



Kingdom of Lesotho  
Ministry of Education and Training



# GRADE 8 SCIENCE AND TECHNOLOGY SYLLABUS 2018



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## INTRODUCTION

The National Curriculum Development Centre (NCDC) in collaboration with the Examination Council of Lesotho (ECOL), National Task Teams/Panels, teacher training institutions, teacher associations, policy makers and educators in Lesotho identified the need for a new Curriculum that would respond to the changing demands of the education sector.

Two major developments have been the move by the country to the universal and compulsory Basic Education and the launch of the Curriculum and Assessment Policy 2009 (Education for Individual and Social Development) which advocates for integrated Basic Education Curriculum that permits persons with a wide range of abilities to benefit from educational provision at this level. The decision to implement programmes to achieve Universal Basic Education and integrated curriculum is based on an understanding that the country needs a well-educated and trained labour force for an increasingly competitive global environment. A sound secondary education foundation is imperative for further education and training and for entry in the world of work.

Science and Technology in the Scientific and Technological Learning Area is a systematic enterprise that builds and organises knowledge in the form of testable explanations and predictions about nature and the universe. It deals with collection of techniques, methods or processes used in the production of goods or services or in the accomplishment of objectives, such as scientific investigation. It contains elements from several traditional “subjects”, including Science, Technical Subjects (ICT, Home Economics), Agriculture, Physical Geography, as well as Health and Physical Education.

Science seeks to promote understanding of scientific and environmental phenomena. It considers the environment as a multi-dimensional concept consisting of biophysical, social, scientific, technological, political, economic, personal and contextual dimensions. It therefore concerns the understanding of scientific and environmental phenomena in terms of physical, economic, social, political and technological development and seeks to promote knowledge, skills and values pertinent to science and technology. Learners need to develop skills such as problem-solving, critical thinking, effective and functional communication, technological and creative skills, predicting, observing, classifying, hypothesising, experimenting, and communicating, whilst gaining:

- an acquisition and understanding of scientific and technological concepts, principles and processes for socio-economic development;

- an understanding of environmental phenomena, including the physical, socio-economic and technological dimensions of environmental issues;
- the ability to apply scientific and technological skills in solving everyday life challenges;
- positive attitudes and values towards the use of science and technology in everyday life.

In Grade 8, the subject has designed activities in such a manner that they enable and promote the use of the scientific, investigation/inquiry and learner-centred approach. The four steps of the scientific method are observation of a phenomenon, formulation of a hypothesis, prediction of future outcomes or other phenomena, and experimentation to test the validity of the predictions. A hypothesis becomes a theory or law of nature if the experiments confirm its validity. Otherwise, it must be modified or rejected and the data further examined. Scientists postulate that the basic laws of the universe are unchangeable, and through observation and experimentation, humans determine the validity of their beliefs to better understand the nature of reality. As such teachers are encouraged to teach likewise. However, teachers can also adopt other approaches to facilitate effective and efficient teaching and learning. Teachers should ensure that activities given to learners develop the above-mentioned scientific competencies.

Certain attitudes or dispositions are also central to scientific inquiry and discovery: these include curiosity, a drive to experiment as well as a desire to challenge theories and to share new ideas and appreciate the world (Conezio & French, 2002). Therefore in Grade 8, Science and Technology will be divided into two sections. The first section will deal with the natural sciences, while the second part will deal with the Applied Sciences. The following attitudes and values are also important while teaching science and technology to learners. These are:

Appreciation  
 Awareness  
 Cooperation  
 Responsibility  
 Integrity  
 Curiosity  
 Self – efficacy

## **TEACHING SCIENCE AND TECHNOLOGY**

Careful selection of content, and use of a variety of approaches to teaching and learning Science and Technology, should promote understanding of:

- Science as a discipline that sustains enjoyment and curiosity about the world and natural phenomena.
- the history of Science and the relationship between Sciences and other subjects.
- the different cultural contexts in which indigenous knowledge systems have developed.
- the contribution of Science to social justice and societal development.
- the need for using scientific knowledge responsibly in the interest of ourselves, of society and the environment.
- the practical and ethical consequences of decisions based on Science.

Science and Technology at Basic Education Level lays the foundation for further studies in more specific Science related disciplines, such as Life Sciences, Physical Sciences, Earth Sciences or Agricultural Sciences and Biological Sciences. It prepares learners for active participation in a society that values technology and promotes responsibility towards the environment. Sciences and Technology can also prepare learners for economic activity and self-expression.

## **OBJECTIVES**

It is expected that at the end of Grade 8 learners could have;

1. acquired knowledge, skills, attitudes and values that will enable them to further their studies either in the Natural Sciences or Applied Sciences.
2. developed research skills to assist them acquire new knowledge.
3. acquired practical skills necessary for further studies.
4. developed skills that will enable them to solve day to day problem and challenges.
5. acquired technological skills to enable them to fit into the changing technological world.

## **COMPETENCIES**

At the end of Grade 8 it is expected that learners will have the following competences and skills:

Learners should be able to:

- observe phenomena and record observations
- draw

- compare
- perform experiments following instructions
- record observations using appropriate means
- manipulate apparatus
- outline methods/procedure used and results obtained
- carry out research with minimal assistance
- present results
- interpret data from different sources measure required quantities accurately
- construct graphs and tables
- solve problems with minimal guidance
- write a scientific report.

### **TEACHING HOURS**

It is recommended that the Science and Technology be allocated 280 minutes per week comprising of three forty (40) minutes periods and two 80 minute period, making it a total of seven periods per week.

## **GRADE 8 SCIENCE AND TECHNOLOGY**

### **SYLLABUS OVERVIEW**

**Learning Outcome: at the end of Grade 8 learners should be able to:**

#### **SCIENCE IN PERSONAL AND SOCIAL PERSPECTIVE**

1. practise methods of irrigation.
2. describe soil fertility.
3. apply soil conservation methods.
4. describe soil drainage.
5. production field crops.
6. describe the impact of population on agricultural land.
7. describe the commercial production of livestock.
8. keep farm records.
9. describe agricultural economics.
10. preserve food.
11. prepare stimulating and nourishing beverages.
12. describe preparation of fruits and vegetables.

#### **PHYSICAL SCIENCES**

13. use science processes to acquire knowledge and solve problems. TG
14. investigate properties and uses of acids and bases.
15. describe reflection of light.
16. describe motion.
17. perform experiments and calculate pressure in solids.
18. demonstrate understanding of magnetism.
19. describe the chemistry of water.
20. describe separation techniques in mixtures.

21. use the Periodic Table.
22. describe formation of compounds.

### **Life Sciences**

23. use asexual reproduction in commercial production of plant crops.
24. practise plant protection.
25. practice animal protection against parasites and predators.
26. describe the effect of heat on food.
27. describe structure and adaptation of specialised cell.
28. describe breathing process in humans.
29. describe the internal parts of the skin and their functions.
30. describe the internal parts of an ear and their functions.

### **EARTH AND SPACE SCIENCE**

31. discuss and explain characteristics of members of the solar system.
32. describe the earth's atmosphere.
33. describe the composition of the earth.
34. describe chemical weathering and the related features.
35. discuss factors influencing climate and the relationship between pressure and global movement of winds.
36. describe processes of wind erosion and transportation.

### **ENERGY**

37. describe the law of conservation of energy.
38. describe heat transfer and its applications.
39. demonstrate understanding of static electricity
40. demonstrate understanding of cells as sources of electricity.

### **TECHNOLOGY**

41. describe simple machines and their applications.



- 42.describe care and maintenance of garden tools and tractor drawn implements.
- 43.demonstrate skills of accurate measuring and weighing in food preparation.
- 44.demonstrate cleaning and care for wooden equipment and utensils.
- 45.use technology to safe money.
- 46.perform basic functions of excel programme.

## GRADE 8 SCIENCE AND TECHNOLOGY

### SYLLABUS ACTIVITY PLAN

#### SCIENCE IN PERSONAL AND SOCIAL PERSPECTIVE

Learning Outcomes: at the end of Grade 8, learners should be able to:	Concepts, Skills, Values and Attitudes	Suggested Learning Experiences	What to assess: the teacher should assess learners' ability to:	Suggested Resources
1. practise methods of irrigation.	<p><b>Concepts</b>  Irrigation  Importance of irrigation  Methods of irrigation:  - flood irrigation  - furrow irrigation  - sprinkler irrigation  Water conservation  Importance of conserving  water  Methods of conserving  water on:  - arable land  - non - arable land  Dam construction</p> <p><b>Skills</b>  Manipulation  Observation  Problem-solving  Critical thinking</p>	<p><b>Teacher and learners:</b></p> <ul style="list-style-type: none"> <li>• revise watering of plants.</li> <li>• discuss irrigation.</li> <li>• discuss importance of irrigation.</li> <li>• discuss different methods of irrigation.</li> <li>• discuss the relationship between irrigation and water conservation.</li> <li>• take a field trip to observe different methods of irrigation</li> <li>• Teacher invites resource persons to discuss methods of conserving water on arable and non – arable land.</li> </ul>	<p>list different methods of irrigation.</p> <p>state the importance of irrigation</p> <p>differentiate between flood, sprinkler and furrow irrigation methods.</p> <p>practise flood, sprinkler and furrow irrigation methods.</p> <p>state the relationship between irrigation and water conservation.</p>	<p>Resource person.</p> <p>Environment.</p> <p>Field trips.</p> <p>Charts.</p> <p>Posters.</p> <p>Pictures.</p> <p>Garden tools.</p>

	<p>Decision-making</p> <p><b>Values and Attitudes</b></p> <p>Caring</p> <p>Responsibility</p> <p>Awareness</p> <p>Appreciation</p>	<p><b>Under the guidance of a teacher, learners:</b></p> <ul style="list-style-type: none"> <li>• undertake a mini project to practise different methods of irrigation.</li> <li>• undertake a project to practise methods of conserving water.</li> <li>• discuss effects of dams on soil conservation.</li> <li>• construct a dam.</li> </ul>	<p>write a report on a methods of irrigation field trip.</p> <p>identify methods of conserving water</p> <p>practise methods of conserving water on arable land.</p> <p>practise methods of conserving water on non - arable land.</p> <p>construct a dam.</p>	
2. describe soil fertility.	<p><b>Concepts</b></p> <p>Soil fertility</p> <p>Essential elements:</p> <ul style="list-style-type: none"> <li>- micro-nutrients</li> <li>- macro-nutrients</li> </ul> <p>Fertilisers:</p> <ul style="list-style-type: none"> <li>- organic</li> <li>- inorganic</li> <li>- advantages and disadvantages</li> </ul> <p>Soil pH:</p> <ul style="list-style-type: none"> <li>- Loss of soil fertility</li> </ul>	<p><b>Teacher and learners:</b></p> <ul style="list-style-type: none"> <li>• revise soil fertility done in previous grades.</li> <li>• discuss essential elements/nutrients necessary for plant growth.</li> <li>• discuss the difference between micro and macro nutrients needed by plants.</li> <li>• discuss organic and inorganic fertilisers, their</li> </ul>	<p>name essential elements for plant growth.</p> <p>discuss importance of essential elements in plant growth.</p> <p>differentiate between micro and macro nutrients.</p>	<p>Environment.</p> <p>Fertilizer samples.</p> <p>Soil testing kit.</p> <p>Soil samples.</p>

