FOREWORD

The Ministry of Education and Skills Development is pleased to present the revised junior secondary school syllabuses. This marks a major milestone towards the attainment of quality education in Botswana. The revised syllabuses signals another major milestone in the attainment of the ideals reflected in the Revised National Policy on Education and brings closer the realization of the aspirations reflected in Vision 2016. The publication of these syllabuses is also a deliberate effort to provide accessible quality education for the creation of an educated labour force. It has been observed that countries with superior education systems are also the most economically successful. Thus, high quality education is seen as a vital pre-requisite in increasing productivity and competitiveness leading to national growth and development and subsequently, a higher standard of living for all citizens.

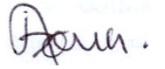
The revised junior secondary syllabuses come at a time of unprecedented knowledge explosion, technological changes, a fluid socio-economic context and an increasingly interdependent regional and global economy. In this age of global competitiveness, it is important that all countries foster human resources by developing requisite competencies among young people. Survival in this millennium depends on the ability to effectively accommodate and manage change, and to adapt to the changing socio-economic and cultural plains. It is the wish of the Ministry of Education and Skills Development to prepare young Batswana for future growth and adaptation to ongoing changes in the socio-economic context.

The revised junior secondary programme has not been drastically changed. It is still built on the ten year basic education philosophy that seeks to provide quality learning experiences. It provides students with a broad based education that equips students' with knowledge and skills that are transferable to everyday life. The content has been selected from the students' immediate environment to facilitate understanding and ease of transfer of skills. Furthermore, the programme aims at creating and sustaining a conducive environment for learning and teaching that allows students to excel within their own capabilities. A deliberate attempt has been made to infuse and integrate emerging issues such as Environmental Education, HIV/AIDS Education, Disaster Management, Anticorruption Culture, Emotional Intelligence, Civic Education and the world of work. The programme also pays attention to the all round development of the individual and the inculcation of attitudes and values that nurture respect for one's self and for others. Life skills education has been integrated into the programmes.

The learners are exposed to a range of knowledge and foundation skills such as numeracy, literacy, prevocational and problem solving skills. It also focuses on the development of desirable attitudes towards different types of work, social and moral values that are expected of them at the end of the program. The implementation of the revised programme begins in 2010.

Critical to the success of the revised junior secondary programme is the recognition of individual talents, needs and learning styles. Thus, the role of the teacher in the classroom must be that of a facilitator for effective learning to occur. The teacher must be conscious of the students' needs to take a certain measure of responsibility for their own learning. The teacher must also take cognissance of the broad range of ability of the student body and the different levels of achievement. This entails the use of participatory teaching and learning styles that provide a rich diverse learning environment.

On behalf of the Ministry of Education and Skills Development, I wish to record my appreciation to members of the National Panels and Standing Committees, school heads, teachers, institutions and other organisations for their invaluable contributions during the revision of these syllabuses.



Permanent Secretary
Ministry Of Education and Skills Development

ACKNOWLEDGEMENTS

The Department of Curriculum and Evaluation wishes to express its sincere gratitude to the JC Integrated Science Standing Committee and National Panel members who worked tirelessly in the development of this integrated science syllabus. The department salutes them for their professional commitment and dedication.

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FORM 3

1.0 INTRODUCTION

This syllabus is a result of the JC Evaluation Report of 2002 that recommended some changes to the JC science program after extensive consultation with various stakeholders. The Revised Science Syllabus is designed to cater for learners who will proceed to senior secondary education or vocational training and learners who will leave formal education at the end of Form III to join the world of work. The syllabus builds on what learners learnt at the primary level. In achieving the objectives of the syllabus, it should be realised that when children come to school, they bring with them some experiences, knowledge, skills, attitudes and beliefs. Some of these experiences may become useful or inhibitive during the teaching-learning process, and so teachers have to be aware of these earlier experiences to communicate understanding more effectively through recognising individual abilities, interests and needs.

This syllabus document has been divided into **two parts**. The first part is an introduction which;

- describes the syllabus layout,
- explains the rationale for the Ten-Year Basic Science programme,
- outlines the aims of Ten-Year Basic Education Programme,
- outlines the aims of the Three-Year Science syllabus and finally
- proposes teaching approaches that can facilitate meaningful learning.

The **second part** details programme outlines for Forms I, II and III in the nine broad units that make the syllabus. The broad units comprise of:

Unit 1.0 Science, Technology and Society

The unit will help learners to understand the relevance and applications of science and technology in their lives. It is hoped that learners would develop science process skills and understand the dynamics of science, technology and society.

Unit 2.0 Plants, Animals and The Environment

The unit seeks to implore learners to explore the natural environment and gain a better understanding of the interactions of the biotic and abiotic systems.

Unit 3.0 Materials and Their Properties

The unit helps learners to study and gain a deeper understanding of the physical environment. Learners will learn about the nature of matter including its physical and chemical properties.

Unit 4.0 Sexual Reproductive Health

The unit focuses on exposing learners to issues of sexual and reproductive health and helping learners to develop skills to deal with such issues. It is hoped that the unit will help learners to grow into informed, loving and caring parents.

Unit 5.0 Force, Motion and Energy

The unit aims at providing learners with a deeper understanding of the interaction of matter and its effects. They also learn about sustainable use of resources.

Unit 6.0 Health and Safety

The unit empowers learners to understand and develop healthy and safe habits in their interaction with their environment.

Unit 7.0 The Human Body

This unit aims to help learners to gain a deeper understanding of their human anatomy and physiology, hence a better understanding and appreciation of their body structures and how their bodies function.

Unit 8.0 Electricity and Magnetism

The unit aims at giving learners a deeper understanding of electricity. It also challenges learners to explore and adopt ways of using electricity sustainably and safely.

Unit 9.0: The Solar System

The unit is intended to help learners to develop a broader perspective of the earth and its systems. Learners gain a deeper understanding of the 'living earth" and how its systems continually interact and the impact of these interactions on their lives. It is also hoped that learners would develop interest in the study of nature beyond the earth.

