity consumption in each.</p> <p>Tests</p> | <p>Pictures, books and electrical accounts</p> |

| | | | |
|--------------------------|--|---|--|
| <p>WEEK: 9-10</p> | <p>LIFE AND LIVING TOPIC: ADAPTATIONS OF ANIMALS AND PLANTS IN SOUTH AFRICA LO1 AS:1, 2 and 3 LO 2 AS: 3 and 4</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • Learners name different groups of plants. • Teacher explains how Algae have adapted to their environment. • Learners collect information on the following plants and explain their adaptation: <ul style="list-style-type: none"> • Hydrophytes • Mesophytes • Xerophytes • Teacher explains how animals have adapted to various biomes in South Africa, e.g. Karoo | <p>Investigation and Translations</p> <p>Tests and Examinations</p> | <p>Pictures, books and real examples</p> |
|--------------------------|--|---|--|

Lesson Plan

| | | | |
|--|--|--|----------------------|
| Grade: 8 | Learning Area: Natural Sciences | | TERM 2. Date: |
| Duration: 2 hours | | | |
| Theme/Strand: LIFE AND LIVING | | | |
| Core knowledge and concepts: Nutrition | | | |
| Integration: 1. Language LO2: Speaking LO3: Reading LO5: Thinking and reasoning AS: Collects and records information in different ways 1. Technology LO1 AS 2: Designs | | | |
| Selected Los and ASs | Learning and teaching activities: | Details of assessment | |
| LO 1: SCIENTIFIC INVESTIGATIONS AS: Plans investigations: AS: Conducts investigations and collects data AS: Evaluates data and communicates findings LO2: CONSTRUCTING SCIENCE KNOWLEDGE: AS: Recalls meaningful information: AS: Interprets information | 1 Teacher explains what diseases one can get when eating too much of certain foods, e.g. Obesity when eating too much carbohydrates. Use pictures, videos or a story/ give a scenario to explain obesity. 2. Learners read about other health problems that can occur when eating incorrectly, i.e. rickets, anorexia nervosa, etc. Write short notes on 3. Learners <i>collect</i> pictures and articles depicting these eating disorders | Forms of assessment: Assignments- write notes on obesity and its effect on people. Translations- interpret graphs showing percentages of obese people in different countries. Test Investigation- on health problems related to eating habits in different communities. | |

| | | |
|--|--|--|
| | 4. Learners <i>design</i> a healthy eating plan to follow to prevent these diseases and disorders | |
| Resources: Pictures, books and videos | | |
| Expanded opportunities: Read articles on healthy living and on healthy diet. | Teacher reflection: Teachers will note <ul style="list-style-type: none"> • how the Lesson Plan could have been presented differently • what impacted on experiments done • other examples that may have been used • what was good / weak about the Learning Unit | |

Lesson Plan

| | | | |
|--|--|--|--|
| Grade: 8 | Learning Area: Natural Sciences | | |
| Duration: 2 hours | Date: | TERM: 2 | |
| Strand: MATTER AND MATERIALS | | | |
| Core knowledge and concepts: The decomposition of a compound :The Learners see how copper sulphate can be decomposed into elements using electricity | | | |
| Integration: 1.Language LO2: Speaking LO3: Reading LO5: Thinking and reasoning AS: Collects and records information in different ways 2. Technology LO1 AS 2: Designs | | | |
| Selected Los and ASs | Learning and teaching activities: | Details of assessment | |
| LO 1: SCIENTIFIC INVESTIGATIONS AS: Plans investigations: AS: Conducts investigations and collects data AS: Evaluates data and communicates findings LO2: CONSTRUCTING SCIENCE | <ul style="list-style-type: none"> • The Learners build a circuit connecting the electrodes to the battery • Learners place Copper Sulphate into the water to make a Copper Sulphate solution • Learners place the electrodes at opposite ends of the beaker • Learners observe after a few minutes what | Forms of assessment: Assignment and Investigation | |

| | | |
|---|---|----------------------------|
| <p>KNOWLEDGE: AS: Recalls meaningful information: AS: Interprets information AS: Categorizes AS: Applies</p> | <p>happens at each electrode</p> <ul style="list-style-type: none"> • Learners record their observations • Copper, Oxygen and sulphur forming at the different electrodes • Teacher discusses the chemistry of the decomposition of the compound in terms of electrolysis | <p>Test / Examinations</p> |
| <p>Resources: Pictures, books, Copper sulphate, beakers, water, connecting wires and two electrodes, oil and nails</p> | | |
| <p>Expanded opportunities: Explore industries where they use electroplating. Collect information on mining of precious metals.</p> | <p>Teacher reflection: Teachers will note</p> <ul style="list-style-type: none"> • how the Lesson Plan could have been presented differently • what impacted on experiments done • other examples that may have been used • what was good / weak about the Learning Unit | |

