Examinations Council
of Eswatini

EPC

ESWATINI PRIMARY CERTIFICATE

Syllabus

For Examination In 2025 - 2027

Science

Subject Code: 513

Contents

ESWATINI PRIMARY CERTIFICATE

Broad Guidelines

The Ministry of Education and Training is committed, in accordance with the National Policy Statement on Education, to provide a Curriculum and Assessment System (Grade 5 to Grade 7) so that at the completion of primary education, learners will:

- be equipped to meet the changing needs of the Nation, and
- have attained internationally acceptable standards.

Eswatini's National Education Policy Directives

Eswatini Primary Certificate (EPC) syllabuses for studies in Grade 5 to Grade 7 will individually, and collectively, enable learners to develop **essential skills** and provide a broad **learning experience** which:

- inculcates values and attitudes as well as knowledge and understanding,
- encourages respect for human rights and freedom of speech,
- respects the values and beliefs of others, relating to issues of gender, culture, and religion,
- develops desirable attitudes and behaviour towards the environment,
- provides insight and understanding of global issues which affect quality of life in Swaziland and elsewhere, e.g., pandemics, global warming, and technological advances.

The National Curriculum for Grade 5 to Grade 7

Learners will be given opportunities to develop **essential skills** which will overlap across the entire range of subjects studied. These skills are listed below.

- Communication and language skills
- Numeracy skills: mathematical ideas, techniques and applications
- Problem-solving skills
- Technological awareness and applications
- Critical thinking skills
- Work and study skills
- Independent learning
- Working with others

To develop these skills, learners must offer **five compulsory subjects**.

Compulsory Subjects

- SiSwati
- English Language
- Mathematics
- Science
- Religious Education

Electives

- Agriculture
- Consumer Science
- Social Studies
- Practical Arts and Technology
- French

Fields of Study

- Pure Sciences
- Social Sciences and Humanities
- Business Studies
- Consumer Science
- Agriculture
- Technical Studies

1.0 INTRODUCTION

This syllabus is a revised version of the old Eswatini Primary Certificate Science Syllabus. It lays a foundation in science and is designed in such a way that learners hinge in well into the Junior Secondary Science, Senior Secondary Science syllabuses and any other equivalent course. The curriculum content of the syllabus is arranged into sub-strands covering five areas/strands: Living things (Life science); Matter, Forces and Energy (Physical science), Earth (Earth science) and Technology.

The Government's aspiration regarding Education for All (EFA) goal No. 6 is to "improve all aspects of the quality of education and ensure excellence so that recognised and measurable learning outcomes are achieved by all especially in literacy, numeracy and essential life skills. This goal is in line with the national aspiration that universal access to basic and pragmatic education will remain Eswatini's priority within available financial and the resource capacities. In ensuring quality and pragmatic Science education, this syllabus focuses on both Science and Technology content as well as the development of skills. The syllabus is taught in a competency–based approach to bring in the application of scientific concepts to everyday life experiences of the learners.

The development of this Science syllabus for the primary Science level was guided by the National Education Policy 2018. This policy states that:

1.1 Science should have a place in the education of all learners who are in the school System, whether or not they are likely to go on to follow a career in Science or Technology field. Science and Technology permeate almost every aspect of daily life.

1.2 Science education should be regarded as a continuum from Grade 1 to 12. Courses of science education should form a coherent series of experiences for learners as they progress through the science curriculum.

1.3 The central objective of National Policy for Science in secondary education (Junior and Senior) in Eswatini is that all learners should be given a broad programme of Science well suited for their abilities and aptitudes for the full five years of secondary education. Full attention must be given to the development of scientific skills and processes as well as to knowledge, understanding and attitude at the lower level.

1.4 The Science curriculum should be inclusive and provide genuine equality of opportunity and balanced courses. Particular attention should be given to the expectations and attitudes of the girl-child and special needs education aspects.

In addition, this policy envisages that after undertaking this course, learners should;

1.5 understand the natural and physical world, the process by which scientific concepts are developed and modified.

1.6 think critically and analytically integrate and synthesise knowledge and draw conclusions from complex material.

1.7. develop technical, mathematical and quantitative skills necessary for calculation, analysis and problem solving.

2.0 RATIONALE

Science and Technology is globally recognized as a driver of the socio-economic development of countries. It creates awareness of, and provides possible solutions to, the risks to the sustainability of the world, whilst meeting the needs of society in the 21st Century.