The units are introduced at **Form 1** and further developed during the later years. Each unit is sub-divided into **topics**. From topics, **sub-topics** have been selected to allow learners to develop science process skills and to help learners acquire knowledge that will enable them to understand science concepts, laws, principles, theories and practices. **General objectives** have been derived for each topic. The general objectives give rise to **specific objectives** that describe what students are expected to do. These include applying basic science process skills, interpreting natural phenomena, understanding and applying scientific principles. A deliberate effort has been made to show the relationships between the disciplines of science and technology, how they impact on society and how society influences them. Issues on Sexual Reproductive Health Education (**SRHE**), Environmental Education (**EE**), **HIV** and **AIDS** Education and concepts relating to the world of work have also been infused into the syllabus.

1.1 RATIONALE

Science by its nature involves experimental activities characterised by inquiry methods of learning. Through learning science, children can understand the rapidly changing environment around them. Children learn about objects and events through asking questions, investigating and experimenting to find appropriate answers. This scientific method of inquiry develops in children skills and attitudes that facilitate the learning of science and other subjects. Specifically, science gives children the opportunity to:

- acquire basic scientific knowledge and skills
- apply the acquired knowledge to new situations
- use the acquired scientific knowledge and skills in solving problems
- recognise relationships among the basic scientific concepts
- scientifically process information at their disposal.

Science plays a central role in society by helping children gain an understanding of the scientific and technical aspects of the society in which they live. Using the scientific approach provides children with a better ability to use the knowledge they have acquired and to cope with the ever-changing technological developments that have become so much a part of our lives.

1.2 AIMS OF THE TEN-YEAR BASIC EDUCATION PROGRAMME

On completion of the Ten-Year Basic Education Programme, learners should have:

1. developed competency and confidence in the application of computational skills in order to solve day-to-day problems.
2. developed an understanding of business, everyday commercial transactions and entrepreneurial skills.
3. developed critical thinking, problem-solving ability, individual initiative, inter-personal and inquiry skills.
4. developed desirable attitudes towards different types of work and the ability to assess personal achievement and capabilities realistically in pursuit of appropriate career/employment opportunities and/or further education.
5. acquired knowledge, skills, and attitudes in food production and industrial arts for self-reliance and self-sufficiency.
6. developed literacy and understanding of the use of information and communication technology (ICT) in the world of work and in every sphere of life.
7. acquired knowledge and understanding of their environment and the need for sustainable utilisation of natural resources.
8. developed desirable values, attitudes and behavioural patterns in interacting with the environment in a manner that is protective, preserving and nurturing.
9. acquired knowledge and understanding of society, appreciation of their culture including languages, traditions, songs, ceremonies, customs, social norms and a sense of citizenship.
10. developed the ability to express themselves clearly in English, Setswana and a third language both orally and in writing, using them as tools for further learning and employment.

11. acquired science knowledge and skills, including knowledge of the laws governing the natural world.

12. acquired knowledge and practice of moral standards and health practices that will prepare them for responsible family and community life.

13. developed their own special interests, talents and skills whether these be dexterity, physical strength, intellectual ability, and/or artistic gifts.

14. developed an appreciation of technology and acquire technology skills including basic skills in handling tools and materials.

15. gained the necessary knowledge and ability to interact with and learn about their community, the government of their country and the world around them.

1.3 AIMS OF THE THREE-YEAR JUNIOR SECONDARY EDUCATION PROGRAMME

On completion of the Three Year Junior Secondary Education Programme, learners should have:

1. developed competence and confidence in the application of computational skills in order to solve day to day problems.

2. acquired knowledge of business, everyday commercial transactions and entrepreneurship.

3. developed critical thinking, problem solving ability, individual initiative, creativity, interpersonal and inquiry skills.

4. developed desirable attitudes towards different types of work and the ability to assess personal achievement and capabilities realistically in pursuit of appropriate career/ employment opportunities/ possibilities and/ or further education and training.

5. acquired knowledge, skills and desirable agricultural production and industrial arts attitudes for self- reliance and self sufficiency.

6. developed literacy and understanding of the significance of ICT in the world of work and in every sphere of life.

7. acquired knowledge and understanding of their environment and the need for sustainable utilization of natural resources.

8. developed desirable values, attitudes and behaviour in interacting with the environment in a manner that is protective, preserving, and nurturing.

9. acquired knowledge and understanding of society, appreciation of different cultures, religion and a sense of citizenship.

10. developed tolerance towards different cultures, pride in own culture and foster unity in diversity.

11. developed the ability to express themselves clearly in English, Setswana, Modern Foreign Language and/or a third language and sign language, using them as tools for further learning and employment.

12. acquired science knowledge, skills and understanding of laws and principles governing the natural world.

13. acquired knowledge, attitudes, moral standards, life skills and health practices including awareness and management of epidemics that will prepare them for responsible and productive family and community life.

14. developed special interests, talents and skills, including dexterity, physical strength, intellectual ability, aesthetics and/ or artistic gifts.

15. developed an appreciation of technology and acquired technology skills including skills and safety precautions in handling tools and materials

16. acquired knowledge and ability to interact with and learn about their community, the government of their country and the world around them

17. acquired knowledge and skills that promote democracy, good governance, peace and security

1.4. AIMS OF THE THREE-YEAR INTEGRATED SCIENCE PROGRAMME.

At the end of the three years of Junior Secondary Science Programme, learners should have developed:

1. an understanding of basic principles, processes and concepts of science as they are experienced in everyday life.

2. sound scientific skills such as curiosity, objectivity, open-mindedness, creativity, patience, integrity, initiative and an inquisitiveness.

3. the ability to use science process skills for understanding and exploring natural phenomenon, problem solving and decision making.

4. an awareness and understanding of the interrelationships among science, technology and society in the context of science and everyday life.

5. basic computer skills and understanding of the significance of computers in the study of science and in science related careers.

6. a positive attitude towards the environment and the ability to use natural resources in a sustainable manner.