	<p>- Maintenance of soil fertility</p> <p><b>Skills</b>  Manipulation  Observation  Identification  Problem-solving  Decision-making  Evaluation  Recording  Measurement</p> <p><b>Values and Attitudes</b>  Caring  Responsibility  Awareness  Appreciation</p>	<p>importance in soil fertility, and advantages and disadvantages of each.</p> <p><b>Learners:</b></p> <ul style="list-style-type: none"> <li>• identify organic and inorganic fertilisers.</li> <li>• discuss soil pH and its effects in crop production.</li> <li>• in groups, determine pH of different soil samples.</li> <li>• identify factors that cause loss of soil fertility.</li> <li>• describe methods used to maintain soil fertility.</li> <li>• carry out projects that maintain soil fertility under the guidance of the teacher.</li> </ul>	<p>differentiate between organic and inorganic fertilisers.</p> <p>state advantages and disadvantages of organic and inorganic fertilisers.  describe soil pH.</p> <p>state the effects of soil pH in crop production.</p> <p>determine soil pH of different soil samples.</p> <p>identify methods to maintain of soil fertility.</p> <p>mention factors that cause of loss of soil fertility</p> <p>carry out various projects that maintain soil fertility in their school garden.</p>	
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3. apply soil conservation methods.	<p><b>Concepts</b> Soil conservation Methods of soil conservation: - gabions - silt traps</p> <p><b>Skills</b> Observation Manipulation Decision-making Problem-solving Critical thinking Measurement</p> <p><b>Values and Attitudes</b> Awareness Appreciation Cooperation Responsibility</p>	<p><b>Teacher and learners:</b></p> <ul style="list-style-type: none"> <li>• revise soil erosion done in previous grades.</li> <li>• discuss soil conservation.</li> <li>• discuss gabions and their effects on soil conservation.</li> <li>• discuss silt traps and their effects on soil conservation.</li> </ul> <p><b>Learners:</b></p> <ul style="list-style-type: none"> <li>• identify eroded areas where gabions can be used to conserve soil.</li> <li>• under the guidance of a teacher, construct gabions.</li> <li>• identify eroded areas where soil can be conserved by silt traps.</li> <li>• under the guidance of a teacher, construct silt traps.</li> </ul>	<p>state effects of gabions on soil conservation.</p> <p>state the effects of silt traps on soil conservation.</p> <p>identify areas where gabions can be used to conserve soil.</p> <p>identify areas where silt traps can be used to conserve soil.</p> <p>construct gabions.</p> <p>construct silt traps.</p>	<p>Environment.</p> <p>Wire meshes.</p> <p>Stones.</p> <p>Garden tools.</p> <p>Internet.</p> <p>Pictures.</p> <p>Posters.</p>
4. describe soil drainage.	<p><b>Concepts:</b> Soil drainage Effects of soil drainage Methods of drainage: - Surface</p>	<p><b>Teacher and learners:</b></p> <ul style="list-style-type: none"> <li>• discuss soil drainage.</li> <li>• discuss the effects of soil drainage.</li> </ul>	<p>define soil drainage.</p> <p>mention methods of soil drainage.</p>	<p>Environment.</p> <p>Internet.</p> <p>Pipes.</p>

	<p>- Subsurface</p> <p><b>Skills</b>  Manipulation  Observation  Identification  Critical thinking  Evaluation  Problem-solving  Decision-making</p> <p><b>Values and Attitudes</b>  Responsibility  Awareness  Appreciation</p>	<ul style="list-style-type: none"> <li>• discuss surface and sub-surface drainage.</li> <li>• discuss advantages and disadvantages of surface and sub-surface drainage.</li> </ul> <p><b>Learners:</b></p> <ul style="list-style-type: none"> <li>• identify areas where surface drainage can be used.</li> <li>• identify areas where sub-surface drainage can be used.</li> <li>• under the supervision of the teacher, practise surface drainage.</li> <li>• under the supervision of the teacher, practise subsurface drainage.</li> </ul>	<p>state importance of soil drainage.</p> <p>differentiate between surface and sub-surface drainage.</p> <p>practise surface and sub-surface drainage.</p>	Garden tools.
5. produce field crops.	<p><b>Concepts</b>  Different classes of crops:  - vegetables, field, fruit and trees</p> <p>Crop production:  Site selection</p> <p>Land preparation:  -site clearance  -tillage practices:</p>	<p><b>Teacher and learners:</b></p> <ul style="list-style-type: none"> <li>• discuss different classes of crops according to their use and products.</li> <li>• revise crop production.</li> <li>• discuss factors to consider when selecting a site for crop production.</li> <li>• discuss factors to consider when clearing</li> </ul>	<p>name different classes of crops according to their use and products.</p> <p>identify factors that influence site selection for crop production.</p>	<p>Land.</p> <p>Charts.</p> <p>Garden tools.</p> <p>Agric machinery/implements.</p> <p>Variety of crops.</p>

	<p>primary secondary</p> <p>minimum/conservational tillage</p> <p>Choice of cultivar Methods of sowing Application of fertilisers Harvesting and storage Marketing</p> <p><b>Skills</b> Manipulation Observation Identification Problem-solving Decision-making Evaluation Critical thinking Recording Measurement</p> <p><b>Values and Attitudes</b> Caring Responsibility Awareness Appreciation Cleanliness</p>	<p>a land for crop production.</p> <ul style="list-style-type: none"> <li>• discuss different tillage practises done during soil preparation.</li> </ul> <p><b>Learners:</b></p> <ul style="list-style-type: none"> <li>• identify suitable site for crop production.</li> <li>• carry out a practical exercise to prepare land for growing different crops.</li> <li>• discuss factors to consider when choosing different crop cultivars.</li> <li>• practise different methods of sowing on their plots.</li> </ul> <p><b>Teacher and learners:</b></p> <ul style="list-style-type: none"> <li>• discuss methods of fertilizer application in crop production.</li> <li>• discuss harvesting and storage of crops.</li> </ul>	<p>state factors to consider during land clearance for crop production.</p> <p>state difference between primary, secondary and minimum tillage practices.</p> <p>state factors to be considered when choosing a crop cultivar.</p> <p>Carry out a practical exercise to prepare land for growing different crops.</p> <p>demonstrate between methods of sowing seeds on their plots.</p> <p>demonstrate methods of fertilizer application.</p>	<p>Pictures.</p> <p>Posters.</p> <p>Internet.</p>
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		<b>Learners:</b> <ul style="list-style-type: none"> <li>• demonstrate methods of fertilizer application.</li> <li>• demonstrate methods harvesting and storage of crops.</li> <li>• Teacher and learners discuss marketing of crops.</li> <li>• Teacher guides learners to undertake a project on production of crops.</li> </ul>	demonstrate harvesting methods.  demonstrate storage methods.  carry out a practical exercise for growing crops of their choice	
6. explain impact of population on agricultural land.	<b>Concepts</b> Population growth Impact of population growth Land use  <b>Skills</b> Observation Identification Problem-solving Decision-making Evaluation  <b>Values and Attitudes</b> Caring Responsibility Awareness Appreciation	<b>Teachers and learners:</b> <ul style="list-style-type: none"> <li>• discuss relationship between population growth and land use.</li> <li>• discuss impact of population growth on agricultural land.</li> <li>• discuss ways in which agricultural land can be affected by population growth.</li> <li>• identify affected agricultural land due to population growth.</li> <li>• Learners debate on the effects of population growth on agricultural land.</li> </ul>	relate population growth to land use.  state the impact of population growth on land.  identify ways in which an agricultural land can be affected by population growth.  identify affected agricultural land due to population growth.	Charts.  Environment.  Internet.  Pictures.  Resource person.



		<ul style="list-style-type: none"> <li>Teacher invites resource person to discuss impact of population on agricultural land.</li> </ul>	argue on the effects of population growth on agricultural land.	
7. describe commercial production of livestock.	<p><b>Concepts</b></p> <p>Commercial production of livestock</p> <p>Socio-economic importance of livestock</p> <p>Livestock management:</p> <ul style="list-style-type: none"> <li>Housing</li> <li>Feeding</li> <li>Cleaning</li> <li>Handling</li> <li>Castration</li> <li>Identification</li> <li>Injection</li> <li>dehorning</li> <li>Culling</li> <li>Weaning</li> <li>Fostering</li> <li>Candling</li> <li>Debeaking</li> <li>Slaughtering</li> </ul> <p>Breeding</p> <p>Disease control</p> <p>Effects of proper management on</p>	<p><b>Teacher and learners:</b></p> <ul style="list-style-type: none"> <li>discuss commercial production of livestock.</li> <li>discuss social and economic importance of livestock.</li> <li>discuss proper housing of livestock.</li> <li>Learners discuss material for livestock housing.</li> <li>discuss proper feeding of livestock.</li> <li>discuss proper cleaning of livestock environment.</li> <li>discuss proper handling of animals.</li> <li>Teacher demonstrates proper handling of animals.</li> <li>Learners practise proper handling of animals.</li> </ul>	<p>identify commercial benefits from production of livestock.</p> <p>state social and economic importance of livestock.</p> <p>mention proper housing of different livestock.</p> <p>discuss proper feeding of different livestock.</p> <p>describe proper handling of different livestock.</p> <p>engage in a livestock project to practise castration, identification,</p>	<p>Internet.</p> <p>Charts.</p> <p>Posters.</p> <p>Shears.</p> <p>Spades.</p> <p>Protective clothing.</p> <p>Medical kit.</p> <p>Broom.</p> <p>Dehorning equipment.</p> <p>Castration equipment.</p> <p>Debeaking equipment.</p> <p>Slaughtering kit.</p>

	<p>livestock production</p> <p><b>Skills</b>  Observation  Identification  Manipulation  Problem-solving  Measurement  Decision-making  Evaluation  Measurement  Decision-making  Evaluation  Recording</p> <p><b>Values and Attitudes</b>  Caring  Responsibility  Awareness  Appreciation</p>	<p><b>Teacher and learners:</b></p> <ul style="list-style-type: none"> <li>• discuss breeding of animals.</li> <li>• discuss disease control in animal production.</li> <li>• discuss effects of proper management on livestock production.</li> <li>• Teacher invites resource person to discuss proper management of livestock.</li> <li>• Teacher and learners visit agricultural institutions and farms to observe proper management of livestock.</li> <li>• Teacher and learners discuss control of predators in animal production.</li> </ul>	<p>injection, dehorning, culling, weaning, fostering, candling, debeaking and slaughtering.</p> <p>describe breeding in livestock production.</p> <p>mention different ways of controlling diseases in livestock.</p> <p>state effects of proper management of livestock.</p> <p>use their interpersonal and intrapersonal skills effectively when engaging with the resource person.</p> <p>write a report on a field trip taken about proper management of livestock.</p>	
8. keep farm records in agricultural production.	<p><b>Concepts</b>  Farm records</p>	<p><b>Teacher and learners:</b></p> <ul style="list-style-type: none"> <li>• discuss different types of farm records.</li> </ul>	<p>State different types of farm records.</p>	<p>Internet.   Teacher's Guide.</p>