Science and Technology education enables learners to understand and value the world around them and appreciate their role as responsible citizens. It cultivates a positive attitude towards the universal values of scientific contributions and achievements.

Science and Technology also provides learners with a context within which they can develop the skills associated with investigations. These skills enable learners to participate responsibly in developing innovative ideas and solutions to the challenges of daily life. The Science and Technology syllabus encourages learners to become curious, self-motivated, creative and productive.

The main sections of the EPC Science Assessment syllabus are:

- Aims
- Assessment Objectives
- Specification grid
- Scheme of Assessment
- Curriculum Content
- Grade Descriptions

3.0 AIMS

The aims of the syllabus are the same for all learners including those with special needs. Differentiation will be according to learning objectives, teaching style and assessment strategies. The aims are set out below, but not listed in order of priority.

This syllabus has been designed and developed to enable leaners to:

3.1 demonstrate an understanding of the relationship between their body and the environment

3.2 explain the environmental changes that occur around them

3.3 engage in informed interactions between the environment and themselves

3.4 acquire scientific knowledge, science process skills, and develop attitudes which have immediate significance for the learners in terms of intrinsic interests and application to learners' individual lives as well as problem solving

3.5 make learners appreciate, discover and develop life orientation skills to prepare them to be proactive citizens able to adapt to different real life situations. .

3.6 to encourage learners to develop an inquiring mind, to apply science and technology skills to solve practical problems and to understand their relationship with the environment, whilst acquiring the foundation for future studies in the sciences.

3.7 understand, interpret and apply basic scientific concepts and principles

3.8 use scientific concepts to address social issues and maintain a healthy lifestyle in their environment

3.9 develop scientific skills, confidently apply them to solve problems and communicate scientific information with growing proficiency

3.10 recognise and appreciate the importance of living in harmony with the environment by demonstrating the use of resources in a sustainable manner both individually and in the community

3.11 recognise the usefulness of science as a starting point for science-based careers.

This syllabus has been designed and developed to guide teaching and assessment of the different subject areas in Science as stated in the syllabus components.

4.0 ASSESSMENT OBJECTIVES

Assessment objectives in Science are:

4A Knowledge and Comprehension

4B Application of scientific information

4C Investigative skills

A description of each assessment objective follows.

4A Knowledge and Comprehension

Learners should demonstrate knowledge and understanding in relation to the use of:

A1. scientific vocabulary (terms, definitions, symbols, quantities and units);

A2. facts, concepts, phenomena, theories, technology, instruments and conventions.

A3. the techniques, procedures and principles of safe science practice.

Questions used for testing these objectives usually begin with words such as: name, give, discuss, outline, state, describe, define, select, list, explain, match, identify.

4B Application of Scientific Information

Using words or other written forms of presentation (i.e. symbols, graphs and numbers), learners should be able to:

B1. locate, select, organize, and present information from different sources

B2. identify patterns, report trends and draw conclusions from given information

B3. translate information from one form to another

B4. manipulate numerical and other forms of data

B5. give explanations for phenomena, patterns and relationships

B6. solve problems, including some of a quantitative and qualitative nature

B7. apply science and technology in everyday situations.

When testing these objectives, words like the following could be used: summarize, show, support, identify, justify, demonstrate, explain, suggest, differentiate, compare, analyze.

4C Investigative Skills

Learners should be able to:

C1. incorporate scientific values and attitudes in their investigative skills

C2. formulate hypotheses and predictions

C3. use techniques, apparatus and materials (including improvised equipment)

C4. demonstrate knowledge of how to safely measure quantities accurately and appropriately

C5. make and record observations, measurements and estimates

C6. interpret and evaluate experimental observations and data

C7. demonstrate knowledge of solving problems, and science creative writing e.g related to the environment, energy and technology.

C8. plan and carry out investigations, evaluate methods and suggest possible improvements (including controlling variables, selection of most appropriate techniques, apparatus and materials).

C9. evaluate the benefits and limitations of science and technology in the 21st Century

C10. apply science and technology in everyday situations e.g using locally available materials to solve problems

C11. carefully follow a sequence of instructions

C12. draw, complete or label diagrams of apparatus

C13. describe precautions taken in carrying out a procedure to ensure safety or the accuracy of observations and data, including the control of variables and repetition of measurements

These objectives are a guide to be used during preparation for **Section B** of Paper 2. Candidates are discouraged from using textbooks in the practical component. The section is based on testing investigative skills only, and one of the questions assesses the skill of planning. This question will be based on any one of the strands.