7. the ability to make informed decisions concerning further studies and science-based careers and vocations.

1.5 CRITICAL COMPETENCIES

At the end of three years of Junior Secondary Science Programme, learners should be able to:

1. recognise basic facts in science.

2. show understanding of principles, concepts and processes of science as they are experienced in real life situations.

3. recognise and communicate scientific knowledge across a range of topics.

4. use technology safely and appropriately.

5. appreciate and demonstrate the interrelationship between science, technology and society.

6. demonstrate conceptual understanding of science cycles, principles, processes and systems.

7. use process skills in science for understanding and exploring natural phenomenon, problem solving and decision making.

8. demonstrate a grasp of abstract and complex science concepts.

9. demonstrate the ability to use natural resources in a sustainable way.

10. demonstrate the significance of computers in science related careers.

11. work with computers and computer programmes, and use computers to solve problems.

12. demonstrate inquiry, interpersonal and critical thinking skills.

13. make informed decisions about further studies in science, science based-careers and vocations, and life in general.

14. demonstrate scientific skills such as curiosity, open-mindedness, creativity, objectivity, integrity and initiative.

1.6 RECOMMENDED TEACHING METHODS

In line with the Revised National Policy on Education (1994), the syllabus encourages learner centered approach to teaching and learning. It involves learners applying the science process skills to answer questions and solve problems while the teacher provides an allowing environment. The learner centered approach helps learners discover that society, science and technology are mutually symbiotic; science principles are applied in the development of technology while the type of technology developed is driven by what society needs. The approach ensures that all learners including those with special needs are reached because it is the learner but not the teacher who is dictating the pace of learning and teaching.

1.7 ASSESSMENT

Assessment is an inclusive process of monitoring and keeping track of learners' progress overtime. It is an integral part of the teaching-learning process. It is therefore

recommended that formative assessment (Continuous Assessment) be conducted regularly as a diagnostic process of learners' classroom work. Assessment should take cognizance of learners with special needs.

Summative assessment will be used to measure the learners' achievement at the end of the programme. The Botswana Examination Council (BEC) will coordinate the summative assessment component.

1.8 INCLUSIVE EDUCATION

The integrated science syllabus is premised on the concept of inclusion, which requires the creation of an enabling environment for all learners, irrespective of their physical, intellectual and/or emotional abilities. All learners have the right to education. Inclusive education commits teachers to ensure that all learners overcome potential barriers to learning and assessment. It requires teachers to modify programmes of study to give all learners relevant and appropriate challenging work. The UNESCO Framework for Action on Special Needs Education (1994) advocates for the engagement of all learners in meaningful learning, irrespective of their station in life. This would include "gifted children, children with disabilities and children from disadvantaged or marginalised areas or groups"

1.9 EMERGING ISSUES

In an endeavour to ensure that the curriculum is responsive to the needs of the society, emerging issues should be infused and integrated during classroom dynamics. Emerging issues help learners appreciate the challenges and developments occurring around their environment. This helps to prepare learners for life, citizenship and the world of work.

1.10 TIME ALLOCATION

The syllabus has been developed on the assumption that science will be allocated **4 periods** per week on a 40 minutes period, five-day timetable. The syllabus also indicates **approximate** period allocation per unit.

FORM 1

UNIT 1. 0: SCIENCE, TECHNOLOGY AND SOCIETY		
1.1 – The Nature of Science ***(7 periods)***		
Subtopics	***General Objectives***	***Specific Objectives***
	Learners should be able to:	*Learners should be able to:*
The Interactions of Science, Technology and Society.	1.1.1 understand effects of science and technology in everyday life.	1.1.1.1 distinguish between science and technology. 1.1.1.2 evaluate the impact of technology on society. 1.1.1.3 discuss the influence of society on technology. 1.1.1.4 examine environmental and health issues related to technology.
Doing Science	1.1.2 acquire basic science process skills to carry out scientific investigations.	1.1.2.1 develop questions to form a hypothesis. 1.1.2.2 plan an investigation. 1.1.2.3 describe a sequence of events occurring in an investigation. 1.1.2.4. conduct an investigation. 1.1.2.5 infer relations of variables from experimental results. 1.1.2.6 draw conclusions based on observations.
Working Safely in the Laboratory	1.1.3 develop basic knowledge, skills and techniques to work safely in the laboratory.	1.1.3.1 identify common hazards in a laboratory. 1.1.3.2 follow safety guidelines. 1.1.3.3 demonstrate appropriate safety techniques in manipulating equipment and materials.
1.2-Measurements ***(18 periods)***		
Scalars and Vectors	1.2.1 distinguish between scalars and vectors	1.2.1.1 define a scalar quantity. 1.2.1.2 define a vector quantity. 1.2.1.3 calculate the resultant of vectors acting along a straight line. 1.2.1.4 classify physical quantities into scalars and vectors.
Measuring Length	1.2.2 perform estimations and accurate measurements of length.	1.2.2.1 define length. 1.2.2.2 state the SI unit for length. 1.2.2.3 convert measurements in traditional and non-standard units into metres. 1.2.2.4 measure length to the nearest millimetre. 1.2.2.5 identify sources of error in the measurement of length. 1.2.2.6 estimate the length of common objects to the nearest centimetre.
Measuring Area	1.2.3 perform estimations and accurate measurements of area.	1.2.3.1 estimate the area of a regular shape. 1.2.3.2 determine the area of an irregular object.