Lesson Plan

| Grade: 8 | | Learning Area: Natural Sciences | |
|--|---|---|--|
| Duration: 2 hours | | Date: TERM: 3 | |
| Strand: PLANET EARTH AND BEYOND | | | |
| Core knowledge and concepts: Global warming and Earth's climate | | | |
| Integration: 1. Language LO2: Speaking LO3: Reading LO5: Thinking and reasoning AS: Collects and records information in different ways 3. Technology LO1 AS 2: Designs | | | |
| Selected Los and ASs | Learning and teaching activities: | Details of assessment | |
| LO 1: SCIENTIFIC INVESTIGATIONS AS: Plans investigations: AS: Conducts investigations and collects data AS: Evaluates data and communicates findings LO2: CONSTRUCTING SCIENCE KNOWLEDGE: AS: Recalls meaningful information: | The Learners research articles on the effect of El nina and El nino on the Earth's weather patterns Learners complete worksheets and label drawings on the above topic | Forms of assessment: Research Task and Translation Case Study | |

| | | |
|--|---|--|
| AS: Interprets information AS: Applies knowledge | | |
| Resources: Pictures, books, newspapers and atlases | | |
| Expanded opportunities: Provide articles as to how Africa is affected already by climatic changes. | Teacher reflection: Teachers will note <ul style="list-style-type: none"> • how the Lesson Plan could have been presented differently • what impacted on experiments done • other examples that may have been used • what was good / weak about the Learning Unit | |

Lesson Plan

| | | | |
|--|--|--|----------------|
| Grade: 8 | | Learning Area: Natural Sciences | |
| Duration: 3 hours | | Date: | TERM: 4 |
| Strand: LIFE AND LIVING | | | |
| Core knowledge and concepts: | | | |
| The learners investigate how the five classes of vertebrates have adapted to their environments | | | |
| Integration: 1. Language | | | |
| LO2: Speaking | | | |
| LO3: Reading | | | |
| LO5: Thinking and reasoning | | | |
| AS: Collects and records information in different ways | | | |
| 4. Technology | | | |
| LO1 AS 2: Designs | | | |
| Selected Los and ASs | Learning and teaching activities: | Details of assessment | |
| LO 1: SCIENTIFIC INVESTIGATIONS AS: Plans investigations: AS: Conducts investigations and collects data AS: Evaluates data and communicates findings LO2: CONSTRUCTING SCIENCE KNOWLEDGE: | <ol style="list-style-type: none"> 1. Learners choose one of the vertebrates to see how they are adapted to their environments: 2. Learners collect pictures and information 3. Learners report on their findings | Forms of assessment: <div style="text-align: center;"> Assignments and Investigation </div> | |

| | | |
|--|--|--|
| AS: Recalls meaningful information: AS: Interprets information | | |
| Resources Pictures, books and Internet | | |
| Expanded opportunities: Show how other animals and plants have adapted to their environments | Teacher reflection: Teachers will note <ul style="list-style-type: none"> • how the Lesson Plan could have been presented differently • what impacted on experiments done • other examples that may have been used • what was good / weak about the Learning Unit | |

Lesson Plan

| | | |
|--|--|--|
| Grade: 8 | Learning Area: Natural Sciences | Date: TERM 4 |
| Duration: 2 hours | | |
| Strand: Matter and Materials (Magnetism) | | |
| Core knowledge and concepts: | | |
| <ul style="list-style-type: none"> • Electromagnetism | | |
| Integration: 1. Language LO2: Speaking LO3: Reading LO5: Thinking and reasoning AS: Collects and records information in different ways 5. Technology LO1 AS 2: Designs | | |
| Selected Los and ASs | Learning and teaching activities: | Details of assessment |
| LO 1: SCIENTIFIC INVESTIGATIONS AS: Plans investigations: AS: Conducts investigations and collects data AS: Evaluates data and communicates findings LO2: CONSTRUCTING SCIENCE KNOWLEDGE: AS: Recalls meaningful information: AS: Interprets information | Teacher instructs Learners to build their own magnet Activity 1: Learners plan what they will need to build their own magnet Activity 2: Learners collect information regarding making magnets The teacher questions Learners on their findings Activity 3: Learners interpret their information and build an electromagnet | Forms of assessment: Research Test / worksheet Display and Presentation |

| | | |
|---|---|--|
| | <p>Activity 4: Learners communicate their findings and displays their working electromagnet.</p> | |
| <p>Resources: Nail, batteries, Copper wire or insulated connecting wire</p> | | |
| <p>Expanded opportunities: Show how electromagnets are used in everyday life in industry</p> | <p>Teacher reflection: Teachers will note</p> <ul style="list-style-type: none"> • how the Lesson Plan could have been presented differently • what impacted on experiments done • other examples that may have been used • what was good / weak about the Learning Unit | |