The information candidates need to answer the questions is in the question paper itself or the experimental context and skills listed objective **C**.

5.0 SPECIFICATION GRID

The different assessment objectives will be given the following approximate weighting in examination:

ASSESSMENT OBJECTIVE	Paper 1 (marks)	Paper 2 (marks)	Weighting of assessment objectives in overall qualification
A Knowledge and Comprehension	25	25	50 (not more than 25% recall)
B Application of Scientific Information	15	15	30
C Investigative Skills	0	20	20

The assessment objectives are weighted to give an indication of their relative importance. The percentages are not intended to provide a precise statement of the number of marks allocated to particular assessment objectives.

6.0 Weighting of Papers

Paper	Weighting
1	50 %
2	50 %

7.0 SCHEME OF ASSESSMENT

The syllabus has been drawn upon the assumption that candidates will have done three hours per week (.e.g. 6 x 30 minutes periods) during the course of three years before final examination in Grade 7.

It is compulsory for **all** candidates to write **two** papers: Paper **1** (Multiple choice) and Paper **2** (structured questions) to be eligible for the award of **Grades A to G.** These papers will weigh 80 % of the total assessment and the Continuous Assessment will contribute 20 % to the final assessment.

A description of each paper follows.

Paper 1 (1 hour)

(a) Will consists of 40 compulsory multiple-choice questions of the four-choice type covering every strand of the syllabus.

(b) Will test mainly objectives **A** (Knowledge and Comprehension) and **B** (Application of scientific Information).

Paper 2 (1 hour 30 minutes)

(a) Will consists of **two** sections, Section **A** and Section **B** with a total of 60 marks

(b) Each question will carry 10 marks covering the different strands of the syllabus.

Section **A** will consist of **four** (4) compulsory questions. These questions shall test objectives **A** and **B**.

Section **B** will consist of **two** (2) *compulsory* questions. This section will test mainly objective **C**. The questions shall require familiarity with laboratory equipment and procedures, designing (science creative writing), and shall assume that the candidates have done hands-on practical activities.

8.0 CURRICULUM CONTENT

Learners will develop all skills in the curriculum content outlined below.

STRAND	**SUB-STRAND**	
A. LIVING THINGS	**A1 ANIMALS**	
	Sub-sub strand / competencies	**Indicators of success**
	1.0 Senses and sense organs	**All learners should be able to:**
	1.1 List and describe the use of the five senses to explore the environment stating the receptor organ and its stimulus	1.1.1 list the five senses used by animals to explore their environment stating the receptor organ (and the specific stimuli they respond to). (a) sight - eye (light), (b) hearing - ear (sound), (c) smell - nose (chemicals in air) (d) touch - skin (pain, touch, heat), (e) taste - tongue (chemicals in food)
	2.0 Classification of Living things	**All learners should be able to:**
	2.1 Describe the differences between living things and non-living things	2.1.1 state and describe the characteristics of living things 2.1.2 classify things into living and non-living things using their observable characteristics

	3.0 Classification of animals	**All learners should be able to:**
	3.1 Classify animals into vertebrates and invertebrates and state some of the distinguishing features of both groups	3.1.1 state that animals can be classified into vertebrates and invertebrates 3.1.2 classify, using common characteristic features, vertebrates into: fish, amphibians, reptiles, birds and mammals 3.1.3 use a key based on easily identifiable features to classify the five classes of vertebrates 3.1.4 compare and contrast, using common characteristic features, between the different classes of vertebrates 3.1.5 classify invertebrates (insects and worms) using external characteristic features
	4.0 Life cycles of animals	**All learners should be able to:**
	4.1 Describe the differences in the life cycles of a mammal, an insect and a bird	4.1.1 identify and name the different stages in the life cycles of a mammal i.e. cow, an insect i.e. butterfly and a bird i.e. chicken 4.1.2 draw and label the life cycles of a mammal i.e. cow, an insect i.e. butterfly and a bird i.e. chicken 4.1.3 describe similarities and differences in the life cycles of a mammal i.e. cow, an insect i.e. butterfly and a bird i.e. chicken
	A2 PLANTS	
	1.0 Parts of a flowering plant	**All learners should be able to:**
	1.1 Identify and describe the functions of different parts of a flowering plant	1.1.1 identify parts of a flowering plant i.e. leaves, roots, stem and flower 1.1.2 describe functions of the different parts of a flowering plant