Measuring Volume	1.2.4 perform estimations and accurate measurements of volume.	1.2.4.1 define volume 1.2.4.2 read accurately the scale of a measuring cylinder to the nearest cubic centimetre/millilitre [cm^3/ml]. 1.2.4.3 measure the volume of irregular floating and sinking objects using displacement. 1.2.4.4 identify the possible sources of error 1.2.4.5 estimate the volume of a substance.
Measuring Mass	1.2.5 perform estimations and accurate measurements of mass.	1.2.5.1 define mass 1.2.5.2 state the SI unit for mass 1.2.5.3 measure mass of different objects. 1.2.5.4 read the scale of a balance to the nearest gram. 1.2.5.5 identify sources of error in the measurement of mass 1.2.5.6 estimate the mass of common objects.
Density	1.2.6 understand the relationship between mass and volume.	1.2.6.1 define density. 1.2.6.2 calculate density for different substances. 1.2.6.3 use the hydrometer to measure densities of liquids. 1.2.6.4 relate density to buoyancy.
Measuring Temperature	1.2.7 perform estimations and accurate measurements of temperature.	1.2.7.1 define temperature 1.2.7.2 state the SI unit for temperature 1.2.7.3 make conversions between the Celsius scale, the Kelvin scale and the Fahrenheit scale 1.2.7.4 read the scale of a thermometer to the nearest degrees Celsius (°C). 1.2.7.5 read the scale of a clinical thermometer to the nearest 0.1 °C. 1.2.7.6 estimate temperature. 1.2.7.7 demonstrate sensitivity and range using a variety of thermometers.
Measuring Time	1.2.8 perform estimations and accurate measurements of time.	1.2.8.1 read the scales of a stopwatch or a stop-clock to the nearest second. 1.2.8.2 identify sources of error in measuring time. 1.2.8.3 estimate time to the nearest minute.

UNIT 2.0: PLANTS, ANIMALS AND THE ENVIRONMENT		
2.1- Living Matter ***(6 periods)***		
Subtopics	***General Objectives***	***Specific Objectives***
	Learners should be able to:	*Learners should be able to:*
Classification of Living Things	2.1.1 understand the basis of classification of living things.	2.1.1.1 identify basic principles of classification of living things. 2.1.1.2 construct simple keys to classify living things.
Plant and Animal Cells	2.1.2 understand the structure of the cell as the building unit in organisms.	2.1.2.1 describe the cell as the basic unit of life in plants and animals. 2.1.2.2 identify a variety of animal and plant cells. 2.1.2.3 identify the main parts of a plant cell and of an animal cell. 2.1.2.4 state the functions of the main parts of a plant cell and of an animal cell. 2.1.3.5 describe differences and similarities in structure and function between plant and animal cells.
Cell Specialisation	2.1.3 understand the specialised functions of different plant and animal cells.	2.1.3.1 relate the structure of a cell to its function. 2.1.3.2 prepare wet mount slides of simple plant and animal cell. 2.1.3.3 use a microscope to examine slides of plant and animal cells.
Plants and Animals Systems	2.1.4 understand the structure and functions of systems in plants and animals	2.1.4.1 describe a multi-cellular organism. 2.1.4.2 describe a unicellular organism. 2.1.4.3 define the terms “tissue, organ, system and organism” 2.1.4.4 explain the function of systems in plants and animals.
2.2-Energy Flow in Living Things ***(11 periods)***		
Leaf Structure	2.2.1 understand the structure and functions of a leaf.	2.2.1.1 explain the importance of the structure of a leaf in photosynthesis. 2.2.1.2 describe the structures in a leaf that help in exchange of gases in plants.
Photosynthesis	2.2.2understand the process of photosynthesis and its importance to life.	2.2.2.1 describe the process of photosynthesis. 2.2.2.2 write a word equation for photosynthesis. 2.2.2.3 investigate the production of oxygen and carbohydrates by green plants. 2.2.2.4 test a leaf for starch using an appropriate method. 2.2.2.5 explain the importance of photosynthesis to all life.
Respiration	2.2.3 acquire knowledge of the process of respiration in living organisms.	2.2.3.1 define respiration. 2.2.3.2 distinguish between respiration and breathing. 2.2.3.3 write the word equation for respiration. 2.2.3.4 describe the relationship between photosynthesis and respiration in plants. 2.2.3.5 discuss the effects of deforestation on the environment.
Transport of Food, Water and Nutrients in Plants.	2.2.4 acquire knowledge of how substances	2.2.4.1 describe the transport of end products of photosynthesis in plants. 2.2.4.2 demonstrate the transport of water and mineral salts in plants.

	are transported in plants.	2.2.4.3 define transpiration. 2.2.4.4 investigate conditions that affect the rate of transpiration.
Nutrient Cycles	2.2.5 recognise the interdependence of living organisms through nutrient cycles.	2.2.5.1 describe the nitrogen cycle in terms of nitrogen fixation by root nodules and lightning, animal and plant nutrition, nitrogen in the air and denitrification. 2.2.5.2 describe the carbon cycle in terms of animal and plant nutrition, combustion, respiration, decomposition and formation of fossil fuels.
2.3-Managing Natural Resources ***(4 periods)***		
Conserving Natural Resources	2.3.1 recognise the need to conserve natural resources and practice conservation strategies.	2.3.1.1 define the term " natural resource". 2.3.1.2 identify important natural resources found in Botswana. 2.3.1.3 discuss the importance of conserving natural resources. 2.3.1.4 demonstrate ways of conserving natural resources.
Methods of Conservation	2.3.2 understand the importance of recycling to resource conservation.	2.3.2.1 explain the importance of recycling to conservation. 2.3.2.2 use safe methods for recycling resources. 2.3.2.3 explore the business potential of recycling resources.