**PROPOSED ACTIVITIES FOR TEACHING AND LEARNING NATURAL SCIENCES
GRADE 9**

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*

| TERM:2 WEEKS | TEACHING AND LEARNING ACTIVITIES | ASSESSMENT | RESOURCES |
|-----------------|--|---|---|
| WEEK:1 | <p>LIFE AND LIVING TOPIC: INTERACTIONS IN THE ENVIRONMENT</p> <p>LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • Learners recall information related to ecosystem, feeding relationships, food webs and food chains. • Discuss interdependency of living organisms in the ecosystems. • Teacher asks learner to go to a designated place near the school and look for the feeding habits of animals to establish interdependency. • Collect information on various interactions in the environment caused by humans that alter the balance of the ecosystem. E.g. pollution of environment by burning, dumping of waste, cutting down trees, etc. • Select an area near to the school and make an audit on the pollutants in the environment • Investigate the elements that have a negative impact on plant and animals in the environment e.g. Veld fires, overgrazing, erosion, air pollution etc. and come up with suggestions to reduce the environmental impact of those identified causes. • Learners will report back in class | <p>Investigation on the feeding habits of the identified organisms. E.g. locust, earthworms etc.</p> <p>Identify the pollutants in the environment and suggest corrective ways to reduce the impact.</p> <p>Written/ oral presentations of findings.</p> | <p>Books Newspaper Internet magazines</p> |

| | | | |
|-----------------------|--|--|---|
| <p>WEEK: 2</p> | <p>Air, water and land pollutants e.g. factory emissions in residential areas how they could take action to conserve this resource within their local environment</p> <ul style="list-style-type: none"> • Learners visit an industrial area or from newspaper or internet or from resources provided or from local community to collect information on factory emissions in residential areas. • Learners categorize the information in a table under different pollutants: water pollutants, air pollutants and land pollutants and discuss how they work. • Learners use the information from the above activity and discuss the causes, the impact and how to reduce pollution. • Make suggestions to local authorities to reduce pollution in the area. <p>Critically discuss the impact of the following on decisions people make on their life style choices.</p> <ul style="list-style-type: none"> • Environment: What factors influence the lifestyle of people? Physical features e.g. rivers, mountains, climate, • Man-made: industries like manufacturing of products (making, recycling, etc.) • Agricultural practices by man (cultivation of land, types of soil, water sources, etc.) | <p>Draw graphs from the table of pollutants they have recorded and identify the most common type of pollutant.</p> <p>Describe ways to reduce pollution.</p> <p>Write an assignment, discussing how the rights of people can be met when dealing with social issues like pollution.</p> <p>Tool- rubric</p> | <p>Books Newspaper Internet magazines</p> |
|-----------------------|--|--|---|

| | | | |
|-----------------------|--|---|--|
| <p>WEEK: 3</p> | <p>LIFE AND LIVING TOPIC: HUMAN REPRODUCTION LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • Teacher explains reproduction in human beings. • Learners identify reproductive organs and sex cells. • Teacher explains the development of the foetus in the mother's womb. • Learners investigate about the sexual diseases that can be transmitted during the sexual activities. • Discuss the influence of human values and behaviour in the community for the prevention of sexually transmitted diseases. | <p>Collect pictures of foetal development of human being and make poster and present the poster in the class. Tool- rubric.</p> <p>Written work on the development of foetus.</p> <p>Visit to local clinics, interview nurses/doctors, collect data on sexually transmitted diseases and write a report. Tool-rubric.</p> | <p>Notebook, text books, model, brochures, magazines, health institutions, health experts.</p> |
|-----------------------|--|---|--|