	2.0 Plant needs	**All learners should be able to:**
	2.1 investigate and describe what plants need for life and growth	1.2.1 identify the needs of plants for growth i.e. nutrients, water, carbon dioxide, oxygen and light 1.2.2 state that fertilisers provide nutrients for plants 1.2.3 investigate the effect of fertilisers on plant growth
	3.0 Life cycle of flowering plants	**All learners should be able to:**
	3.1 describe the life cycle of flowering plants	3.1.1 define the flower as the reproductive organ of a plant 3.1.2 identify and name the parts of a flower i.e. petals, sepal, anther, filament, stamen, ovary, ovule, stigma, style, pistil 3.1.3 explain the functions of the different parts of a flower 3.1.4 describe pollination in terms of transfer of pollen grains from the anther of a flower to the stigma (*adaptations of flowers for wind and insect pollination are not required)* 3.1.5 state that wind and insects are agents of pollination 3.1.6 describe fertilisation in flowering plants 3.1.7 describe the importance of fertilization as formation of fruit and seed 3.1.8 define seed dispersal as the scattering of seeds away from the parent plant 3.1.9 list the agents of seed dispersal 3.10 describe how seeds are dispersed 3.11 state the importance of seed dispersal to the plant 3.12 investigate and describe the conditions necessary for germination with reference to water, oxygen and a suitable temperature 3.13 identify and label the stages in the life cycle of a flowering plant e.g. bean and maize plants in terms of flowering, pollination, fertilisation, seed dispersal and germination)

	4.0 Photosynthesis	**All learners should be able to:**
	4.1 describe how plants make food	4.1.1 define photosynthesis as a process through which plants make their food (in the form of glucose) using water and carbon dioxide in the presence of light and chlorophyll 4.1.2 list the conditions necessary for photosynthesis as water, carbon dioxide, chlorophyll and sunlight 4.1.3 describe the absorption of water, sunlight and carbon dioxide for photosynthesis 4.1.4 state the end products of photosynthesis as oxygen and glucose 4.1.5 discuss what would happen to animals if there were no plants 4.1.6 design an activity to make the environment greener limited to controlling dongas and replacing cut trees
	A3 INTERDEPENDENCE	
	1.0 Feeding relationships	**All learners should be able to:**
	1.1 Identify and name a variety of common animals that are carnivores, herbivores and omnivores	1.1.1 define the terms: (a) producer as an organism that makes its own food (b) consumer as an organism that feeds on other organisms (c) herbivore as an animal that feed on plants, (d) carnivore as an animal that feed on other animals and (e) omnivore as an animal that feed on both plants and animals (f) predator as an animal that eats other animals (g) prey as an animal that is eaten by a predator 1.1.2 classify animals, including humans, as herbivores, carnivores or omnivores based on the food they eat in a habitat

	1.2 Describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other	1.2.1 define the term *habitat* as the place where an organism lives, feeds and reproduces 1.2.2 construct simple food chains to show feeding relationships 1.2.3 construct food webs to show feeding relationships in a habitat 1.2.4 describe predator-prey relationships in a habitat 1.2.5 describe the effects of death or removal of living things in a habitat on food chain 1.2.6 describe the role of producers and consumers in maintaining balance in nature 1.2.7 describe the effects of human activity, limited to deforestation and agriculture, on habitats 1.2.8 describe the effects of climate change on habitats
	2.0 Preventing extinction	**All learners should be able to:**
	2.1 Suggest ways to protect habitats and the disappearance of some living things	2.1.1 state the importance of protecting habitats and preventing the extinction of living things 2.1.2 discuss ways of protecting endangered animals, plants and habitats using local examples, limited to education, monitoring and protecting animals, plants and habitats

	A4 THE HUMAN BODY	
	1.0 Body organs	**All learners should be able to:**
	1.1 Describe the main functions of the internal organs of the human body	1.1.1 identify and name the main organs of the human body i.e. heart, lungs, kidneys, intestines, rectum and liver 1.1.2 state the main function of each organ (a) heart - pumping blood to the body (b) lungs – where exchange of gases occurs during breathing (c) kidneys - removing toxic waste from the body (d) intestines – digestion and absorption of digested food and water (e) rectum - where food which cannot be digested (faeces) is stored (f) liver - removes poisonous substances from the body
	2.0 Digestive system	**All learners should be able to:**
	2.1 Describe the main function of the parts of the digestive system in humans	2.1.1 (a) identify and name the different types of teeth i.e. pre-molars, molars, canines and incisors (b) state the functions of the molars, pre-molars, canines and incisors (c) state and explain the differences between the teeth of carnivores and herbivores 2.1.2 identify and name the main parts of the digestive system i.e. mouth, tongue, teeth, gullet, stomach, small and large intestine, rectum 2.1.3 state the functions of the main parts of the digestive system: (a) mouth - where food is chewed into small pieces (b) teeth - break large pieces of food into small pieces (c) tongue - pushes food into the gullet (d) gullet - carries food from the mouth to the stomach (e) stomach - stores food temporarily (f) small intestines - digestion and absorption of digested food