UNIT 3.0: MATERIALS AND THEIR PROPERTIES		
3.1 – The Nature of Matter ***(13 periods)***		
Subtopics	***General Objectives***	***Specific Objectives***
	Learners' should be able to:	*Learners' should be able to:*
Understanding Matter	3.1.1 comprehend the properties of the different states of matter.	3.1.1.1 define matter. 3.1.1.2 identify the physical properties of matter. 3.1.1.3 describe the nature of matter in terms of particles called atoms. 3.1.1.4 describe the structure of an atom in terms of neutrons, protons and electrons. 3.1.1.5 explain the physical properties of gases, liquids and solids in relation to particle arrangement. 3.1.1.6 demonstrate expansion, compressibility and contraction of gases, liquids and solids.
Changes of State of Matter	3.1.2 comprehend changes of states of matter.	3.1.2.1 interpret changes of state in terms of rearrangement of particles. 3.1.2.2 demonstrate changes of state of matter.
Diffusion	3.1.3 understand diffusion in terms of particle movement.	3.1.3.1 define diffusion. 3.1.3.2 describe diffusion of particles in fluids. 3.1.3.3 demonstrate diffusion in fluids. 3.1.3.4 identify diffusion in everyday life.
The Science of Water	3.1.4. know the chemical and physical properties of pure water and their effects on nature.	3.1.4.1 investigate physical properties of pure water. 3.1.4.2 conduct a chemical test for water. 3.1.4.3 state the chemical constituents of a water molecule. 3.1.4.4 explain the anomalous expansion of water on cooling. 3.1.4.5 describe effects associated with the anomalous expansion of water. 3.1.4.6 investigate the significance of the anomalous expansion of water to lives of marine animals.
3.2-Acids and Bases ***(5 periods)***		
Properties of Acids, Bases and Alkalis	3.2.1 understand properties of acids, bases and alkalis.	3.2.1.1 define the terms "acid, base and alkali." 3.2.1.2 list the common properties of acids, bases and alkalis. 3.2.1.3 define an acid-alkali indicator. 3.2.1.4 prepare acid-alkali indicators from plant material. 3.2.1.5 interpret the colour of a universal indicator when placed in an acidic, neutral or alkaline solution. 3.2.1.6 describe the corrosive and hazardous effects of concentrated acids and concentrated alkalis. 3.2.1.7 classify household chemicals *as*acidic, alkaline or neutral. 3.2.1.8 correctly interpret safety symbols and instructions on labels. 3.2.1.9 demonstrate safe storage of hazardous chemicals. 3.2.1.10 take appropriate action during accidents involving common chemicals in the home.

UNIT 4.0: SEXUAL REPRODUCTIVE HEALTH		
4.1- Human Growth and Development ***(4 periods)***		
Subtopics	***General Objectives***	***Specific Objectives***
	Learners should be able to:	*Learners should be able to:*
The Reproductive System	4.1.1 understand the functions of the different parts of the human reproductive system.	4.1.1.1 describe the functions of parts of the female reproductive system. 4.1.1.2 describe the functions of parts of the male reproductive system. 4.1.1.3 distinguish between the male and the female sex cells
Physical Development and Puberty	4.1.2. develop positive attitudes about their sexuality.	4.1.2.1 describe changes that occur at puberty. 4.1.2.2 describe the menstrual cycle. 4.1.2.3 state the three hormones responsible for changes at puberty. 4.1.2.4 describe the functions of each hormone responsible for changes at puberty. 4.1.2.5 define menopause.
4.2-Family Planning ***(3 periods)***		
Methods of Birth Control	4.2.1 acquire basic knowledge about the use of a variety of birth control methods.	4.2.1.1 list the different methods of birth control 4.2.1.2 discuss the advantages and disadvantages of the different methods of birth control. 4.2.1.3 discuss the implications of family planning in the light of family size. 4.2.1.4 identify outlets that provide family planning advice and services.
4.3-Sexual Behaviour Problems ***(5 periods)***		
Sexually Transmitted Infections and HIV and AIDS.	4.3.1 know about sexually transmitted infections and HIV/AIDS and their prevalence and seriousness.	4.3.1.1 define the concept "sexually transmitted infections" (STIs) 4.3.1.2 describe signs, transmission and treatment of sexually transmitted diseases: syphilis, gonorrhoea, herpes and thrush. 4.3.1.3 discuss AIDS as a sexually transmitted infection. 4.3.1.4 describe the medical conditions of advanced HIV and AIDS. 4.3.1.5 distinguish between being HIV positive and having AIDS. 4.3.1.6 identify opportunistic infections associated with HIV and AIDS 4.3.1.7 identify programmes in place for the treatment of HIV and AIDS conditions.

UNIT 5.0: FORCE, MOTION AND ENERGY		
5.1- Energy Forms and Energy Changes ***(12 periods)***		
Subtopics	***General Objectives***	***Specific Objectives***
	Learners should be able to:	*Learners should be able to:*
Energy Forms and Energy Sources	5.1.1. know and utilise the different forms of energy and energy sources.	5.1.1.1 define the term "fossil fuels" 5.1.1.2 explain the origins of fossil fuels. 5.1.1.3 discuss the importance of fossil fuels. 5.1.1.4 distinguish between renewable energy sources and non-renewable energy sources. 5.1.1.5 describe methods of harnessing alternative sources of energy. 5.1.1.6 discuss the importance of conserving energy. 5.1.1.7 identify alternative energy sources available in Botswana. 5.1.1.8 evaluate the feasibility of harnessing different sources of energy in Botswana in terms of financial and environmental implications. 5.1.1.9 explore the business potential of harnessing alternative energy sources in Botswana.
Energy Sources in the Home	5.1.2 know the different sources of energy used in the home.	5.1.2.1 identify sources of chemical energy in the home. 5.1.2.2 identify sources of heat and light energy in the home. 5.1.2.3 discuss the financial and environmental implications of using the different energy sources in the home. 5.1.2.4 evaluate the benefits of choosing a specific energy source for use in the home.
Energy Changes	5.1.3. understand energy transformations, their applications and implications.	5.1.3.1 identify applications of energy changes in everyday life. 5.1.3.2 discuss the importance of energy transformations to people, animals and plants 5.1.3.3 identify natural phenomena that are caused by energy transformations. 5.1.3.4 describe the causes of the greenhouse effect and its consequences.
Using Energy Sources Safely	5.1.5 know and demonstrate common safety precautions when handling energy sources in the home.	5.1.5.1 discuss safety precautions to be taken when using mains electricity. 5.1.5.2 make simple diagnoses of faults in electrical appliances. 5.1.5.3 discuss safety precautions to be taken when using fossil fuels in the home or school. 5.1.5.4 demonstrate ways of preventing accidents when burning fuels.
5.2 – Sound Energy ***(7 periods)***		
The Sounds we Hear.	5.2.1 understand the nature, characteristics and properties of sound.	5.2.1.1 demonstrate the production of low and high notes. 5.2.1.2 relate pitch to frequency of vibration. 5.2.1.3 relate loudness to amplitude of vibration. 5.2.1.4 demonstrate reflection of sound (echo). 5.2.1.5 state the relative speeds of sound in different media.