| | | | |
|----------|--|--|--|
| WEEKS: 4 | <p>ENERGY AND CHANGE TOPIC:SYSTEMS MADE TO TRANSFER ENERGY (electrical, mechanical & solar energy) LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> Learners will be given a task of listing 5 objects which they think can store energy e.g. torch cells, elastic band, etc Learners make electric circuits- <ul style="list-style-type: none"> – connecting electric cells in series and in parallel and write their observations about the brightness of the bulb. <p>-Connecting bulbs in series and parallel make drawings and write their findings with regard to the brightness.</p> <p>-Discuss the reasons for the change in brightness.</p> <ul style="list-style-type: none"> Learners are asked to make or construct a buzzer using the connection that will give the best results. | <p>Compile a list of objects available in their immediate environment and illustrate how energy transfer occurs, by drawings or pictures. Tool- checklist</p> <p>Complete a written question-and-answer activity based on their observation. The teacher uses a memorandum to assess the activity.</p> <p>Practical activity on series and parallel connections. Teacher uses a rubric to assess.</p> | <p>Torch cells, elastic rubber, electric kit, connecting wires, electric bulbs, buzzer, switch, etc.</p> |
| | <p>TOPIC: TRANSFER OF LIGHT LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> Teacher explains reflection and refraction by drawing diagrams, hereby illustrating her/his explanation. Learners copy diagrams into their | <p>Investigate whether light rays can be reflected and refracted using mirror, prisms, coin, water, etc. Teacher uses observation sheet/rubric/checklist to assess.</p> | <p>Light kit, mirror, water, coin, beaker, torch cells, activity books, drawing material</p> |

| | | | |
|---------------|--|--|---|
| | <p>workbooks.</p> <ul style="list-style-type: none"> Learners do practical activities to learn about reflection and refraction of light. Using the light kit and the coin and water. Learners make a drawing from the practical activity to illustrate refraction and reflection. | Practical activity | |
| WEEK:5 | <p>MATTER AND MATERIALS TOPIC:GENERATION OF ELECTRICITY LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1 ACTIVITIES:</p> <ul style="list-style-type: none"> Discuss the sources of electricity. Learners connects two metal rods stuck in green apple / tomato using connecting wires through a bulb / voltmeter and observe what is taking place. Learners, in groups, sets up beaker, sulphuric acid, two rods, insulated wire, and voltmeter, ammeter and one bulb to generate electricity and reports on findings. Teacher explains how electricity is generated by turning a coil in a magnetic field (working of dynamo fitted to bicycles) Learners will do research on how electricity is generated in South Africa e.g. Nuclear power stations,, hydro electric power stations, thermo electric (coal) power stations, etc. | <p>Explains how electricity is generated from the apple/ tomato</p> <p>Explains how electricity is generated using H₂SO₄ and the metal rods.</p> <p>Learners hand in research assignment Teacher uses rubric to assess</p> | <p>Voltmeter, apple, tomato, ammeter, bulb, connecting wires, anodes, sulphuric acid, beaker.</p> <p>Internet, books, magazines, newspapers</p> |

| | | | |
|-----------------------|--|---|--|
| <p>WEEK: 6</p> | <p>MATTER AND MATERIALS TOPIC: COMPOUNDS LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • Teacher explains compounds and give examples • Divide learners into groups, learners conduct experiments on acids and bases e.g. HCl + NaOH. • Make observations and balance the equations. • Write down reactions of metals with acids e.g. HCl + Zn. • Balance the equations • Reaction of acid (HCl) with the carbonate (CuCO₃) • Teacher explains reaction between oxygen (in water) and iron. This reaction is known as oxidation / rusting of iron / corrosion of iron. | <p>Completes chemical equations to represent chemical reactions between metals and acids, carbonates and acids, oxygen and metals, etc.</p> <p>Learners complete worksheet with equations for chemical reactions.</p> | <p>HCl, NaOH, Zn, CuCO₃, Water, nails, wire, activity book.</p> |
| <p>7 - 9</p> | <p>Standardized Assessment Task (SAT)</p> | <p>According to SAT marking instrument.</p> | |
| <p>10</p> | <p>Controlled Test / Midyear Exams</p> | <p>According to the developed marking instrument/ memo.</p> | |