	<p>Importance of farm records</p> <p>Types of records:</p> <ul style="list-style-type: none"> <li>- inventory</li> <li>- financial: <ul style="list-style-type: none"> <li>costs</li> <li>sales</li> </ul> </li> <li>- diary</li> <li>- livestock: <ul style="list-style-type: none"> <li>health</li> <li>breeding</li> <li>feeding: <ul style="list-style-type: none"> <li>production</li> <li>daily activities</li> </ul> </li> </ul> </li> <li>- crops: <ul style="list-style-type: none"> <li>daily activities</li> <li>production</li> </ul> </li> </ul> <p><b>Skills</b></p> <p>Manipulation</p> <p>Observation</p> <p>Identification</p> <p>Problem-solving</p> <p>Recording</p> <p>Critical thinking</p> <p><b>Values and Attitudes</b></p> <p>Responsibility</p> <p>Awareness</p> <p>Appreciation</p> <p>Efficiency</p> <p>Assertiveness</p>	<ul style="list-style-type: none"> <li>• discuss importance of farm records.</li> <li>• identify books used in record keeping.</li> <li>• Teacher demonstrates record keeping.</li> <li>• Learners practise keeping of records.</li> <li>• Teacher invites resource person to discuss record keeping.</li> <li>• Teacher organizes field trip to agricultural institution to observe use of farm records.</li> </ul>	<p>explain the importance of farm records.</p> <p>describe types of records.</p> <p>demonstrate how farm records are kept in agricultural production.</p>	<p>Charts.</p> <p>Posters.</p> <p>Record books.</p> <p>Resource person.</p> <p>Agricultural institutions.</p>
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9. describe agricultural economics.	<p><b>Concepts</b> Agricultural economics Factors of production Problems of economics:  <ul style="list-style-type: none"> <li>- scarcity</li> <li>- choice</li> <li>- risks</li> <li>- uncertainty</li> </ul> Inputs:  <ul style="list-style-type: none"> <li>- fixed costs</li> <li>- variable costs</li> </ul> Outputs</p> <p><b>Skills</b> Identification Problem-solving Decision-making Evaluation</p> <p><b>Values and Attitudes</b> Responsibility Awareness Appreciation</p>	<ul style="list-style-type: none"> <li>• Teacher and learners discuss agricultural economics.</li> <li>• Teacher explains factors of production.</li> <li>• Teacher and learners discuss problems of economics.</li> <li>• Teacher explains inputs to learners.</li> <li>• Learners identify inputs.</li> <li>• Teacher explains outputs to learners.</li> <li>• Learners identify outputs.</li> </ul>	<p>describe factors of production.</p> <p>distinguish differences between risk and uncertainty.</p> <p>differentiate between scarcity and choice.</p> <p>differentiate between fixed and variable costs.</p> <p>state agricultural outputs.</p>	<p>Internet.</p> <p>Teacher's Guides.</p> <p>Posters.</p> <p>Charts.</p>
10. demonstrate methods of preserving food.	<p><b>Concepts</b> Methods of preservation food with principles:  <ul style="list-style-type: none"> <li>- pickling</li> <li>- jam – making</li> <li>- drying and salting</li> </ul> Preservatives</p>	<ul style="list-style-type: none"> <li>• Teacher and learners revise preservation methods covered in previous classes</li> <li>• Learners research on traditional practices on preservation of food.</li> </ul>	<p>state reasons for preserving food.</p> <p>list preservatives used.</p>	<p>Kitchen equipment.</p> <p>Ingredients.</p> <p>Food dryer.</p> <p>Preserving bottles.</p>

	<p>Reasons for preserving food</p> <p><b>Skills</b>            Demonstration            Observation            Manipulation            Preservation            Communication</p> <p><b>Values and Attitudes</b>            Appreciation            Cleanliness            Cooperation            Responsibility            Awareness</p>	<ul style="list-style-type: none"> <li>• Learners report their findings.</li> <li>• Teacher and learners discuss reasons for preserving food and preservative principles behind each method.</li> <li>• Teacher demonstrates different methods of preserving food (pickling, jam-making, drying and salting).</li> <li>• Learners identify preservatives (additives) and give reasons for adding them in different methods.</li> <li>• Explore different preservatives from food labels or packages.</li> <li>• Investigate prices of convenient foods (commercially processed/preserved).</li> </ul> <p><b>Learners in groups preserve:</b></p> <ul style="list-style-type: none"> <li>- vegetable by pickling.</li> <li>- fruits by jam-making.</li> </ul>	<p>demonstrate preserving of food by: pickling, jam making and drying and salting.</p> <p>explain preservation methods with principles.</p> <p>package and label preserved food substances.</p>	<p>Wire mesh-for-drying.</p> <p>Teacher's Guide.</p> <p>Food labels and packages.</p>
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		<ul style="list-style-type: none"> <li>- meat by drying and salting.</li> <li>- package and label preserved food substances.</li> </ul>		
11. prepare stimulating and nourishing beverages.	<p><b>Concepts</b></p> <p>Beverages</p> <p>Types of non-alcoholic beverages:</p> <ul style="list-style-type: none"> <li>- stimulating beverages: coffee</li> <li>- nourishing beverages: milk based drinks egg – based drinks sour porridge – motoho mahleu</li> </ul> <p>Nutritive value</p> <p>Setting drink tray</p> <p>setting tea tray</p> <p><b>Skills</b></p> <p>Manipulation</p> <p>Observation</p> <p>Demonstration</p> <p>Measuring</p> <p>Accuracy</p> <p>Cooking</p> <p>Recording</p> <p>Reporting</p>	<p><b>Teacher and Learners:</b></p> <ul style="list-style-type: none"> <li>• revise beverages covered in the previous grades.</li> <li>• discuss nutritive value of different beverages including tea.</li> <li>• explore different food labels and find more on nutritive value of different beverages.</li> <li>• Teacher demonstrates how to make different drinks using appropriate units of measurement.</li> </ul> <p><b>Learners:</b></p> <ul style="list-style-type: none"> <li>• explore sources of recipes for different beverages.</li> <li>• prepare different beverages.</li> <li>• identify suitable beverages for different people and meals.</li> </ul>	<p>state the nutrients found in the different beverages.</p> <p>prepare the different beverages.</p> <p>identify suitable beverages for different people and meals.</p> <p>set tea and drink tray.</p>	<p>Kitchen equipment.</p> <p>Recipe books.</p> <p>Ingredients.</p> <p>Teacher’s Guide</p> <p>Food labels.</p> <p>Internet.</p>

	<b>Values and Attitudes</b> Awareness Cleanliness Appreciation Cooperation	<ul style="list-style-type: none"> <li>• set tea and drink tray.</li> </ul>		
12. describe preparation of fruits and vegetables to retain their nutritive value.	<b>Concepts</b> Preparation of fruit and vegetables: <ul style="list-style-type: none"> <li>- Choice of fruits and vegetables</li> <li>- Nutritive value of each</li> <li>- rules for conserving nutrients during: preparation cooking serving</li> </ul> Proper Storage of fruits and vegetables at home  <b>Skills</b> Demonstration Observation Cutting Chopping Cooking  <b>Values and Attitudes</b> Cooperation Cleanliness	<b>Teacher and Learners:</b> <ul style="list-style-type: none"> <li>• revise cooking of fruits and vegetables from previous grades.</li> <li>• revise oxidation from previous grades.</li> <li>• discuss nutritive value of fruits and vegetables.</li> <li>• Learners compare oxidation occurring in fruits and vegetables during their preparation.</li> <li>• Learners measure different vegetables using appropriate instruments and units.</li> </ul> <b>Teacher:</b> <ul style="list-style-type: none"> <li>• brings different fruits and vegetables in class to identify good quality of .</li> </ul>	state nutrients found in fruits and vegetables.  explain proper storage of fruits and vegetables at home.  explain rules to observe when choosing fruits and vegetables.  describe ways of conserving nutrients in the preparation, cooking and serving of vegetables.	Kitchen equipment.  Fruits.  Vegetables.  Posters.  Teacher's Guide  Internet.

		<ul style="list-style-type: none"> <li>• demonstrates proper storage of fruit and vegetables at home.</li> <li>• demonstrates ways of conserving nutrients in the preparation, cooking and serving of vegetables and fruits.</li> <li>• Teacher and learners visit a nearby market to identify good quality of fruit and vegetables.</li> <li>• Learners report their findings.</li> </ul>		
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## PHYSICAL SCIENCES

Learning Outcomes: at the end of Grade 8, learners should be able to:	Concepts, Skills, Values and Attitudes	Suggested Learning Experiences	What to assess: the teacher should assess learners' ability to:	Suggested Resources
13. use science processes to acquire knowledge and solve problems.	<p><b>Concepts</b> Investigatory process:</p> <ul style="list-style-type: none"> <li>- identify a problem</li> <li>- hypothesis</li> <li>- data collection</li> <li>- data analysis</li> <li>- drawing conclusion</li> <li>- scientific report</li> </ul> <p><b>Skills</b> Observation Recording Interpretation Manipulation Reporting Communication</p> <p><b>Values and Attitudes</b> Curiosity Cooperation Honesty Appreciation</p>	<ul style="list-style-type: none"> <li>• Teacher and learners revise the components of an investigation.</li> </ul> <p><b>Under the supervision of the teacher, learners:</b></p> <ul style="list-style-type: none"> <li>• identify a problem in their surrounding (e.g pollution).</li> <li>• formulate a hypothesis.</li> <li>• design a procedure to test the hypothesis.</li> <li>• collect, organise and interpret data.</li> <li>• make a conclusion based on the data.</li> <li>• write a scientific report on the investigation including each step.</li> <li>• present the results.</li> </ul>	<p>identify a problem.</p> <p>formulate a hypothesis.</p> <p>design a procedure to test a hypothesis.</p> <p>collect, organise and interpret data.</p> <p>make a conclusion based on data.</p> <p>write a scientific report.</p> <p>share the results.</p>	<p>Teacher's Guide.</p> <p>Environment.</p> <p>Internet.</p> <p>Textbooks.</p>
14. investigate properties and uses of acids and bases.	<p><b>Concepts</b> pH pH scale Acids and bases:</p>	<p><b>Teacher and Learners:</b></p> <ul style="list-style-type: none"> <li>• revise the physical properties of acids and</li> </ul>	<p>define acids, bases and alkalis.</p>	<p>pH chart.</p> <p>pH meter.</p>

	<ul style="list-style-type: none"> <li>- chemical properties</li> <li>- effect on universal indicator paper</li> <li>- strength</li> <li>- uses</li> </ul> <p>Test for hydroxide and hydrogen ions Neutralisation Oxides Types of oxides</p> <ul style="list-style-type: none"> <li>- acidic</li> <li>- basic</li> <li>- amphoteric</li> <li>- neutral</li> </ul> <p>lime limestone</p> <p><b>Skills</b> Communication Observation Manipulation Recording Classification</p> <p><b>Values and Attitudes</b> Caring Appreciation Awareness</p>	<p>base from previous grades.</p> <ul style="list-style-type: none"> <li>• discuss chemical properties of acids, bases and alkalis.</li> <li>• discuss the uses of acids and bases.</li> <li>• discuss strength of acids and bases in terms of hydrogen and hydroxide ions.</li> <li>• discuss pH.</li> <li>• discuss oxides and classify them.</li> <li>• discuss the manufacture of calcium oxide (lime) from calcium carbonate (limestone).</li> <li>• discuss uses of calcium hydroxide.</li> </ul> <p><b>Learners:</b></p> <ul style="list-style-type: none"> <li>• perform activities to determine pH values of different substances using universal indicator and pH scale.</li> <li>• investigate chemical properties of acids as in their reactions with:</li> </ul>	<p>state uses of acids and bases.</p> <p>distinguish between bases and alkalis.</p> <p>describe the tests for the ions present in acids and alkalis.</p> <p>describe strength of acids and alkalis in terms of hydrogen ions and hydroxide ions.</p> <p>distinguish between strong and weak acids/alkalis.</p> <p>write word equations for the reactions of acids/alkalis.</p> <p>classify oxides as acidic, basic, neutral and amphoteric.</p> <p>describe manufacture of lime from limestone in terms of chemical reactions involved.</p>	<p>Acid-base.</p> <p>Indicators.</p> <p>Chemicals.</p> <p>Glassware.</p> <p>Teacher's Guide.</p>
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		alkalis/bases, carbonates and metals. <ul style="list-style-type: none"> <li>investigate chemical properties of alkalis as in their reactions with: acids and ammonium salts.</li> <li>perform activities to determine presence of hydroxide and hydrogen ions in solutions.</li> <li>perform activities that will enable them to classify oxides based on the metallic and non-metallic character of elements from which they are formed.</li> </ul>	state uses of lime and calcium hydroxide as in neutralization.	
15. describe reflection of light.	<b>Concepts</b> Light Reflection Virtual and real images Ray diagrams Applications of: - reflection  <b>Skills</b> Observation Manipulation Drawing	<ul style="list-style-type: none"> <li>Teacher and learners revise waves.</li> <li>Teacher and learners discuss light and its characteristics.</li> <li>With the guidance of the teacher, learners perform experiments to illustrate the formation of optical images as seen in a plane mirror.</li> </ul>	list characteristics of light.  illustrate formation of optical images as seen in a plane mirror.  use "virtual image" and "real image" to describe images formed.  state and explain the characteristics of the	Sources of light.  Plane mirrors.  Lenses.  Prism blocks.