How Sound Moves.	5.2.2 understand the propagation of sound.	5.2.2.1 distinguish between a longitudinal wave and a transverse wave. 5.2.2.2 demonstrate the propagation of a longitudinal wave. 5.2.2.3 demonstrate energy transmission by a transverse wave. 5.2.2.4 define wavelength, frequency and amplitude. 5.2.2.5 interpret a labelled diagram of a transverse wave showing wavelength and amplitude. 5.2.2.6 identify the wavelength on a longitudinal wave diagram.
How we Hear.	5.2.3 understand the simple structure of the ear and the body's ability to detect and respond to sound.	5.2.3.1 state the functions of parts of the ear that enable hearing. 5.2.3.2 state the function of the Eustachian tube. 5.2.3.3 identify the different parts of the middle ear and the inner ear. 5.2.3.4 describe the movement of sound waves into the ear.
Ear Defects and Hearing Impairment.	5.2.4. understand the condition of hearing impairment .	5.2.4.1 describe different degrees of hearing impairment. 5.2.4.2 discuss the possible causes of ear defects and their methods of prevention. 5.2.4.3 diagnose signs of hearing impairment on a person. 5.2.4.4 demonstrate safe and healthy care for ears.

UNIT 6.0: HEALTH AND SAFETY		
6.1 – Personal Hygiene ***(3 periods)***		
Subtopics	***General Objectives***	***Specific Objectives***
	Learners should be able to:	*Learners should be able to:*
Caring for Teeth.	6.1.1. know the structure of the tooth and practise proper oral hygiene.	6.1.1.1 identify the different parts of a tooth 6.1.1.2 relate the shape of a tooth to its function. 6.1.1.3 investigate the causes of tooth decay and gum disease. 6.1.1.4 describe the action of acid on the tooth. 6.1.1.5 demonstrate healthy oral care to prevent tooth decay and gum disease.
6.2-Communicable Diseases ***(7 periods)***		
Infectious Diseases.	6.2.1. understand the causes and transmission of infectious diseases.	6.2.1.1 define the term "infectious disease" 6.2.1.2 distinguish between infectious and communicable diseases. 6.2.1.3 differentiate between communicable diseases and non-communicable diseases. 6.2.1.4 classify communicable diseases using common causative agents (bacteria, protozoa, virus, & fungi). 6.2.1.5 list the vectors of common communicable diseases in Botswana.
Preventing Infections	6.2.2 be aware of how common communicable diseases can be prevented.	6.2.2.1 suggest methods of prevention and controlling of communicable diseases. 6.2.2.2 discuss life cycles of a housefly, a mosquito and a bilharzia fluke. 6.2.2.3 describe how each life cycle can be controlled. 6.2.2.4 analyse national statistics for communicable diseases.
Food Poisoning	6.2.3. be aware of the causes and dangers of food poisoning.	6.2.3.1 investigate optimal conditions for microbial growth. 6.2.3.2 state common causes of food poisoning. 6.2.3.3 identify symptoms and signs of food poisoning. 6.2.3.4 demonstrate ways of preventing food poisoning.
Food Preservation and Handling	6.2.4 practise different methods of food preservation and demonstrate due consideration for hygiene when handling food.	6.2.4.1 describe safe methods of preparing food. 6.2.4.2 demonstrate safe methods of preparing food. 6.2.4..3 describe different methods of food preservation. 6.2.4.4 apply common methods of food preservation.

6.3-Nutrition ***(6 periods)***		
Digestion	6.3.1 understand the process of digestion.	6.3.1.1 define the term "digestion." 6.3.1.2 discuss the importance of digestion. 6.3.1.3 explain the functions of the different parts of the digestive system. 6.3.1.4 state that enzymes are responsible for the digestion of food. 6.3.1.5 state the end-products of starch, protein and fat digestion. 6.3.1.6 explain the absorption of food into the blood stream. 6.3.1.7 identify starch, protein, reducing sugar and fat using food tests.
6.4-Drugs ***(3 periods)***		
Drug Use	6.4.1 understand the nature of drugs and appreciate the consequences of their inappropriate use .	6.4.1.1 define a drug. 6.4.1.2 distinguish between medicinal and non-medicinal drugs. 6.4.1.3 identify drugs that are commonly abused. 6.4.1.4 discuss dangers of misuse of medicinal drugs. 6.4.1.5 investigate general uses of medicinal plants in their locality. 6.4.1.6 identify allergic reactions to drugs and other substances.

UNIT 7.0: THE HUMAN BODY		
7.1 – Transporting Substances in the Human Body ***(8 periods)***		
Subtopics	***General Objectives***	***Specific Objectives***
	Learners should be able to:	*Learners should be able to:*
Blood	7.1.1 know the nature of blood and its functions.	7.1.1.1 state functions of blood. 7.1.1.2 list the different components of blood. 7.1.1.3 describe the functions of the different components of blood 7.1.1.4 state the different blood groups. 7.1.1.5 discuss the uses of blood groups in medicine. 7.1.1.6 describe safety measures taken during blood transfusion.
The Heart and Circulatory Problems	7.1.2 understand the functions and problems of the circulatory system.	7.1.2.1 describe the heart structure and its function. 7.1.2.2 describe the structure and functions of the blood vessels. 7.1.2.3 state common diseases of the circulatory system. 7.1.2.4 discuss causes of diseases of the circulatory system. 7.1.2.5 discuss methods of prevention of diseases of the circulatory system.
Breathing	7.1.3 understand the process of breathing.	7.1.3.1 describe the process of breathing. 7.1.3.2 describe the role of the lungs in the exchange of gases 7.1.3.3 investigate the levels of carbon dioxide in inhaled and exhaled air. 7.1.3.4 investigate the effect of physical activity on the rate and depth of breathing. 7.1.3.5 explain the effects of smoking on lungs.
7.2-Excretion ***(3 periods)***		
The Excretory System	7.2.1 know and understand human organs responsible for removing waste materials from the body.	7.2.1.1 define the term “excretion” 7.2.1.2 identify organs responsible for excretion 7.2.1.3 classify excretory products according to organs excreting them. 7.2.1.4 discuss common problems of the excretory system and how they can be prevented. 7.2.1.5 distinguish between excretion and egestion.