		(g) large intestines - absorption of water, and forms and pushes faeces to the rectum (h) rectum - where food which cannot be digested is stored before it leaves the body through the anus
	3.0 Reproduction in humans	**All learners should be able to:**
	3.1 Describe the main stages of reproduction in humans	3.1.1 (a) describe the main physical changes that occur in girls at puberty (b) describe the main physical changes that occur in boys at puberty 3.1.2 (a) identify the main parts of the male reproductive system (front view only: testis, scrotum, penis, sperm duct, urethra) (b) describe the functions of the main parts of the male reproductive system: (i) testis – produces sperms (ii) scrotum – protects the testes (iii) penis – delivers sperms into the cervix or vagina (iv) sperm duct – carries sperms from the testes to the penis (v) urethra – passage of sperms (c) identify and label the main parts of the female reproductive system (front view only: ovary, oviduct, uterus, cervix, vagina) (d) describe the functions of the main parts of the female reproductive system: (i) ovary – produces the ova/ female sex cell (ii) oviduct – where fertilisation occurs (iii) uterus – where embryo develops to a baby (iv) cervix – it is an opening into the uterus or where sperms are deposited (v) vagina – receives the penis during sexual intercourse and serves as passage for the baby during birth 3.1.3 describe the process of fertilisation in humans

STRAND	SUB-STRAND	
B. MATTER, FORCES AND ENERGY	**B1 MATTER**	
	1.0 States of matter	**All learners should be able to:**
	1.1 Investigate and describe properties of states of matter in terms of shape, volume and compressibility	1.1.1 define matter as anything that has mass and volume 1.1.2 list the states of matter as solids, liquids and gases 1.1.3 describe the physical properties of solids, liquids and gases in terms of shape, volume and compressibility 1.1.4 describe the processes that happen when matter is heated or cooled i.e. melting, evaporation, condensation and freezing (particle arrangement not required)
	2.0 Physical and chemical changes	**All learners should be able to**:
	2.1 Identify changes that are reversible and irreversible	2.1.1 describe and investigate physical and chemical changes 2.1.2 identify physical changes from different activities e.g. melting, freezing, dissolving and evaporation 2.1.3 explain why melting, freezing, dissolving and evaporation are physical changes 2.1.3 explain why cooking, burning and rusting are chemical changes

	3.0 Separating techniques	**All learners should be able to:**
	3.1 Use knowledge of solids, liquids and gases to decide how to separate solutions and mixtures	3.1.1 define the terms solute, solvent, soluble, insoluble and solution 3.1.2 state examples of solutes, solvents and solutions 3.1.3 describe methods of separating mixtures i.e. sieving, sorting by hand, using a magnet, evaporation and filtration
	3.2 Investigate and describe the effect of stirring and temperature on the rate of solubility	3.2.1 define solubility 3.2.2 describe the effect of stirring and temperature on the rate of solubility 3.2.3 investigate the effect of stirring and temperature on the rate of solubility
	4.0 Measurements	**All learners should be able to:**
	4.1 Use the displacement method to measure the volume of substances	4.1.1 define volume as the amount of space occupied by an object 4.1.2 state the units of volume i.e. millilitres / cubic centimetres and litres 4.1.3 measure the volume of liquids 4.1.4 measure the volume of irregular objects
	4.2 Measure mass in grams and kilograms accurately	4.2.1 define mass as the amount of matter in an object 4.2.2 state the instruments (lever arm balance, electronic balance, bathroom scale, triple beam balance) and units for measuring mass 4.2.3 measure the mass of different objects in grams and kilograms