	<p>Discovery Experimentation Communication</p> <p><b>Values and Attitudes</b> Cooperation Curiosity</p>	<ul style="list-style-type: none"> <li>Teacher and learners discuss 'virtual image' and 'real image'.</li> <li>Teacher and learners discuss the characteristics of the optical image as seen in the plane mirror.</li> <li>Learners investigate reflection of light rays in a plane mirror.</li> <li>Learners draw ray diagrams using the law: angle of incidence = angle of reflection.</li> <li>Learners use the law of reflection in constructions, measurements and calculations for reflections in a plane mirror.</li> <li>Teacher and learners discuss the applications of reflection.</li> </ul>	<p>optical image as seen in the plane mirror.</p> <p>draw ray diagrams using the law: angle of incidence = angle of reflection.</p> <p>use the law of reflection for construction, measurement and calculation for reflections in a plane mirror.</p> <p>describe applications of reflection.</p>	
16. describe motion.	<p><b>Concepts</b> Motion Distance Time Distance – time graphs</p>	<ul style="list-style-type: none"> <li>Teacher and learners revise measurement of distance using different instruments.</li> </ul>	<p>estimate distance travelled from one point to the next.</p> <p>calculate distance travelled.</p>	<p>Stop watch.</p> <p>Charts.</p> <p>Tape measure.</p>

	<p>Displacement Scalar quantity Vector quantity Speed Average speed Velocity</p> <p><b>Skills</b> Drawing Manipulation Observation Recording Analysis Interpretation Calculation</p> <p><b>Values and Attitudes</b> Awareness Cooperation</p>	<ul style="list-style-type: none"> <li>• Teacher and learners discuss motion.</li> <li>• Learners estimate and measure distance travelled by different objects.</li> <li>• Learners perform activities to show total distance travelled.</li> <li>• Teacher and learners discuss displacement.</li> <li>• Learners perform activities to show displacement.</li> <li>• Learners calculate distance travelled, displacement and speed.</li> <li>• Learners measure distance and time, and construct distance time graph.</li> <li>• Learners interpret distance time graphs.</li> <li>• Teacher and learners discuss scalar and vector quantities.</li> <li>• Teacher and learners discuss speed, average speed and velocity.</li> </ul>	<p>calculate displacement.</p> <p>calculate speed using: total distance/total time (<math>s = d/t</math>)</p> <p>plot and interpret distance-time graphs</p> <p>distinguish between scalar and vector quantities.</p> <p>distinguish between distance travelled and displacement.</p> <p>recall and use: velocity = displacement/time.</p>	<p>Metre Sticks.</p> <p>Trundle Wheel.</p>
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		<ul style="list-style-type: none"> <li>Learners relate speed, average speed and velocity.</li> </ul>		
17. perform experiments and calculate pressure in solids.	<p><b>Concepts</b>            Pressure in solids            Calculation of pressure            Pascal (Pa)            Applications of solid pressure            Effects of solid pressure</p> <p><b>Skills</b>            Observation            Identification            Comparison            Manipulation            Recording            Accuracy            Measurement            Critical thinking</p> <p><b>Values and Attitudes</b>            Caring            Awareness            Cooperation            Appreciation</p>	<ul style="list-style-type: none"> <li>Teacher and learners revise pressure in fluids.</li> <li>Teacher and learners discuss pressure in solids.</li> <li>Learners perform activities that show that pressure is high on a small surface area and low on a larger surface area.</li> <li>Learners carry out activities in which they measure force applied per unit area.</li> <li>Learners use a formula <math>Pressure = \frac{Force}{Area}</math> to calculate pressure in <math>N/m^2</math>.</li> <li>Learners relate Pascal (Pa) to <math>N/m^2</math>.</li> <li>Learners convert measurements from Pascals (<math>N/m^2</math>) to atmospheres (atm), <math>1 N/m^2 = 1 atm</math>.</li> </ul>	perform activities to demonstrate pressure in liquids. record and report observations.  compare pressure on small and large surfaces.  calculate pressure using the formula $P = \frac{F}{A}$ .  convert measurement from Pascal to atmosphere.  describe a situation in which pressure is applied in everyday life.	Object  Chart  Posters.  Internet.  Teacher's Guide.

		<ul style="list-style-type: none"> <li>Teacher gives learners problems or scenario on the relationship between pressure and surface area.</li> <li>Learners identify applications of solid pressure in real-life situations.</li> <li>Teacher and learners discuss the effects of solid pressure.</li> </ul>		
18. demonstrate understanding of magnetism.	<p><b>Concepts</b>  Magnetic field lines  Magnetic particles  Methods of magnetising:  <ul style="list-style-type: none"> <li>single stroking</li> <li>double stroking</li> </ul> Test for a magnet  Methods of demagnetizing:  <ul style="list-style-type: none"> <li>hammering</li> <li>heating</li> </ul> </p> <p><b>Skills</b>  Communication  Problem-solving  Observation  Manipulation</p>	<p><b>Teacher and learners:</b></p> <ul style="list-style-type: none"> <li>revise magnetism.</li> <li>use iron filings to determine the magnetic fields of two bar magnets in different positions.</li> <li>discuss the arrangement of magnetic particles in a magnet.</li> <li>discuss methods of magnetising objects.</li> <li>discuss methods of demagnetising objects.</li> <li>discuss ways of testing a magnet..</li> </ul>	<p>draw magnetic lines of force around pairs of magnets.</p> <p>draw the structure of a bar magnet to show the arrangement of the magnetic particles.</p> <p>magnetise object using single and double-stroke methods.</p> <p>describe single-stroking and double-stroking methods of making magnets.</p>	<p>Charts/posters.</p> <p>Bar magnets.</p> <p>Iron filings.</p> <p>Soft iron objects.</p> <p>Steel objects.</p> <p>Paper clips.</p> <p>Pins.</p>

	<p>Drawing</p> <p><b>Values and Attitudes</b>  Appreciation  Awareness  Cooperation  Responsibility</p>	<ul style="list-style-type: none"> <li>discuss ferromagnetic and non-ferromagnetic materials.</li> <li>discuss the design and use of permanent magnets.</li> </ul> <p><b>Learners:</b></p> <ul style="list-style-type: none"> <li>draw magnetic lines of force around a pair of magnets.</li> <li>magnetize object by single and double stroking.</li> <li>investigate methods of demagnetizing.</li> <li>perform activities to determine poles of magnets.</li> </ul>	<p>test a magnet.</p> <p>identify poles of a magnetized object.</p> <p>identify repulsion as an indication that an object is a magnet.</p> <p>name methods of demagnetizing.</p> <p>state the magnetic properties of iron and steel.</p> <p>distinguish between ferromagnetic and non-ferromagnetic materials.</p> <p>describe the design and the use of permanent magnets.  differentiate between magnetic properties of iron and steel.</p>	
19. describe chemistry of water.	<p><b>Concepts</b>  Water  - chemical tests for water</p>	<p><b>Teachers and Learners:</b></p> <ul style="list-style-type: none"> <li>revise uses of water from previous grades.</li> </ul>	<p>state ions that cause water hardness.</p>	<p>Water treatment plant.</p> <p>Glassware.</p>



	<ul style="list-style-type: none"> <li>- hard and soft water</li> </ul> <p>Ions that cause water hardness:</p> <ul style="list-style-type: none"> <li>- <math>Ca^{2+}</math></li> <li>- <math>Mg^{2+}</math></li> </ul> <p>Softening of hard water:</p> <ul style="list-style-type: none"> <li>- ion-exchange,</li> <li>- simple distillation,</li> <li>- addition of sodium carbonate</li> </ul> <p>Uses of deionised water</p> <p>Water Pollution</p> <p>Large-scale treatment of water</p> <p><b>Skills</b></p> <p>Communication</p> <p>Observation</p> <p>Photography</p> <p>Manipulation</p> <p>Drawing</p> <p><b>Values and Attitudes</b></p> <p>Caring</p> <p>Appreciation</p> <p>Awareness</p> <p>Cooperation</p> <p>Responsibility</p>	<ul style="list-style-type: none"> <li>• revise hard and soft water from the previous grades.</li> <li>• discuss causes of water hardness.</li> <li>• discuss softening of hard water by ion exchange , simple distillation and addition of sodium carbonate.</li> <li>• discuss uses of deionised water.</li> <li>• discuss water pollution by chemicals.</li> <li>• take an excursion to water treatment plants, including treatment of polluted water bodies.</li> </ul> <p><b>Learners:</b></p> <ul style="list-style-type: none"> <li>• investigate physical properties of water before and after softening hard water using simple distillation and sodium carbonate.</li> <li>• perform activities to test water using copper (II) sulphate and cobalt (II) chloride.</li> </ul>	<p>state methods of softening hard water.</p> <p>describe softening of hard water.</p> <p>describe treatment of water on a large scale.</p> <p>describe chemical tests for water using copper (II) sulphate and cobalt (II) chloride.</p> <p>state the sources of chemicals that pollute water.</p> <p>describe the effects of water pollutants (chemicals).</p>	<p>Chemicals.</p> <p>Heating apparatus.</p> <p>Camera.</p> <p>Copper (II) sulphate.</p> <p>Cobalt (II) chloride.</p>
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		<ul style="list-style-type: none"> <li>research on sources and effects of chemicals as water pollutants.</li> </ul>		
20. describe separation techniques in mixtures.	<p><b>Concepts</b> Crystallization Fractional distillation Solvent extraction Use of separating funnel</p> <p><b>Skills</b> Communication Observation Manipulation Drawing</p> <p><b>Values and Attitudes</b> Caring Appreciation Awareness Cooperation Responsibility</p>	<p><b>Teacher and learners:</b></p> <ul style="list-style-type: none"> <li>revise separation methods from previous grades.</li> <li>discuss fractional distillation.</li> <li>Teacher demonstrates fractional distillation.</li> <li>Teacher and learners discuss solvent extraction as a method of separating mixtures.</li> <li>Teacher and learners discuss crystallization as a method of separation.</li> <li>Learners perform experiments to separate mixtures by: Crystallization, paper chromatography, solvent extraction and use of separating funnel.</li> <li>Learners observe and record the findings.</li> </ul>	<p>state different methods used in separation of mixtures.</p> <p>describe separation of mixtures.</p> <p>perform experiments to separate different mixtures.</p> <p>suggest suitable techniques for separating different mixtures.</p> <p>draw and label apparatus used to separate mixtures.</p>	<p>Charts</p> <p>Posters.</p> <p>Projector.</p> <p>Glassware.</p> <p>Chromatography paper.</p> <p>Filter paper.</p> <p>Heating apparatus.</p> <p>Solvents.</p> <p>Mixtures.</p>