UNIT 8.0: ELECTRICITY AND MAGNETISM		
8.1-Electrical Energy ***(16 periods)***		
Subtopics	***General Objectives***	***Specific Objectives***
	Learners should be able to:	*Learners should be able to:*
Magnetism	8.1.1 understand simple phenomenon of magnetism	8.1.1.1 demonstrate the phenomenon of induced magnetism. 8.1.1.2 describe different methods of magnetisation. 8.1.1.3 distinguish between the magnetic properties of iron and steel. 8.1.1.4 identify uses of magnetic materials. 8.1.1.5 demonstrate proper care for magnets.
Electric Charge	8.1.2. understand the concept of electric charge	8.1.2.1 demonstrate the phenomenon of electrostatic charging. 8.1.2.2 state the two types of charges. 8.1.2.3 state the SI unit for charge. 8.1.2.4 demonstrate repulsion and attraction between charges.
Sources of Electricity	8.1.3 know different ways of generating electricity.	8.1.3.1 identify sources of electrical energy. 8.1.3.2 describe the energy changes in a power station. 8.1.3.3 demonstrate the generation of electricity using a dynamo.
Effects of Electricity	8.1.4. be aware that electricity has heating, chemical and magnetic effects.	8.1.4.1 demonstrate the heating effect of electricity. 8.1.4.2 demonstrate the chemical effect of electricity 8.1.4.3 identify applications of the heating effect of electricity. 8.1.4.4 demonstrate the magnetic effect of electric current. 8.1.4.5 identify applications of the magnetic effect of electricity. 8.1.4.6 identify the applications of the chemical effect of electricity
Electrical Power Consumption	8.1.5.understand the costing of electricity consumption and use mains electricity sustainably.	8.1.5.1 relate the power rating of an electrical appliance to its electrical energy consumption. 8.1.5.2 perform calculations involving the power rating of an appliance and the period of usage to determine cost. 8.1.5.3 device means of reducing the cost of electricity.
Safe use of Electricity in the Home	8.1.6 acquire knowledge of the safe use of electricity in the home	8.1.6.1 use fuses appropriately according to their ratings. 8.1.6.2 explain the need for 'Earthing' metal cases and for 'double insulation' of electrical appliances. 8.1.6.3 define the terms: live, neutral and earth in the context of electricity. 8.1.6.4 wire a mains plug correctly. 8.1.6.5 investigate why switches and fuses are connected to the live wire. 8.1.6.6 describe the necessary diagnostic steps to be followed when there is an electrical fault in a circuit.

UNIT 9.0: THE SOLAR SYSTEM		
9.1-Earth Systems ***(3 periods)***		
Subtopics	***General Objectives***	***Specific Objectives***
	Learners should be able to:	*Learners should be able to:*
Earth Spheres	9.1.1 understand the interactions among the main spheres of the Earth.	9.1.1.1 define the term "geo-science" 9.1.1.2 state the four main spheres that make up the Earth (atmosphere, biosphere, hydrosphere and lithosphere). 9.1.1.3 describe the features of each of the Earth's spheres. 9.1.1.4 identify processes of sphere interaction. 9.1.1.5 identify at least three careers that are related to the study of geo-science.

FORM 2

UNIT 1.0: SCIENCE, TECHNOLOGY AND SOCIETY		
1.3-Gene Technology ***(4 periods)***		
Subtopics	***General Objectives***	***Specific Objectives***
	Learners should be able to:	*The learners should be able to:*
Genetic Engineering	1.3.1 appreciate the significance of genetic engineering to their way of life.	1.3.1.1 define a gene 1.3.1.2 describe the technology of genetic engineering 1.3.1.3 discuss the significance of genetic engineering to medicine, agriculture forensic science and energy generation.
Applications of Genetic Engineering	1.3.2 know the potential benefits and limitations of gene technology.	1.3.2.1 investigate the potential benefits of genetic engineering. 1.3.2.2 discuss limitations of genetic engineering. 1.3.2.3 debate the ethical and moral issues of gene technology.

UNIT 2.0: PLANTS, ANIMALS AND THE ENVIRONMENT		
2.1-Living Matter ***(3 periods)***		
Subtopics	***General Objectives***	***Specific Objectives***
	Learners should be able to:	*Learners should be able to:*
Adaptation	2.1.5 understand adaptation of organisms to their environments and how human activity may offset that.	2.1.5.1 discuss the adaptation of plant and animal species to their environment. 2.1.5.2 identify human activities that may impact negatively on plant and animal adaptations. 2.1.5.3 predict the possible effect(s) of human activities on the adaptation of plant and animal species in an ecosystem.
2.4-Ecosystems ***(4 periods)***		
Characteristics of Ecosystems	2.4.1. understand the interaction of living things with each other and with their environment.	2.4.1.1 describe an ecosystem. 2.4.1.2 describe characteristics of an ecosystem. 2.4.1.3 study the structure and make up of an ecosystem in their locality. 2.4.1.4 infer the relationships among the organisms found in the ecosystem in their locality.
Feeding Relationships of Organisms	2.4.2 recognise the importance of plants as food producers.	2.4.2.1 describe effects of changes in food supply on population size of animals and plants 2.4.2.2 describe energy flow through living things using food chains, food webs and food pyramids. 2.4.2.3 construct a food pyramid to show the numbers of organisms consumed at each feeding level. 2.4.2.4 explain concentration of pollutants through food chains and food webs.
2.5-Sexual Reproduction in Flowering Plants ***(6 periods)***		
Reproductive Parts of a Flower	2.5.1 know reproductive parts of a flowering plant.	2.5.1.1 identify the different parts of a flower. 2.5.1.2 identify the reproductive parts of a flower. 2.5.1.3 draw and label the reproductive parts of a flower. 2.5.1.4 state the functions of the reproductive parts of a flower.
Pollination and fertilisation	2.5.2 understand the processes of pollination and fertilisation.	2.5.2.1 describe the process of pollination. 2.5.2.2 distinguish between wind and insect pollinated flowers. 2.5.2.3 describe fertilisation in flowering plants. 2.5.2.4 describe changes in a flower leading to seed and fruit formation.
Seed Dispersal	2.5.3 understand the importance of seed dispersal.	2.5.3.1 classify fruits and seeds according to their methods of dispersal. 2.5.3.2 discuss the different methods of seed dispersal. 2.5.3.3 explain the importance of seed dispersal to plant life.