| TERM: 3 WEEKS | TEACHING AND LEARNING ACTIVITIES | ASSESSMENT | RESOURCES |
|------------------|---|--|---|
| Weeks 1-2 | <p>LIFE AND LIVING TOPIC: MALNUTRITON AND DEFICIENCY DISEASES LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • Teacher explains the term “malnutrition”, cause of malnutrition (obesity) and its effect on the body • Describes deficiency diseases and give examples- kwashiorkor, Erasmus etc. • Teacher gives an extract showing pictures, symptoms and signs, of a person suffering from malnutrition. • Learners identify features of malnutrition. • Interview. The learners identify a case in their environment (community) e.g. an individual suffering from malnutrition. • Design a questionnaire to interview that affected individual. • Gather information on how to prevent or treat the condition. • Visit the clinics and nearby hospital and social workers. • The learners analyse the information and make a summary of causes and preventive measures of the diseases. | <p>Case study on malnutrition and deficiency diseases. Identify a disease caused by malnutrition. Conduct interview and write a report.</p> <p>Collect data regarding the disease from different people/community, draw a graph using that information Group Assessment</p> <p>Presentation of their findings to the class. A rubric is used for assessment - Teacher assessment</p> <p>Learners submit assignment on malnutrition. Rubric is used for assessment.</p> | <p>Pen , paper, questionnaire, health workers Affected community member, tape recorder, and camera. Graph sheet</p> |

| WEEKS | TEACHING AND LEARNING ACTIVITIES | ASSESSMENT | RESOURCES |
|--------|--|--|--|
| 3 | <p>TOPIC: RESPIRATORY SYSTEM LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • Discuss respiratory organs, their functions and importance of the process. • Learners identify the parts, on the model of the respiratory system • 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. • Teacher explains and discusses the gaseous exchange in the lungs and the respiratory sites in the cells (mitochondria). • Discuss respiratory diseases caused by pollution. | <p>Labelled drawing of respiratory system with a brief explanation of the functions of the important parts of the system.</p> <p>Answer questions</p> <p>Make a poster showing dangers of smoking.</p> <p>Class test</p> | <p>Research books, internet, brochures, magazines, health institutions.</p> <p>Model, pencil, workbook, coloured pencils</p> |
| WEEK:4 | <p>TOPIC: EXCRETORY SYSTEM LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • Teacher discusses the importance of excretion and the organs responsible for the process. • Learners identify organs (lungs, kidney, skin etc) responsible for excretion using the model or charts. • Teacher explains the processes of how unwanted substances (faeces, urine, carbon dioxide, perspiration, etc.) are excreted by the body. | <p>Prepare an assignment on how unwanted substances are excreted by the body. Teacher assesses by using a rubric.</p> | <p>Textbooks, internet, research books, models</p> |

| | | | |
|-----------------------|--|---|--|
| <p>WEEK: 5</p> | <p>TOPIC: VARIATION IN ORGANISMS LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • Field trip: The learners study different organisms in their natural habitats. • The learners will prepare a poster to illustrate the adaptation mechanism used by few animals in the ecosystem. • Learners do research on human activities that caused extinction of a certain species of living organisms. | <p>Collect and record data regarding organisms in their natural habitats.</p> <p>Teacher/ Group uses checklist to assess.</p> <p>Reports on human activities that caused extinction of certain species. Engage in a gallery walk.</p> | <p>Notebook, pen/pencil, tape recorder, camera</p> <p>Poster charts, coloured pencils, magazines, photographs, books.</p> <p>Textbooks, cameras, photographs/pictures.</p> |
| <p>WEEK: 6</p> | <p>MATERIAL AND MATERIALS TOPIC: EXTRACTION OF USEFUL MATERIALS FROM RAW MATERIALS LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • Brainstorm the processes taking place in a mine as extraction of pure metal from its ore • The teacher explains to the learners how useful materials are extracted from naturally formed 'raw' materials e.g. iron in the form of iron oxide (Fe₂O). Discuss the processes of either heating or electrolysis. • Learners observe the demonstration on the separation of iron oxide to iron and oxygen. | <p>Explain reactions of acids with metals, metal oxides and carbonates.</p> <p>Completion of chemical equations for the reaction.</p> <p>Learners conduct simple experiments and record their findings.</p> | <p>Science kit</p> <p>Chemicals, test tubes spirit lamp, spoon, goggles.</p> |

| | | | |
|-----------------------|--|---|---|
| <p>WEEK: 7</p> | <p>ENERGY AND CHANGE TOPIC: HOW TO SAVE ENERGY LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • Learners investigate how to save electricity. • Teacher invites an expert from an electrical company to talk on how to save electricity and the cost of electricity. • 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. • 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. | <p>Investigation on the use of electricity and ways to reduce the consumption of electricity in households, presentation of the findings Rubric to assess presentation.</p> <p>Completing a questionnaire based on the topic of talk.</p> <p>Teacher assesses using a memo.</p> <p>Submit report on findings of different sources of energy (for a gallery walk). The teacher uses a checklist to assess.</p> <p>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.</p> | <p>Notebooks, research books, magazines, newspapers, brochures.</p> <p>Expert, tape recorders, questionnaire,</p> <p>Models, internet, textbooks, magazines.</p> <p>Community members, pen, paper, newspaper.</p> |
|-----------------------|--|---|---|