		<ul style="list-style-type: none"> <li>Learners draw different apparatus used in separation techniques.</li> <li>Learners record their observations using appropriate methods.</li> </ul>		
21. use the Periodic Table.	<p><b>Concepts</b></p> <p>Periodic Table</p> <p>Classification of elements into:</p> <ul style="list-style-type: none"> <li>periods</li> <li>groups</li> </ul> <p>Valence electrons</p> <p>Group number</p> <p>Period number</p> <p>Relationships:</p> <ul style="list-style-type: none"> <li>number of valence electrons and Group number</li> <li>periods and number of electron shells</li> </ul> <p>Trends:</p> <ul style="list-style-type: none"> <li>groups</li> <li>metallic character</li> </ul> <p>Symbol notation <math>{}^a_bX</math></p> <p>Sub-atomic particles</p> <p><b>Skills</b></p> <p>Communication</p> <p>Observation</p>	<p><b>Teacher and Learners:</b></p> <ul style="list-style-type: none"> <li>discuss arrangement of elements in the Periodic table.</li> <li>discuss the change in metallic character across the Periodic Table.</li> <li>discuss valence electrons.</li> <li>discuss trends in groups and metallic character.</li> </ul> <p><b>Learners:</b></p> <ul style="list-style-type: none"> <li>perform activities to deduce the relationship between the number of valence electrons and the Group number.</li> <li>perform activities to deduce the relationship between the number of electron shells and the Period.</li> </ul>	<p>define the Periodic Table of elements.</p> <p>describe trends in metallic character across the Periodic Table.</p> <p>describe trends in groups.</p> <p>describe the relationship between the number of valence electrons and the Group number.</p> <p>describe the relationship between the number of electron shells and the Period number.</p> <p>represent atoms using the notation <math>{}^a_bX</math>.</p> <p>calculate number of sub atomic particles.</p>	<p>Charts.</p> <p>Posters.</p> <p>Periodic Table of the elements.</p>

	Recording Classification Analysis Deduction  <b>Values and Attitudes</b> Caring Appreciation Awareness Cooperation Responsibility	<ul style="list-style-type: none"> <li>perform activities to deduce the symbol notation <math>{}_b^aX</math>.</li> <li>calculate the number of sub – atomic particles.</li> </ul>		
22. describe formation of compounds.	<b>Concepts</b> Stability of atoms Valency Ion formation Charge Anion Cation Ionic bonds Bonding Ionic compounds Oxidation numbers Properties of ionic compounds: - solubility of polar solvents - electrical conductivity - fixed points	<b>Teacher and Learners:</b> <ul style="list-style-type: none"> <li>revise electronic configuration.</li> <li>discuss stability of atoms in relation to noble gas electronic configuration.</li> </ul> <b>Learners:</b> <ul style="list-style-type: none"> <li>use diagrams and equations to illustrate formation of cations and anions.</li> <li>use diagrams and equations to illustrate formation of ionic compounds.</li> </ul>	relate stability of atoms to noble gas electronic configuration.  describe formation of ions, ionic bonds and ionic compounds.  write chemical equations for the formation of ions and ionic compound.  explain the relationship between charge, valency, oxidation number and number of electrons transferred.	Charts/posters.  Periodic Table.  Electrolytes.  Electrodes.  Battery.  Solvents.  Heating apparatus.  Glassware.  Low voltage bulbs /galvanometer.

	<p><b>Skills</b> Communication Observation Classification deduction drawing</p> <p><b>Values and Attitudes</b> Caring Appreciation Awareness Cooperation Responsibility</p>	<ul style="list-style-type: none"> <li>perform activities to determine valency of atoms in compounds.</li> <li>explore the relationship between valency, charge, oxidation number and number of electrons transferred.</li> <li>perform activities to deduce formulae of ionic compounds.</li> <li>investigate physical properties of ionic compounds: solubility, electrical conductivity and fixed points.</li> <li>relate charge, valency and oxidation numbers.</li> </ul>	<p>present valency and charge in a conventional way.</p> <p>calculate oxidation numbers and charge of ionic compounds.</p> <p>draw structures of ions and ionic compounds.</p> <p>write symbols ions and ionic compounds.</p> <p>describe the physical properties of ionic compounds.</p>	Connecting wires.
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## LIFE SCIENCES

Learning Outcomes: at the end of Grade 8, learners should be able to:	Concepts, Skills, Values and Attitudes	Suggested Learning Experiences	What to assess: the teacher should assess learners' ability to:	Suggested Resources
<p>23. use asexual reproduction in commercial plant production.</p>	<p><b>Concepts</b>  Asexual reproduction  Vegetative parts:  - roots  - tubers  - leaves  - stems  - buds  Methods of asexual reproduction:  - budding  - grafting  - layering  - cutting</p> <p><b>Skills</b>  Manipulation  Observation  Identification  Problem-solving  Decision-making  Evaluation  Reporting</p> <p><b>Values and Attitudes</b>  Caring  Responsibility</p>	<p><b>Teacher and learners:</b></p> <ul style="list-style-type: none"> <li>revise asexual reproduction from previous grades.</li> <li>discuss vegetative parts used in asexual reproduction.</li> <li>discuss methods of asexual reproduction.</li> <li>Learners identify roots, tubers, leaves, stems and buds used in asexual reproduction.</li> <li>Teacher demonstrates methods of asexual reproduction.</li> </ul> <p><b>Teacher and learners:</b></p> <ul style="list-style-type: none"> <li>discuss advantages and disadvantages of asexual reproduction.</li> </ul>	<p>describe different methods of asexual reproduction.</p> <p>demonstrate budding, grafting, layering and cutting.</p> <p>describe advantages and disadvantages of asexual reproduction.</p> <p>state vegetative parts used in asexual reproduction.</p> <p>demonstrate different methods of asexual reproduction.</p> <p>write a report on asexual reproduction field trip.</p> <p>carry out a project on different asexual reproduction methods.</p>	<p>Plant parts.</p> <p>Charts.</p> <p>Internet.</p> <p>Garden tools.</p>

	Appreciation Cleanliness	<ul style="list-style-type: none"> <li>take a field trip to see projects that use asexual reproduction in their environment.</li> <li>Learners carry out a project to practise different asexual reproduction methods.</li> </ul>		
24. practise plant protection.	<b>Concepts</b> Plant protection Weeds Weed control <ul style="list-style-type: none"> <li>physical</li> <li>chemical</li> <li>biological</li> </ul> Storage pests Integrated pest and disease management (IPDM) <b>Skills</b> Manipulation Observation Identification Problem-solving Decision-making Evaluation Measurement	<b>Teacher and learners:</b> <ul style="list-style-type: none"> <li>revise plant protection done in previous grades.</li> <li>identify weeds on a field crop.</li> <li>identify different types of weeds on a crop field.</li> <li>discuss effects of weeds in crop production.</li> <li>discuss physical, chemical and biological methods of controlling weeds.</li> <li>Learners practise methods of controlling weeds.</li> </ul>	identify weeds on a crop field.  describe the effects of weeds on crop production.  differentiate different types of weeds.  state effects of weeds in crop production.  differentiate between methods of weed control.  practise different methods of weed control.  identify different types of storage pests	Environment.  Weeds.  Containers.  Herbicides.  Pesticides.  Protective clothing.  Internet. Charts.

	<b>Values and Attitudes</b> Caring Responsibility Awareness Appreciation	<b>Teacher and learners:</b> <ul style="list-style-type: none"> <li>identify storage pests.</li> <li>discuss common storage pests in Lesotho.</li> <li>discuss effects of storage pests.</li> <li>discuss prevention and control of storage pests.</li> <li>Learners practise control of storage pests.</li> </ul> <b>Teacher:</b> <ul style="list-style-type: none"> <li>invites resource person to discuss storage pests and integrated pest and disease management (IPDM).</li> <li>explains IPDM to learners.</li> <li>Learners practice IPDM in plant protection.</li> <li>Teacher and learners discuss effects of IPDM.</li> </ul>	state common storage pests in Lesotho.  state effects of storage pests.  demonstrate prevention and control of storage pests.  describe the effects of IPDM in crop production.  demonstrate use of IPDM in crop production.	
25. practise animal protection against	<b>Concepts</b> Animal protection against: - Parasites:	<ul style="list-style-type: none"> <li>Learners identify animal parasites from pictures and posters.</li> </ul>	identify animal parasites.	Environment.



parasites and predators.	<p>types effects methods of prevention and control : hygiene feeding vaccination quarantine</p> <p>- Predators</p> <p><b>Skills</b> Manipulation Observation Identification Problem-solving Decision-making</p> <p><b>Values and Attitudes</b> Caring Responsibility Awareness Appreciation</p>	<p><b>Teacher and learners:</b></p> <ul style="list-style-type: none"> <li>• discuss animal protection against parasites and predators.</li> <li>• discuss types of animal parasites.</li> <li>• discuss the differences between predators and parasites in animals.</li> <li>• discuss effects of parasites in animals.</li> <li>• discuss methods of prevention and control of animal parasites.</li> <li>• Teacher demonstrates methods of preventing and controlling animal parasites.</li> <li>• Learners practise different methods of preventing and controlling of animal parasites.</li> </ul>	<p>state different types of parasites in animals.</p> <p>describe the effects of parasites in animals.</p> <p>state methods of prevention and control of animal parasites.</p> <p>differentiate between a predator and parasite. carry out a project to prevent and control animal parasites.</p> <p>describe control of predators in animal production.</p>	<p>Resource person.</p> <p>Internet.</p> <p>Posters.</p> <p>Charts.</p> <p>Pictures.</p> <p>Chemicals.</p> <p>Vaccination kit.</p>
26. describe effects of heat on food.	<p><b>Concepts</b> Positive effects of heat on food: - spoilage control/safe to eat - edibleness</p>	<ul style="list-style-type: none"> <li>• Teacher and learners revise ways of cooking vegetables and changes they discover during preparing different foods while cooking or</li> </ul>	<p>state natural causes of food spoilage.</p> <p>list ways of storing fruits and vegetables.</p>	<p>Teacher's Guide.</p> <p>Fruits and vegetables.</p>