	B2 FORCES	
	1.0 Magnetism	**All learners should be able to:**
	1.1 Explore the forces of attraction and repulsion between magnets	1.1.1 classify objects into magnetic and non-magnetic 1.1.2 describe magnets as having two poles (North and South) 1.1.3 state that the magnetic force is a non-contact force 1.1.4 explain the effects of forces between two magnets 1.1.5 investigate the attraction and repulsion of magnets
	2.0 Friction	**All learners should be able to:**
	2.1 Investigate the effect of friction in everyday life	2.1.1 describe friction as a force between two moving surfaces in contact 2.1.2 investigate the effect of friction on different surfaces 2.1.3 identify everyday situations where friction is useful 2.1.4 describe how friction can be increased or decreased
	3.0 Force of gravity	**All learners should be able to:**
	3.1 Explain that Earth's gravity pulls objects towards the centre of the Earth	3.1.1 explain that gravity is a force that makes objects fall to the ground on Earth 3.1.2 explain that gravity depends on the size of object (pull of gravity on bigger planets is stronger than on smaller planets) 3.1.3 compare the pull of gravity on the Moon and on Earth

	B3 ENERGY	
	1.0 Sound	**All learners should be able to:**
	1.1 Demonstrate that sounds are made when objects or materials vibrate	1.1.1 state that sound is produced by vibrating objects 1.1.2 state that sound can travel through solids, liquids and gases 1.1.3 investigate that sound travels through solids, liquids and gases
	2.0 Electricity	**All learners should be able to:**
	2.1 draw and construct a simple circuit and explain how it works	2.1.1 identify and name the parts of a circuit (cell, connecting wires, bulb, switch) 2.1.2 construct a simple circuit 2.1.3 draw a simple circuit using symbols for bulb, switch and cell 2.1.4 explain that electricity will flow in a complete (closed) circuit 2.1.5 identify an open and a closed circuit 2.1.6 describe the function of a switch in a circuit
	3.0 Light	**All learners should be able to:**
	3.1 Explain that light travels in a straight line and can be reflected or blocked	3.1.1 identify common sources of light (e.g. a candle, a torch, the Sun) 3.1.2 perform an experiment to demonstrate that light travels from a source in straight lines 3.1.3 draw a ray and a beam of light 3.1.4 investigate that light can be reflected by objects (e.g. a mirror, the Moon) 3.1.5 describe the formation of shadows (i.e. when an object blocks light)

C. Earth **(*Earth science*)**	**C1 EARTH in SPACE**	
	1.0 The solar system	**All learners should be able to:**
	1.1 Describe the effect of the Earth's rotation on its axis	1.1.1 describe Earth's rotation 1.1.2 explain day and night in terms of the Earth's rotation
	1.2 Explain that the Earth is part of a system of planets orbiting around the Sun	1.2.1 describe the Sun as a star at the centre of the solar system 1.2.2 list the planets in order of size and proximity to the Sun 1.2.3 describe the Moon as a body orbiting the Earth
	1.3 Describe the effect of the Earth's orbit around the Sun	1.3.1 describe the Earth's revolution around the Sun 1.3.2 explain how the tilt of the Earth's axis leading to the four seasons of the year 1.3.3 describe the effect of the Earth's orbit on the length of the day and the temperature
	C2 EARTH'S NATURAL RESOURCES	
	1.0 Uses of natural resources	**All learners should be able to:**
	1.1 Describe how living things use the Earth's resources	1.1.1 identify and name the Earth's resources e.g. air, water, wind, soil and minerals 1.1.2 describe how the resources are used (e.g. soil for construction; coal for heating; wind for generating electricity)

	1.2 Name several gases and identify one way in which each is useful to humans	1.2.1 state that air is a mixture of gases i.e. oxygen, carbon dioxide, nitrogen and other gases 1.2.2 state the uses of: (a) oxygen- for respiration (b) carbon dioxide- used in fire extinguishers
	2.0 Soil	**All learners should be able to:**
	2.1 Investigate and describe the characteristics of soils	2.1.1 the types of soil i.e. sandy, loam and clay soil. 2.1.2 compare the differences of soil in terms of particle size and texture 2.1.3 investigate the properties of the different types of soil in terms of water retention and aeration
	3.0 The water cycle	**All learners should be able to:**
	3.1 Describe the water cycle	3.1.1 describe the water cycle in terms of evaporation, transpiration, condensation and precipitation 3.1.2 draw and label the water cycle 3.1.3 describe the effect of temperature with evaporation
D.TECHNOLOGY	**D1 ROLE OF SCIENCE AND TECHNOLOGY**	
	1.0 Technology in transport	**All learners should be able to:**
	1.1 Describe how inventors improve people's lives	1.1.1 describe an inventor as a person who makes a new product 1.1.2 describe, with reference to the rubber tyre and tarmac, how inventions in the transport industry have improved people's lives.