| | | | |
|----------------------|---|---|--|
| <p>WEEK:8</p> | <p>EARTH AND BEYOND TOPIC: IMPACT OF HUMAN LIFE(ACTIVITIES) IN THE ATMOSPHERE LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • Learners discuss the change in weather patterns. • Teacher uses pictures, articles, videos of the effect of factors that contribute towards Global Warming. • Learners discuss the influence of human activities on Global warming. • Teacher explains the impact of different human activities and ways to reduce/prevent these, to lessen the effect on the earth. | <p>Investigate the changes in weather patterns in recent years in SA and globally.</p> <p>-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 cause of these events.</p> <p>Write a written report on your findings and suggest possible solutions to reduce global warming.</p> <p>Make flyers/ postcards to inform the public about the causes of Global warming.</p> | <p>Books, newspapers, Internet, magazines, TVs, radios, etc.</p> |
|----------------------|---|---|--|

| | | | |
|-----------------------|---|--|--|
| <p>WEEK: 9</p> | <p>EARTH AND BEYOND TOPIC: GEOLOGICAL EVENTS- earthquakes and volcanic eruptions LO 1 AS: 1, 2 AND 3 LO 2 AS: 1,2 ,3 AND 4 LO 3 AS: 1</p> <p>ACTIVITIES:</p> <ul style="list-style-type: none"> • Teacher discusses geological events the causes, types and effects of earthquakes. • Learners investigate about volcano focusing on the questions: What is a volcano? Classification of volcanoes. Effect of volcanoes on the environment. • 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. • Collect information on earth’s active volcanoes. • Learners do research on the history of volcanoes in Africa. • Translate information on to a graph/ table. • Learners will make a model (practical work) of an erupting volcano. • Learners will make a presentation on the model of volcano. | <p>Investigation on recent eruptions of volcanoes and write a report on its impact on human life. Use a rubric to assess.</p> <p>The learners submit their models and present in groups. The teacher uses a rubric to assess.</p> | <p>Research books, magazines, text books, notebooks, pen/pencils, internet</p> <p>Internet, graph sheet, Research books, magazines, text books, notebooks, pen/pencils</p> <p>Modelling clay/clay, Paper, plank, coloured paint.</p> |
|-----------------------|---|--|--|

LESSON EXEMPLAR: GRADE 9

| | | |
|--|--|---|
| Grade :9 | | Date: |
| Duration: 6Hrs | | |
| Topic: Space exploration | | |
| Core knowledge and concepts: Planet Earth and Beyond | | |
| Sub-Strand: Our place in Space | | |
| <i>Space exploration programmes involve international collaboration in the use of earth-based telescopes (such as SALT in South Africa) and telescopes in orbit. Robotic spacecraft travel long distances to send back data about planets and other bodies in our solar system, and research is being done on ways to investigate Mars.</i> | | |
| Learning Outcomes | | Integration Language LO2,3,5 Speaking Reading & Viewing Thinking & Reasoning Technology LO2 Technological knowledge and understanding Geography LO2 Geographical knowledge and understanding |
| LO1: Scientific Investigations | | |
| Assessment Standards | | |
| AS1: Planning an investigation | | |
| AS2: Conducting an Investigation | | |
| AS3: Evaluate and Communicating findings | | |
| LO2: Constructing Scientific knowledge | | |
| AS1: Recalling Information | | |
| AS2: Categorising information | | |
| AS3: Interpreting information | | |
| AS4: Applying Knowledge | | |
| LO3: Science, Society and environment | | |
| AS1: Understand Science as an Human endeavour | | |
| AS2: Understand the sustainable use of earth's resources | | |
| Previous knowledge: Solar System | | |
| Teaching & Learning activities | | Assessment |

Introductory activity on cultural myths and beliefs.

Learner groups are given instructions to go and find out about different beliefs and knowledge in their culture, concerning the solar system. These Beliefs and Myths must be written on a poster chart and put up on the classrooms notice board for everybody to read.

Activity 1. Telescopes.

LO1: AS2 & 3

Teacher uses convex lenses to demonstrate how telescopes work & learners will observe.

Worksheet:

Activity 1.1

Learners are given information to read about different telescopes.