	<ul style="list-style-type: none"> <li>- improve appearance, smell and taste</li> <li>- prevent enzymatic browning-blanching</li> </ul> <p>Negative effects of heat on food:</p> <ul style="list-style-type: none"> <li>- nutritive value is poor/loss of nutrients</li> <li>- damage structure</li> </ul> <p>Food storage and food waste disposal.</p> <p><b>Skills</b>  Discovery  Observation  Cooking  Manipulation  Recording  Reporting  Decision-making</p> <p><b>Values and attitudes</b>  Awareness  Cleanliness  Cooperation</p>	<p>preserving them, from previous grades.</p> <ul style="list-style-type: none"> <li>• Learners and teacher discuss reasons for cooking food.</li> <li>• Learners carry out simple experiments to show action of enzymes on fruits and vegetables (enzymatic browning) during food preparation.</li> <li>• Discover changes in different foods as they are exposed to heat or cooking.</li> <li>• Report their findings.</li> <li>• Learners present their findings.</li> <li>• Teacher and learners discuss changes to different foods as they are exposed to heat. That is, blanch raw vegetables and fruits.</li> <li>• Identify positive and negative effects from the experiments carried out.</li> </ul>	<p>explain food spoilage caused by enzymes.</p> <p>explain measures to take in preventing food spoilage.</p> <p>describe best ways of storing fruits and vegetables to avoid spoilage.</p> <p>describe ways of disposing rotten foods.</p>	
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		<ul style="list-style-type: none"> <li>Teacher and learners discuss ways of storing variety of fruits and vegetables to save money and avoid spoilage.</li> <li>Learners investigate ways of disposing rotten foods.</li> </ul>		
27. describe cell structure, organisation and adaptation of specialised cells.	<p><b>Concepts</b> Parts of a cell: (structure and organisation)</p> <ul style="list-style-type: none"> <li>- mitochondria</li> <li>- cell sap</li> </ul> <p>Specialised cells:</p> <ul style="list-style-type: none"> <li>- root hair cell</li> <li>- palisade cells</li> <li>- red blood cells</li> <li>- white blood cells</li> </ul> <p>Adaptation Function</p> <p><b>Skills</b> Identification Observation Drawing Recording Manipulation</p> <p><b>Values and Attitudes</b> Awareness Appreciation</p>	<p><b>Teacher and Learners:</b></p> <ul style="list-style-type: none"> <li>revise structure of typical plant and animal cells from previous grades.</li> <li>revise parts and functions of a plant and animal cells.</li> <li>discuss mitochondria and cell sap.</li> <li>discuss specialised cells.</li> <li>identify parts of specialised cells from posters.</li> <li>discuss structural modification of specialised in relation to their functions.</li> </ul> <p><b>Learners</b></p> <ul style="list-style-type: none"> <li>observe cells under a microscope.</li> </ul>	<p>identify parts of plant and animal cells.</p> <p>state functions of mitochondria and cell sap.</p> <p>identify specialised cells.</p> <p>describe specialised cells.</p> <p>relate structures of specialised cells to their functions.</p> <p>draw and label specialised cells.</p> <p>calculate magnification.</p>	<p>Microscope.</p> <p>Slides.</p> <p>Cover slips.</p> <p>Prepared slides.</p> <p>Staining reagents.</p> <p>Charts/Posters.</p>

	Cooperation	<ul style="list-style-type: none"> <li>identify parts of different cells from posters or charts.</li> <li>draw and label specialized cells as seen from posters or under a microscope.</li> <li>calculate magnification of their drawings.</li> </ul>		
28. describe breathing process in humans.	<p><b>Concepts</b></p> <p>Breathing process:</p> <ul style="list-style-type: none"> <li>inhaling</li> <li>exhaling</li> </ul> <p>Breathing rate:</p> <ul style="list-style-type: none"> <li>at rest</li> <li>after exercise</li> </ul> <p>Composition of:</p> <ul style="list-style-type: none"> <li>inhaled air</li> <li>exhaled air</li> </ul> <p>Test for carbon dioxide</p> <p>Gaseous exchange</p> <p>Structure of the alveolus</p> <p><b>Skills</b></p> <p>Identification</p> <p>Comparison</p> <p>Observation</p> <p>Drawing</p> <p>Measurement</p> <p><b>Values and Attitudes</b></p> <p>Awareness</p>	<p><b>Teacher and Learners:</b></p> <ul style="list-style-type: none"> <li>revise the breathing system.</li> <li>demonstrate breathing using the breathing system model.</li> <li>discuss breathing process.</li> <li>identify regions where air passes from the atmosphere to the lungs.</li> <li>derive word equation for carbon dioxide test : Calcium hydroxide + Carbon dioxide → Calcium Carbonate + Water <i>Word equation <b>ONLY</b></i></li> <li>discuss gaseous exchange in the lungs.</li> <li>discuss breathing rate.</li> </ul>	<p>define breathing process.</p> <p>identify parts of the system through which air passes.</p> <p>describe breathing process.</p> <p>compare inhaled and exhaled air.</p> <p>explain gaseous exchange in the lungs.</p> <p>carry out a test for carbon dioxide.</p> <p>write word equation for carbon dioxide test.</p> <p>draw and label the alveolus.</p>	<p>Charts/Posters.</p> <p>Breathing system model.</p> <p>Simulations.</p> <p>Teacher's Guide.</p> <p>Lime water.</p> <p>Stop Clocks.</p> <p>Teacher's Guide.</p>

	Responsibility Cooperation	<b>Under the guidance of the teacher, learners:</b> <ul style="list-style-type: none"> <li>engage in activities which will enable learners to compare inhaled and exhaled air.</li> <li>carry out a test for carbon dioxide and observe the results.</li> <li>draw and label the alveolus.</li> <li>demonstrate the presence of carbon dioxide in exhaled air.</li> <li>investigate the impact of exercises on the breathing rate.</li> </ul>	state components of exhaled air and their percentages.  describe the impact of exercises on the breathing rate.	
29. describe the internal parts of the skin and their functions.	<b>Concepts</b> Skin: <ul style="list-style-type: none"> <li>internal parts</li> <li>functions of internal parts</li> </ul> <b>Skills</b> Identification Drawing Observation Manipulation	<ul style="list-style-type: none"> <li>Teacher and learners review the external parts of the skin and their functions.</li> <li>Teacher and learners review care of the skin.</li> <li>Under the guidance of the teacher, learners identify the internal structure of the skin from models, charts or posters.</li> </ul>	identify the internal parts of the skin.  state the functions of the internal parts of the skin.  draw and label the internal parts of the skin.	Model of the skin.  Charts  Posters.  Simulations.

	<b>Values and Attitudes</b> Awareness Appreciation Cooperation	<ul style="list-style-type: none"> <li>Teacher and learners discuss internal parts of the skin and their functions.</li> <li>Learners draw and label the internal parts of the skin.</li> </ul>		
30. describe the internal parts and function of an ear.	<b>Concepts</b> Ear: - internal parts - functions of the internal parts Functions of the ear: - hearing - balancing Causes of hearing defects Caring for the ear  <b>Skills</b> Observation Drawing Identification Manipulation  <b>Values and Attitudes</b> Acceptance Appreciation Awareness Cooperation	<b>Teacher and learners:</b> <ul style="list-style-type: none"> <li>review the external parts of the ear and their functions.</li> <li>use charts/posters/ or models to identify the internal parts of the ear.</li> <li>discuss the functions of the internal parts of the ear.</li> <li>discuss hearing process.</li> <li>discuss balancing of the body through the ear.</li> <li>discuss the causes of hearing defects and how they can be corrected.</li> <li>discuss ways of caring for an ear.</li> </ul>	identify the internal parts of the ear.  describe the functions of the internal parts of the ear.  draw and label the internal parts of the ear.  explain hearing process.  explain how body balance is maintained by the ear.  describe ear defects and their correction.  list ways of caring for the ears.	Ear Model. Charts. Posters. Simulations.

		<b>Learners:</b> <ul style="list-style-type: none"> <li>draw and label the internal parts of the ear.</li> <li>perform activities to experience imbalance.</li> </ul>		
31. describe photosynthesis.	<b>Concepts</b> Photosynthesis Word equation: <ul style="list-style-type: none"> <li>reactants</li> <li>products</li> </ul> Factors necessary for photosynthesis: <ul style="list-style-type: none"> <li>light</li> <li>chlorophyll</li> <li>carbon dioxide</li> </ul> Test for starch  <b>Skills</b> Identification Observation Drawing Recording Manipulation  <b>Values and Attitudes</b> Awareness Appreciation Cooperation Responsibility	<b>Teacher and Learners:</b> <ul style="list-style-type: none"> <li>revise the plant structure and function of each part of a plant.</li> <li>discuss photosynthesis.</li> <li>discuss how different parts of a plant are adapted for photosynthesis: leaves, stem and roots.</li> <li>discuss factors necessary for photosynthesis.</li> <li>derive the word and a symbolic equation for photosynthesis stating reactants and products.</li> </ul> <b>Learners:</b> <ul style="list-style-type: none"> <li>investigate factors necessary for photosynthesis.</li> <li>test a leave for the presence of starch.</li> </ul>	define photosynthesis.  state factors necessary for photosynthesis.  explain how each part of the plant is adapted for photosynthesis.  write word and balanced symbolic equation of photosynthesis.  state reactants and products of photosynthesis.  describe an experiment demonstrating the necessity of light, chlorophyll and carbon dioxide in photosynthesis.	Green plants.  Variegated leaves.  Caustic soda /Sodium carbonate.  Iodine solution.  Water-bath.  White tile.  Alcohol.  Glassware.  Droppers.  Opaque materials.

		<ul style="list-style-type: none"> <li>• write a word and symbolic equation for photosynthesis.</li> <li>• write a scientific report.</li> </ul>	draw the setups for investigating factors necessary for photosynthesis.  write a scientific report.	Aquatic plants.  Glowing splint.  Charts/posters.
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## EARTH AND SPACE SCIENCE

Learning Outcomes: at the end of Grade 8, learners should be able to:	Concepts, Skills, Values and Attitudes	Suggested Learning Experiences	What to assess: the teacher should assess learners' ability to:	Suggested Resources
<p>32. describe processes of chemical weathering and the related features</p>	<p><b>Concepts</b>  <b>Weathering</b>  <b>Chemical weathering:</b>            hydration            hydrolysis            oxidation            carbonation            solution and chelation</p> <p>Effects of chemical weathering on the environment and resulting landforms.</p> <p><b>Skills</b>            Observation            Identification            Drawing            Manipulation            Critical thinking            Recording            Reporting            Analysis</p>	<ul style="list-style-type: none"> <li>Teacher and learners revise physical weathering.</li> </ul> <p><b>Learners:</b></p> <ul style="list-style-type: none"> <li>identify objects that have undergone oxidation.</li> <li>measure the circumference of a sedimentary rock then immerse it in water for 2-3 days. Let it dry for 2-3 days. Afterwards observe the change in circumference and discuss the findings.</li> <li>Teacher and learners discuss chemical weathering.</li> <li>Learners discuss features caused by chemical weathering</li> </ul>	<p>describe the processes of chemical weathering</p> <p>carry out an experiment on hydration using a sedimentary rock.</p> <p>describe features caused by chemical weathering.</p>	<p>Photographs/pictures.</p> <p>Tape measure.</p> <p>Rocks.</p> <p>Water.</p> <p>Soil samples.</p> <p>Charts.</p>