	1.2 Give examples of how people use science and technology in their daily lives	1.2.1 explain how scientific ideas are applied in our everyday lives: (a) friction - bicycle brakes; (b) freezing - food preservation; (c) magnets - refrigerator doors
	1.3 Describe how technology can improve our lives	1.3.1 identify and describe situations that lead to wastage of electricity in our homes 1.3.2 describe how technology products can solve the wastage of electricity e.g. automatic switches, energy saving bulbs, solar power
	D2 DESIGN AND MAKING	
	2.0 Design and make a product (posters, notices, story/letter writing, reports, etc) to solve a problem	2.1.1 identify a problem, select and use appropriate materials / information to make a product (posters, notices, story/letter writing, reports, etc) that solve a named problem. 2.1.2 interpret materials/information presented in graphic stimulus and present it in written form

9.0 GLOSSARY OF TERMS

It is hoped that the glossary will prove helpful to candidates as a guide i.e., it is neither exhaustive nor definitive. The glossary has been deliberately kept brief with respect to the number of terms included but also to the descriptions of their meanings. Candidates should appreciate that the meaning of a term must depend, in part, on its context.

In all questions, the number of marks allocated is shown on the examination paper, and should be used as a guide by candidates to how much detail to give or time to spend in answering. In describing a process the mark allocation should guide the candidate about how many steps to include. In explaining why something happens, it guides the candidate on how many reasons to give, or who much detail to give for each reason.

CALCULATE Used when a numerical answer is required. In general, working should be shown, especially where two or more steps are involved.

DEDUCE Used in a similar way to “Predict” except that some supporting statement is required (e.g., reference to a law, principle, or the necessary reasoning is to be included in the answer).

DEFINE (the term(s) ...) is intended literally, only a formal statement or equivalent paraphrase being required.

DESCRIBE Requires the candidate to state in words (using diagrams where appropriate) the main points of the topic. It is often used with reference either to particular phenomena or to particular experiments. In the former instance, the term usually implies that the answer should include reference to (visual) observations associated with the phenomena. In other contexts, describe should be interpreted more generally (i.e., the candidate has greater discretion about the nature and the organisation of the material to be included in the answer). “Describe and explain” may be coupled, as may “State and explain”.

DETERMINE Often implies that the quantity concerned cannot be measured directly but is obtained by calculation, substituting measured or known values of other quantities into a standard formula (e.g., resistance, the formula of an ionic compound).

DISCUSS Requires the candidate to give a critical account of the points involved in the topic.

ESTIMATE Implies a reasoned order of magnitude statement or calculation of the quantity concerned, making such simplifying assumptions as may be necessary about points of principle and about the values of quantities not otherwise included in the question.

EXPLAIN May imply reasoning or some reference to theory, depending on the context.

FIND Is a general term that may variously be interpreted as “Calculate”, “Measure”, “Determine”, etc.

LIST Requires a number of points, generally each of one word, with no elaboration. Where a given number of points is specified this should not be exceeded.

IDENTIFY Requires the candidate to use given data to look for patterns, trends or locate a particular feature in a given diagram. Also, provide examples where a particular phenomenon is manifested or can be observed.

MEASURE Implies that the quantity concerned can be directly obtained from a suitable measuring instrument (e.g., length, using a rule, or mass, using a balance).

OUTLINE Implies brevity (i.e., restricting the answer to giving essentials).

PREDICT Implies that the candidate is not expected to produce the required answer by recall but by making a logical connection between other pieces of information. Such information may be wholly given in the question or may depend on answers extracted in an earlier part of the question. Predict also implies a concise answer with no supporting statement required.

SKETCH When applied to graph work, implies that the shape and/or position of the curve need only be qualitatively correct, **but** candidates should be aware that, depending on the context, some quantitative aspects may be looked for (e.g., passing through the origin, having an intercept). In diagrams, sketch implies that simple, freehand drawing is acceptable; nevertheless, care should be taken over proportions and the clear exposition of important details.

STATE Implies a concise answer with little or no supporting argument (e.g., a numerical answer that can readily be obtained 'by inspection'). Is a general term that may variously be interpreted as “Give”, “Write down”, etc.