1. The refracting telescope
2. The reflecting telescope
3. The radio telescope

The following activity sheet is answered:

Complete the table below:

| Type of telescope | How it works |
|-------------------|--------------|
| | |
| | |
| | |

1.2 Record your answers to the following questions:

- a. Why is there a limit to the size of a refracting telescope?
- b. What change in the design of the reflecting telescope can be made so that larger and more effective telescopes can be built?
- c. Why can radio telescopes be built larger than other Earth-based telescopes?
- d. How has the use of telescopes helped people to improve their scientific knowledge about space?
- e. Recently some astronomers have been trying to find Earth-like planets around some stars in our galaxy. Which type of telescope would be most suitable for them to use? Explain your answer. Share your answer with a partner/group.

1.3 Make a simple refracting telescope.

In the groups learners are given the following materials and challenged to build a simple refracting telescope.

A lamp or candle

Modeling clay

Written work on different beliefs and knowledge in their culture, concerning the solar system.

Making a telescope

Answer the questions

| | |
|---|----------------------|
| <p>1.3 Make a simple refracting telescope.</p> <p>In the groups learners are given the materials and challenged to build a simple refracting telescope.</p> | |
| <p>1.4 Then do the following:</p> <ol style="list-style-type: none"> 1. Put a lamp at one point of the classroom. 2. Move to the other end of the classroom so that you are as far away from the lamp as possible. 3. Use modelling clay to stick a long-focus convex lens onto a metre stick. This objective lens should be about 20cm from one end of the metre stick. 4. Point the end with the objective lens towards the lamp. Hold a piece of wax paper about 20cm from the other end of the metre stick. Find the image of the lamp on the piece of wax paper. 5. Place a short-focus convex lens as the eyepiece between the wax paper and the end of the meter stick. This lens is the eyepiece. 6. Adjust the eyepiece so that you can see the image of the lamp clearly on the wax paper. Then use modelling clay to stick the eyepiece onto the metre stick at this point. 7. Remove the wax paper and look at the image of the lamp through your simple homemade telescope. 8. Replace the lamp with other objects such as books so that you can look at them through your simple telescope. 9. Share your observation with the rest of the class. | <p>Presentations</p> |

| | |
|---|--|
| <p>Activity 2: LO2: AS3 Project: For one month in the evening learners spend some time observing the sky. Write observations in your workbook on the phases of the moon and on star constellations. Write down any other observation. You may draw where possible.</p> <p>Activity 3: LO2: AS1; LO3: AS1</p> <p>Hold a brainstorming session on living in "space" with learners. Learners are given an assignment to do on the history of the ISS and life in the ISS in comparison to life on earth.</p> | <p>Learners will work in pairs to create a Presentation (chart or written). Their presentation will be based on the following questions:</p> <p>List the contributions of past, present, and future space exploration missions.</p> <p>What are some space exploration missions?</p> <p>How has space exploration improved the quality of life on Earth?</p> |
| <p>Resources: Lenses/magnifying glasses, dead insects and leaves, A lamp or candle, Modelling clay, A long focus (50cm) convex lens, A short focus (5cm) convex lens, A piece of wax paper, A meter stick, binoculars if available; workbook, Chalkboard, work book, books on space, internet etc</p> | |
| <p>Forms of assessment: Demonstration, presentation, homework (assignment), research & brainstorming.</p> | |
| <p>Expanded opportunities:</p> <ul style="list-style-type: none"> • Do a research on the latest development regarding planets • Is space exploration a waste of money or is it worth the money spent? Discuss this in your workbook | <p>Teacher reflection: <i>Teachers will note</i> <i>how the Lesson Plan could have been presented differently</i> <i>other examples that may have been used</i> <i>what was good / weak about the lesson</i> <i>concepts that have not been dealt with effectively</i></p> |

They will be evaluated during the presentation using this rubric:

| Criteria vs. level | 1 | 2 | 3 | 4 |
|--|---------------------------|------------------------|----------------------------|------------------------------|
| Research question answered | Not answered | One answered | Two answered | All answered |
| Systematic presentation | No order | Struggle to follow | Can be followed | Systematic |
| Eye contact | No eye contact | Looking up | Not always | Good eye contact |
| Depth and accuracy of factual information presented | Fact no clearly expressed | Few fact are presented | Facts were fairly adequate | Enough facts given logically |

Research Project:

LO1: AS2 & 3

Resources

Printed material with this information

Topics to research: In pairs learners will do research on the three topics

1. Space exploration of one of the Planets (excluding Earth)
2. National and International Space Explorations excluding the planets
3. NASA history from 1957 - 1966 / from 1967 – 1979/ from 1980 – 1989/ from 1990 – 2000/ 2001 +
(Teacher should monitor the progress of the pairs).