	<p>Judgment</p> <p><b>Values and attitudes</b></p> <p>Awareness</p> <p>Responsibility</p> <p>Appreciation</p> <p>Cooperation</p> <p>Nature loving</p> <p>Environmental concern</p>			
33. explain characteristics of members of the solar system.	<p><b>Concepts</b></p> <p><b>Solar system</b></p> <p><b>Characteristics of the:</b></p> <ul style="list-style-type: none"> <li>- asteroids,</li> <li>- comets,</li> <li>- meteors, and</li> <li>- meteorites.</li> </ul> <p><b>significance of latitude and longitude:</b></p> <ul style="list-style-type: none"> <li>- distribution of world time zones.</li> <li>- differences between local and zonal time.</li> <li>- time calculation using the lines of longitude.</li> </ul>	<ul style="list-style-type: none"> <li>• Learners revise members of the universe.</li> <li>• Learners observe the features of the sun.</li> <li>• Teacher and learners discuss the features of the sun in groups then present to the class.</li> <li>• Teacher and learners describe asteroids, comets, meteors and meteorites.</li> <li>• Teacher and learners revise the phases of the moon.</li> <li>• Teacher and learners discuss characteristics of the moon.</li> <li>• Learners revise lines of latitude and longitude</li> </ul>	<p>define asteroids, comets, meteors and meteorites.</p> <p>explain significance of lines of latitude and longitude.</p> <p>differentiate between zonal, standard and local time.</p> <p>calculate time using standard meridians.</p> <p>explain effects of rotation.</p> <p>define tides.</p> <p>explain formation of different types of tides.</p>	<p>Globe.</p> <p>World map.</p> <p>Atlas.</p> <p>Orbiter.</p> <p>Video of tides.</p> <p>Charts.</p> <p>Grid.</p>

	<p><b>Effects of rotation:</b></p> <ul style="list-style-type: none"> <li>- tides formation and types;</li> <li>- wind deflection; and</li> <li>- ocean currents.</li> </ul> <p><b>Skills</b></p> <p>Observation Communication Comparison Organization Application Identification Information finding Drawing Reporting Recording Inquiry Experimentation</p> <p><b>Values and attitudes</b></p> <p>Awareness Appreciation Cooperation Environmental concern Nature loving Curiosity</p>	<ul style="list-style-type: none"> <li>• Learners use a map to locate places using lines of latitude and longitude.</li> <li>• Teacher and learners revise the use of 4 and 6 figure grid reference to locate places on a map.</li> <li>• Teacher and learners discuss standard meridians and their importance.</li> <li>• Learners identify standard meridians on a map or globe.</li> <li>• Learners use standard meridians to calculate time.</li> <li>• Learners discuss and identify world time zones.</li> <li>• Teacher and learners differentiate between local and zonal time.</li> <li>• Teacher and revise effects of rotation.</li> <li>• Learners discuss the causes of tides.</li> </ul>	<p>explain proofs for the spherical shape of the earth.</p> <p>account for the distribution of land and water on the earth surface.</p>	
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		<ul style="list-style-type: none"> <li>• Learners describe the formation of spring tides and neap tides.</li> <li>• Learners do an experiment on wind deflection and Coriolis Effect.</li> </ul>		
34. describe the earth's atmosphere.	<p><b>Concepts</b> The Earth</p> <ul style="list-style-type: none"> <li>- Land and water distribution</li> <li>- Earth's atmosphere, different layers of the atmosphere and their importance.</li> </ul> <p><b>Skills</b> Observation Identification Recording Reporting Analysis Judgment Interpretation Experimentation</p> <p><b>Value and attitudes</b> Awareness</p>	<ul style="list-style-type: none"> <li>• Revise the shape of the earth.</li> <li>• Learners do an experiments to prove that the earth is spherical.</li> <li>• Learners identify continents and oceans on a map or globe.</li> <li>• Learners describe the distribution of oceans and continents.</li> <li>• Learners discuss composition of air.</li> <li>• Teacher uses a chart to introduce the layers of the atmosphere and discuss their properties.</li> <li>• Learners explain the importance of each layer.</li> </ul>	<p>locate continents and oceans on the world map.</p> <p>name continents and oceans.</p> <p>describe properties of the layers of the atmosphere.</p> <p>state the importance of layers of the atmosphere.</p> <p>explain the importance of different layers of the atmosphere.</p>	<p>Globe.</p> <p>World map.</p> <p>Charts.</p> <p>Internet – animation.</p>

	Appreciation Cooperation			
35. describe the composition of the earth.	<p><b>Concepts</b>  <b>Composition of the earth</b> (Geology):</p> <ul style="list-style-type: none"> <li>- rocks</li> </ul> <p><b>Crustal movements:</b></p> <ul style="list-style-type: none"> <li>- faulting</li> <li>- folding</li> <li>- volcanism</li> </ul> <p>Landforms resulting from faulting, folding and volcanism</p> <p>Economic value of volcanism in Lesotho</p> <p>Effects of earthquakes and volcanism</p> <p><b>Skills</b>  Observation  Identification  Recording  Reporting  Analysis  Judgment  Interpretation</p>	<ul style="list-style-type: none"> <li>• Learners revise the internal structure of the earth.</li> <li>• Learners do an experiment on crustal movement.</li> <li>• Learners discuss the processes of crustal movement and draw the resulting landforms.</li> <li>• Teacher and learners discuss the economic importance of volcanism.</li> <li>• Learners collect and analyse articles about earthquakes and volcanoes around the world.</li> <li>• Learners identify effects of earthquakes and volcanoes in groups and present their findings</li> <li>• Learners do an experiment to show volcanism.</li> </ul>	<p>record findings on crustal movement</p> <p>describe crustal movements and resulting landforms</p> <p>draw landforms resulting from crustal movements</p> <p>state the economic importance of volcanism</p> <p>explain the effects of earthquakes, and volcanoes</p> <p>present findings on volcanism</p>	<p>Globe.</p> <p>World map.</p> <p>Charts.</p> <p>Internet – animation.</p> <p>Articles on earthquakes and volcanoes.</p>

	<b>Value and attitudes</b> Awareness Appreciation Acceptance Environmental concern Responsibility			
36. discuss factors influencing climate and the relationship between pressure and global movement of winds..	<b>Concepts</b> Weather and Climate Factors affecting distribution of temperature: <ul style="list-style-type: none"> <li>- Latitude</li> <li>- Altitude</li> <li>- Aspect</li> <li>- distance from the sea ocean currents, local winds,</li> <li>- air masses and</li> <li>- cloud cover</li> </ul> World distribution of temperature Factors affecting pressure, temperature and pressure: <ul style="list-style-type: none"> <li>altitude</li> </ul> World pressure belts Winds Pressure and winds (relationship),	<ul style="list-style-type: none"> <li>• Learners revise weather and climate.</li> <li>• Learners use instrument (orbiter) to show the position of the sun during different times of the year.</li> <li>• Teacher uses a chart showing relationship between latitude and position of the sun.</li> <li>• Learners discuss their observations from a chart.</li> <li>• Teachers and learners revise properties of the troposphere.</li> <li>• Learners identify areas in their school that receive rays of the sun for a longer period and those which receive them for a shorter</li> </ul>	describe factors influencing the distribution of temperature.  draw diagrams to illustrate factors influencing temperature.  report findings on aspect.  differentiate between continental climate and maritime climate.  name warm and cold ocean currents.  state origins of air masses.  explain the influence of air masses on the place of destination.	Charts.  Television.  Radio.  Newspapers.  Internet.  Atlas.  Climatic maps.  Orbiter.  Climate change toolkit.  Synoptic charts.  Litmus paper.

	<p>Local and planetary winds Wind deflection, ocean currents</p> <p><b>Skills</b> Observation Decision-making Demonstration Creativity Interpretation Critical thinking Reporting Recording Identification cooperation</p> <p><b>Values and attitudes</b> Awareness Appreciation Cooperation</p>	<p>period, and then discuss their observations.</p> <ul style="list-style-type: none"> <li>• Learners observe temperatures at coastal areas and compare it with inland areas using a television, radio, newspapers, and internet.</li> <li>• Learners use a world map of ocean currents to identify warm and cold currents.</li> <li>• Learners identify the origin of air masses on a world map and their influence on temperature.</li> <li>• Learners observe daily cloud cover for a period of time and record their findings.</li> <li>• Learners describe the influence of cloud cover on temperature.</li> <li>• Learners use atlas, synoptic charts and weather charts to</li> </ul>	<p>report findings on cloud cover.</p> <p>describe the relationship between cloud cover and temperature.</p> <p>interpret a synoptic chart and climatic maps.</p> <p>report findings on factors affecting pressure.</p> <p>state factors affecting pressure.</p> <p>describe world distribution of rainfall.</p>	
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		<p>observe world distribution of temperature.</p> <ul style="list-style-type: none"> <li>• Learners carry out experiments on factors affecting pressure,</li> <li>• Learners revise types of rainfall</li> <li>• Learners use climatic maps to describe world distribution of rainfall.</li> </ul>		
37. describe processes of wind erosion and transportation.	<p><b>Concepts</b></p> <p>Erosion</p> <p>Wind erosion:</p> <ul style="list-style-type: none"> <li>- abrasion</li> <li>- deflation</li> <li>- attrition</li> </ul> <p>Wind transportation:</p> <p>saltation and suspension</p> <p>Landforms resulting from wind erosion and deposition</p> <p><b>Skills</b></p> <p>Investigation</p> <p>Observation</p> <p>Identification</p>	<ul style="list-style-type: none"> <li>• Teacher and learners revise physical properties of soil.</li> <li>• Teacher and learners discuss processes of wind erosion by wind using charts.</li> <li>• Teacher and learners discuss processes of wind transport.</li> <li>• Learners take a field trip to the local environment to identify wind deposition and erosional landforms.</li> <li>• Learners present their findings</li> </ul>	<p>describe processes of wind erosion and transportation.</p> <p>draw landforms resulting from wind erosion and deposition.</p>	<p>Prescribed Geography Textbook.</p> <p>Charts.</p> <p>Environment.</p>



	Recording Reporting Cooperation  <b>Values and attitudes</b> Awareness Appreciation Cooperation Nature loving			
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## ENERGY

Learning Outcomes: at the end of Grade 8, learners should be able to:	Concepts, Skills, Values and Attitudes	Suggested Learning Experiences	What to assess: the teacher should assess learners' ability to:	Suggested Resources
38. describe energy conversions.	<p><b>Concepts</b> Energy: - conversions - Conservation</p> <p>Law of conservation of energy</p> <p><b>Skills</b> Manipulation Observation Recording Designing</p> <p><b>Values and Attitudes</b> Cooperation</p>	<ul style="list-style-type: none"> <li>Teacher and learners revise types and sources of energy from previous grades.</li> <li>Teacher and learners discuss energy conversions.</li> <li>Learners engage in activities that involve energy conversions.</li> <li>Teacher and learners discuss energy conversions that occur in hydropower stations.</li> <li>Learners design a model that shows how energy is conserved.</li> <li>Teacher and learners discuss the law of conservation of energy.</li> </ul>	<p>use simple diagrams to show energy conversions.</p> <p>state energy conversions when given diagrams.</p> <p>describe energy conversions.</p> <p>state the law of energy conservation.</p> <p>perform activities that show energy conservation.</p> <p>design models that show energy conservation.</p>	<p>Candles.</p> <p>Circuits boards.</p> <p>Moving objects.</p>
39. describe heat transfer.	<p><b>Concepts</b> Convection Radiation Applications of radiation - emitters</p>	<p><b>Teachers and Learners:</b></p> <ul style="list-style-type: none"> <li>revise conduction of heat.</li> <li>discuss convection and radiation.</li> </ul>	<p>define: latent heat convection radiation</p>	<p>Charts/posters.</p> <p>Differently coloured objects.</p>