SUGGEST Used in two main contexts (i.e., either to imply that there is no unique answer (e.g., in Chemistry, two or more substances may satisfy the given conditions describing an 'unknown'), or to imply that candidates are expected to apply their general knowledge to a 'novel' situation, one that may be formally 'not in the syllabus').

WHAT DO YOU UNDERSTAND BY/WHAT IS MEANT BY: “What do you understand by”/ “What is meant by” (the term (s) ...) normally implies that a definition should be given, together with some relevant comment on the significance or context of the term(s) concerned, especially where two or more terms are included in the question. The amount of supplementary comment intended should be interpreted in the light of the indicated mark value.

PERFORM Perform an experiment in the syllabus implies that the learners will gain great benefit from carrying out such an experiment themselves, and as a result will be able to recall and explain the procedures and the associated science knowledge and understanding, demonstrate how to handle and interpret data from the experiment, and draw conclusions.

INVESTIGATE implies that the learners will have planned the experiment themselves before carrying it out, and as a result will be able to use hypotheses to make predictions and so explain the experimental plan, as well as the issues included above.

TEACHING INVESTIGATIVE SKILLS

We expect you to look for suitable opportunities to embed practical techniques and investigative work throughout the syllabus.

The best way to prepare candidates for section **B** is to integrate practical work fully into the content so that it becomes a normal part of your teaching. Practical work helps candidates to:

- develop a deeper understanding of the syllabus topics
- learn to appreciate the way in which scientific theories are developed and tested
- develop experimental skills and positive scientific attitudes such as objectivity, integrity, cooperation, enquiry and inventiveness.

APPARATUS LIST

This list contains the items you are likely to need for teaching the investigative skills needed for Section **B**. It is not exhaustive and does not include equipment commonly regarded as standard in a science laboratory.

- rulers capable of measuring to 1 mm
- metre rule
- means of writing on glassware
- beakers, 50 cm^3,100 cm^3, 250 cm^3
- polystyrene or other plastic beakers of approximate capacity 150 cm^3
- test-tubes (Pyrex or hard glass), approximately 125 mm × 16 mm
- bungs to fit standard test-tubes and large test-tubes
- conical flasks, within the range 150 cm^3 to 250 cm^3
- measuring cylinders, 100 cm^3, 50 cm^3, 25 cm^3, 10 cm^3
- white tiles
- thermometers (clinical and laboratory), with 1 °C graduations
- stop-clocks (or wall-clock or wrist-watch), to measure to an accuracy of 1 s
- glass rods
- forceps
- spatulas
- scissors
- means of cutting biological materials (e.g. scalpels or sharp knives)
- filter funnels and filter paper
- electrical cells (batteries) and holders to enable several cells to be joined
- connecting leads and crocodile clips
- low-voltage filament lamps in holders
- switches
- torch
- plane mirror
- plasticine or modelling clay
- ray box
- magnets
- balances (e.g triple beam balance, lever arm balance, electronic balance, bathroom scale)

GRADE DESCRIPTIONS

The scheme of assessment is intended to encourage positive achievement by all candidates. Grade descriptions are provided to give a general indication of the standards of achievement likely to have been shown by candidates awarded particular grades. The grade awarded will depend on the extent to which the candidate has met the assessment objectives overall.

Criteria for the standard of achievement likely to have been shown by candidates awarded Grades **A**, **C** and **E** is shown below.

Grade A	Candidate must show mastery of the curriculum
A candidate should be able to: • relate facts to principles and vice versa; • state why particular techniques are preferred for a procedure or operation; • select and collate information from a number of sources and present it in a clear logical form; • solve problems in situations which may involve a wide range of variables; • process data from a number of sources to identify any patterns or trends; • generate a hypothesis to explain facts or find facts to support a hypothesis.	
Grade C	Candidate must show a high level of competence in the curriculum.
A candidate should be able to: • link facts to situations not specified in the syllabus; • describe the correct procedure(s) for a multi-stage operation; • select a range of information from a given source and present it in a clear logical form; • identify patterns or trends in given information; • solve problems involving more than one step, but with a limited range of variables; • generate a hypothesis to explain a given set of facts or data.	
Grade E	Candidate must show competence in the curriculum.
A candidate should be able to: • recall facts contained in the syllabus; • indicate the correct procedure for a single operation; • select and present a single piece of information from a given source; • solve a problem involving one step, or more than one step if structured help is given; • identify a pattern or trend where only a minor manipulation of data is needed; • recognise which of two given hypotheses explains a set of facts or data.	