Assessment tool for the research

1. Space Explorations of the Planets:

| Item | Marks |
|--|-------|
| Planet overview: size, composition, distance from the sun and earth, ability to support life | 4 |
| When was the first mission, include the month/year and country | 3 |
| Purpose of the mission | 1 |
| Estimated Cost (optional) | 1 |

| | |
|--|---|
| Crew Members | 1 |
| Data retrieved | 1 |
| Successes and Failures | 2 |
| Contributions and Effects | 2 |
| Type of Technology used (telescope, rocket, satellite, etc.) | 1 |
| When the most recent mission to the planet, include month/year and country | 3 |
| Are there any future missions planned. If so, when and why? If not, why. Explain | 3 |

2. **Space Exploration for Non-Planets:**

| Item | Marks |
|-----------------------------------|-------|
| Name of Mission | 1 |
| Country Participating the Mission | 1 |
| Estimated Cost | 1 |
| Purpose | 1 |
| Successes and Failure | 1 |
| Contributions and Effects | 1 |

3. **The NASA Space Program:**

| Item | Marks |
|---|-------|
| Original Purpose of NASA | 1 |
| When and why did it change | 1 |
| Current purpose for NASA | 1 |
| Organization of NASA | 1 |
| Various Locations of Branches | 1 |
| How is NASA funded? | 1 |
| Number of missions conducted by NASA since 1957 | 1 |
| Highlight three major accomplishments of the NASA Space Program | 1 |

| Grade: 9 | | Learning Area: Natural Sciences | |
|---|--|---|--|
| Strand: Matter and Materials | | | |
| Duration: 3 weeks | | Content in context: Reaction of oxygen with metals and non-metals | |
| Integration: Language, mathematics | | | |
| Selected LOs and ASs | | Learning Activities | |
| <p>LO 1: SCIENTIFIC INVESTIGATIONS AS: Plans investigations: AS: Conducts investigation and collects data AS: Evaluates data and communicates findings</p> <p>LO2: CONSTRUCTING SCIENCE KNOWLEDGE: AS: Recalls meaningful information: AS: Categorizes information:</p> <p>LO 3: SCIENCE, SOCIETY AND THE ENVIRONMENT AS: Understands science and technology in the context of history and indigenous knowledge.</p> | | <p>Activity:1</p> <ul style="list-style-type: none"> List ten elements from the Periodic table. Categorise these elements into metals and non-metals. Bring different types of metals from home, burn them and see what happens. Record your findings. <p>Activity: 2</p> <p>An investigation into the reaction of oxygen with different substances:</p> <ul style="list-style-type: none"> Teacher demonstrates the reaction of sodium and potassium with oxygen/air. Record observations- name of metal, what changes occurred during the experiment. <p>Activity: 3</p> <ul style="list-style-type: none"> Learners conduct simple investigation tests to observe the reactions of metals/non-metals with air/oxygen .e.g. magnesium, iron (steel wool) calcium, carbon (charcoal) and sulphur. Each time try to determine the smell of the product and write down your observation. After you have completed the investigation with carbon, pour a little lime water into the jar, close it | |
| | | <p>Details of assessment</p> <p>Categorise elements into metals and non-metals.</p> <p>Completion of worksheet on reactions of metals and non-metals with oxygen. Write word equations, use symbols and balance equations.</p> <p>Class test</p> <p>ASSESSMENT METHODS: Teacher Peer/Self</p> <p>ASSESSMENT TOOLS Rubric Memo</p> | |

| | | |
|--|---|--|
| | <p>with a cover slip and shake it. What happens to the lime water? Explain your observation. Test for acidity and alkalinity of oxides using indicators- use litmus paper and observe colour changes.</p> <ul style="list-style-type: none"> • Write an equation in words for each of the reactions observed. • Use symbols and write down the reactions and balance the equations. • Teacher explains the use of indicators to find out the acidity and alkalinity of solutions. <p>Activity: 4</p> <ul style="list-style-type: none"> • Investigate the process of rusting as one of the reactions that takes place in everyday life, by placing a piece of steel wool in water and another piece in oil and observe over a period of two days. • Report back on the findings. • Discuss ways to prevent rusting, corrosion etc and its impact on the economy. | |
| <p>Resources: Steel wool, charcoal, tins, water, indicators, cooking oil, magnesium ribbon, aluminium, iron</p> | | |
| <p>EXPANDED OPPORTUNITY Investigate corrosion</p> | <p>Teacher Reflection What improvement to be made for a more successful lesson.</p> | |