	<p>- absorbers Applications of convection Application of heat transfer in cooking</p> <p><b>Skills</b> Measurement Recording Observation Manipulation Comparison</p> <p><b>Values and Attitudes</b> Appreciation Awareness Cooperation</p>	<ul style="list-style-type: none"> <li>• discuss the relationship between convection and density change.</li> <li>• discuss different methods of heat transference in food preparation.</li> <li>• discuss other applications of heat transfer by using thermoflask.</li> <li>• discuss applications of heat transfer in cooking.</li> <li>• discuss applications of convection and radiation in everyday life.</li> </ul> <p><b>Learners:</b></p> <ul style="list-style-type: none"> <li>• perform activities to show convection and radiation.</li> <li>• .explore examples of radiation of heat by different bodies.</li> <li>• perform activities to classify objects as bad or good heat emitters and absorbers.</li> <li>• research relationship of methods of cooking with</li> </ul>	<p>relate convection to density changes.</p> <p>compare convection and radiation.</p> <p>state applications of convection and radiation in everyday life.</p> <p>report on an activity performed to classify emitters and absorbers of heat as good or bad.</p>	<p>Potassium permanganate.</p> <p>Water.</p> <p>Transparent glassware.</p> <p>Burner.</p> <p>Chimney.</p>
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		methods of heat transference.		
40. demonstrate understanding of cells as sources of electricity.	<p><b>Concepts</b></p> <p>Cell:</p> <ul style="list-style-type: none"> <li>- wet</li> <li>- dry</li> </ul> <p>Components of a cell:</p> <ul style="list-style-type: none"> <li>- electrodes</li> <li>- electrolytes</li> </ul> <p>Types of cells:</p> <ul style="list-style-type: none"> <li>- primary</li> <li>- secondary</li> </ul> <p>Electrical hazards</p> <p>Safety precautions against electricity</p> <p><b>Skills</b></p> <p>Observation Manipulation Drawing Identification Classification Creativity</p> <p><b>Values and Attitudes</b></p> <p>Appreciation</p>	<p><b>Teacher and learners:</b></p> <ul style="list-style-type: none"> <li>• revise circuits and the use of cells.</li> <li>• construct a simple wet cell and connect to a simple circuit.</li> <li>• discuss observations.</li> <li>• discuss electrodes and electrolytes.</li> <li>• dissect and identify parts of a dry cell.</li> <li>• compare wet and dry cells.</li> <li>• discuss types of cells.</li> </ul> <p><b>Learners:</b></p> <ul style="list-style-type: none"> <li>• draw and label a simple cell.</li> <li>• investigate the electrical hazards and the safety precautions against electricity.</li> <li>• present their findings.</li> <li>• design and construct their own simple cells.</li> </ul>	<p>define a cell.</p> <p>define an electrode and an electrolyte.</p> <p>identify positive and negative electrodes.</p> <p>distinguish between primary and secondary cells.</p> <p>distinguish between dry and wet cells.</p> <p>describe the role of the electrolyte in the simple cell.</p> <p>name parts of a simple cell.</p> <p>describe the electrical hazards.</p> <p>list the safety precautions</p>	<p>Electrodes: metals, graphite.</p> <p>Dry cells.</p> <p>Electrolyte: dilute acid.</p> <p>Glassware.</p> <p>Connecting wires.</p> <p>Charts/posters.</p>

	Awareness Cooperation Responsibility		design, construct and write a report of a project on construction of their own simple cells.	
41. demonstrate an understanding of static electricity.	<p><b>Concepts</b></p> <p>Electroscope</p> <p>Charge:</p> <ul style="list-style-type: none"> <li>- detection</li> <li>- effects</li> </ul> <p>Charging by induction</p> <p>Lightning:</p> <ul style="list-style-type: none"> <li>- causes</li> <li>- importance in nitrogen cycle</li> <li>- hazards</li> <li>- safety measures</li> <li>- local practices</li> <li>-</li> </ul> <p><b>Skills</b></p> <p>Communication</p> <p>Problem-solving</p> <p>Observation</p> <p>Manipulation</p> <p>Critical thinking</p> <p>Drawing</p> <p><b>Values and Attitudes</b></p> <p>Appreciation</p>	<p><b>Teacher and learners:</b></p> <ul style="list-style-type: none"> <li>• revise static electricity from previous grades.</li> <li>• discuss parts of an electroscope.</li> <li>• use the electroscope to detect charge of various objects.</li> <li>• demonstrate charging of an electroscope by induction.</li> <li>• perform activities that demonstrate attraction and repulsion.</li> <li>• debate on local beliefs and practices regarding lightning.</li> <li>• visit places where the concept of earthing can be observed.</li> </ul> <p><b>Learners investigate:</b></p> <ul style="list-style-type: none"> <li>• the cause of lightning.</li> <li>• the importance of lightning.</li> <li>• Present their findings</li> </ul>	<p>identify parts of an electroscope.</p> <p>use an electroscope to detect charge.</p> <p>draw a labeled diagram of an electroscope.</p> <p>illustrate the charges of a charged electroscope.</p> <p>describe the effects of a charge on an electroscope.</p> <p>illustrate attraction and repulsion.</p> <p>describe the cause of lightning in relation to static electricity.</p> <p>state the importance of lightning.</p>	<p>Electroscope.</p> <p>Charging rods.</p> <p>Polystyrene balls.</p> <p>Cloths for rubbing.</p> <p>Charts/posters.</p> <p>Lightning.</p> <p>Teacher's Guides.</p>

	Awareness Cooperation Responsibility		suggest suitable safety precautions against static electricity.	
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## TECHNOLOGY

Learning Outcomes: at the end of Grade 8, learners should be able to:	Concepts, Skills, Values and Attitudes	Suggested Learning Experiences	What to assess: the teacher should assess learners' ability to:	Suggested Resources
42. describe simple machines and their functions.	<p><b>Concepts</b> Simple machines</p> <p><b>Types of simple machine:</b></p> <ul style="list-style-type: none"> <li>- lever</li> <li>- pulley</li> <li>- wedge</li> <li>- inclined plane</li> <li>- wheel and axel</li> <li>- gears</li> </ul> <p>Parts of simple machines</p> <p>Functions of simple machines.</p> <p><b>Skills</b> Manipulation Observation Identification Problem-solving Decision-making</p>	<ul style="list-style-type: none"> <li>• Teacher and learners revise simple machines from previous grades.</li> <li>• Teacher and learners discuss types of simple machines.</li> <li>• Teacher and learners discuss parts of simple machines.</li> <li>• Teacher and learners discuss functions of each type of simple machines.</li> <li>• Learners use different simple machines.</li> <li>• Learners identify different machines from carts and posters.</li> <li>• Learners describe machines and their functions.</li> </ul>	<p>list types of simple machines.</p> <p>identify parts of simple machines.</p> <p>describe function of each part of a simple machine.</p> <p>use simple machines.</p> <p>differentiate types of simple machines.</p> <p>draw and label different machines.</p> <p>describe machines and their functions.</p>	<p>Posters/charts.</p> <p>Simple machines.</p> <p>Pulleys.</p> <p>Levers.</p> <p>Wedges.</p> <p>Gears.</p> <p>Inclined planes.</p> <p>Wheel and axle.</p>

	<b>Values and attitudes</b> Caring Responsibility Awareness Appreciation Cleanliness			
43. describe care and maintenance of garden tools and tractor drawn implements.	<b>Concepts</b> Garden tools and tractor drawn implements: - advantages - disadvantages Care and maintenance of tools and tractor drawn implements  <b>Skills</b> Manipulation Observation Identification Problem-solving Decision-making  <b>Values and attitudes</b> Caring Responsibility Awareness Appreciation Cleanliness	Learners brainstorm garden tools and tractor drawn implements.  <b>Teacher and learners:</b> <ul style="list-style-type: none"> <li>discuss advantages of garden tools and tractor drawn implements.</li> <li>discuss disadvantages of garden tools and tractor drawn implements.</li> <li>take a field trip to observe care and maintenance of large tractor drawn implements.</li> <li>Learners practise proper care and maintenance of garden tools.</li> </ul>	list advantages of garden tools.  list advantages and disadvantages of tractor drawn implements.  describe care and maintenance of garden tools.  practice care and maintenance of garden tools  describe care and maintenance of tractor drawn implements.  practice care and maintenance of tractor drawn implements.	Garden tools.  Tractor drawn implements.  Resource person.  Field trip.  Audio-visual equipment.  Posters.
44. demonstrate cleaning and care of wooden equipment and utensils	<b>Concepts</b> <b>Cleaning of wooden utensils:</b>	<b>Learners :</b> <ul style="list-style-type: none"> <li>bring different kitchen equipment and identify</li> </ul>	list utensils made of wood.	Kitchen equipment and utensils.



	<ul style="list-style-type: none"> <li>- Plain</li> <li>- Painted</li> <li>- varnished</li> </ul> <p>Care of wooden utensils</p> <p><b>Skills</b> Manipulation Identification Decision-making Creativity Critical thinking</p> <p><b>Values and attitudes</b> Cleanliness Responsibility Appreciation</p>	<p>the ones made up of wood.</p> <ul style="list-style-type: none"> <li>• Classify wood.</li> <li>• Explore different ways of cleaning wooden materials used for making kitchen equipment and utensils</li> <li>• Investigate cleaning agents used for different woods.</li> <li>• Teachers and learners discuss procedures for cleaning and caring for wooden utensils.</li> </ul>	<p>describe the correct procedure for cleaning wooden utensils.</p> <p>demonstrate cleaning and care of wooden utensils.</p>	<p>Cleaning agents.</p> <p>Teacher's Guide</p> <p>Prescribed Textbooks.</p> <p>Internet.</p>
45. use technology to save money.	<p><b>Concepts</b> Keeping money safely:</p> <ul style="list-style-type: none"> <li>- mobile banking</li> <li>- card payments</li> <li>- credit cards</li> <li>- internet banking</li> </ul> <p>advantages and disadvantages</p> <p><b>Skills</b> Communication Manipulation</p>	<ul style="list-style-type: none"> <li>• Teacher and learners discuss the benefits of keeping money safe.</li> <li>• Teacher and learner discuss ways that are considered unsafe for keeping money.</li> <li>• Teacher and learners brainstorm ways of keeping money safely using technology.</li> <li>• Teacher and learners discuss advantages and</li> </ul>	<p>list benefits of keeping money safe.</p> <p>list unsafe ways of keeping money.</p> <p>state ways of keeping money safe through the use of technology.</p> <p>give advantages and disadvantages of each method.</p>	<p>Charts/posters.</p> <p>Resource person.</p> <p>Internet.</p>

	Logical thinking Decision-making  <b>Values and Attitudes</b> Appreciation Responsibility Honesty	disadvantages of each method used to keep money safe.		
46. perform basic functions of excel.	<b>Concept</b> Spread sheet Graphs and Charts Entering formulas: - product  <b>Skills</b> Calculation Manipulation Classification Application <b>Interpretation</b>  <b>Values and Attitudes</b> Appreciation	<ul style="list-style-type: none"> <li>Teacher and learners revise spreadsheet.</li> <li>Learners collect data and enter it on the spreadsheet.</li> <li>Learners sort data on the spreadsheet.</li> <li>Learners create different sheets on the spreadsheet and label the sheets.</li> <li>Learners create charts and graphs using excel programme.</li> <li>Learners apply Mathematical formula using the spreadsheet: product.</li> </ul>	collect data.  enter data on the spread sheet.  sort data on the spreadsheet.  create sheets and label them.  apply Mathematical formula using spreadsheet: product.	Computers.  Pictures.  Cellular Phones.