UNIT 3.0: MATERIALS AND THEIR PROPERTIES		
3.1-The Nature of Matter ***(4 periods)***		
Subtopics	***General Objectives***	***Specific Objectives***
	Learners should be able to:	*Learners should be able to:*
Dissolution of Matter.	3.1.5 understand the process of dissolution.	3.1.5.1 define the terms solute, solvent and solution. 3.1.5.2 define the concept "universal solvent." 3.1.5.3 carry out dissolution experiments of substances in water.
Types of Solutions	3.1.6 develop skills to apply techniques for making solutions.	3.1.6.1 prepare different concentrations of common solutions in the laboratory. 3.1.6.2 carry out investigations to distinguish between saturated, unsaturated and supersaturated solutions. 3.1.6.3 discuss applications of saturated and supersaturated solutions.
3.3-Components of Air ***(4 periods)***		
Carbon dioxide	3.3.1. understand the preparation, properties and uses of carbon dioxide.	3.3.1.1 produce carbon dioxide from reacting acids with carbonates. 3.3.1.2 test for carbon dioxide. 3.3.1.3 state the properties of carbon dioxide. 3.3.1.4 identify common uses of carbon dioxide.
Oxygen	3.3.2. understand the preparation, properties and uses of oxygen.	3.3.2.1 conduct an experiment to produce oxygen. 3.3.2.2 test for oxygen. 3.3.2.3 state the properties of oxygen. 3.3.2.4 identify common uses of oxygen.
3.4-Construction Materials ***(4 periods)***		
Building Materials	3.4.1 associate structural designs with local conditions and available materials.	3.4.1.1 identify building materials available in their locality. 3.4.1.2 describe properties of different construction materials. 3.4.1.3. relate properties of building materials to their uses. 3.4.1.4 evaluate the selection of different materials for constructing different structures.
Insulation	3.4.2 choose and recognise appropriate materials and designs for insulating buildings.	3.4.2.1 investigate the effects of window positioning, type of roofing material, roof overhang and colour on controlling heat radiation in and out of a building. 3.4.2.2 design experiments to investigate the suitability of materials for insulation.

UNIT 4.0: SEXUAL REPRODUCTIVE HEALTH		
4.4-Human Development and Care ***(10 periods)***		
Subtopics	***General Objectives***	***Specific Objectives***
	The learners should be able to:	*The learners should be able to:*
Pregnancy	4.4.1 understand the various stages of pre-natal development.	4.4.1.1 describe the process of fertilisation. 4.4.1.2 identify signs of pregnancy. 4.4.1.3 describe development of the embryo in terms of zygote, ball of cells (blastula or morula) and foetus. 4.4.1.4 identify placenta, amnion and umbilical cord. 4.4.1.5 describe the functions of the placenta, amnion and umbilical cord. 4.4.1.6 state conditions leading to multiple births. 4.4.1.7 discuss ante-natal care of a pregnant woman which contributes towards a healthy development of the baby. 4.4.1.8 describe nutritional needs of a pregnant woman. 4.4.1.9 describe the main stages of birth.
Child Care	4.4.2. show appropriate attitudes and skills towards child-care.	4.4.2.1 compare breast-feeding to bottle-feeding. 4.4.2.2 discuss nutritional needs of a lactating mother and of the baby. 4.4.2.3 describe the methods of immunisation of babies against: TB, measles, tetanus, hepatitis B, and DPT (diphtheria, polio and whooping cough). 4.4.2.4 discuss the importance of testing for HIV when pregnant. 4.4.2.5 evaluate the significance of Prevention of Mother To Child Transmisson (PMTCT) to the child and the mother. 4.4.2.6 demonstrate proper methods of child-care.

UNIT 5:FORCE MOTION AND ENERGY		
5.3-Investigating Forces ***(32 periods)***		
Subtopics	***General Objectives***	***Specific Objectives***
	Learners should be able to:	*Learners should be able to:*
Types of Forces	5.3.1. understand principles of forces and the role they play in our everyday life.	5.3.1.1 classify forces into contact forces and action-at-a-distance forces 5.3.1.2 demonstrate that where there is a force, it is exerted by one object on another. 5.3.1.3 show the direction of force acting on an object in familiar simple situations. 5.3.1.4 predict the resultant of forces acting on a body.
Effects of Forces	5.3.2. know the effect of forces on objects.	5.3.2.1 demonstrate the effect of a force on the size and shape of a body. 5.3.2.2 demonstrate the effect of a force in the speed and direction of a body. 5.3.2.3 state the different applications of forces in real life. 5.3.2.4 investigate the importance of force of gravity to life on earth.
Force of Friction	5.3.3 understand the effect of friction on fluids and how it can be overcome.	5.3.3.1 demonstrate the effects of friction on the motion of an object. 5.3.3.2 investigate force of friction in fluids. 5.3.3.3 demonstrate how friction in fluids may be reduced. 5.3.3.4 state applications of fluid friction.
Measuring Force	5.3.4. know the relationship between mass and weight.	5.3.4.1 make a simple force meter and calibrate it. 5.3.4.2 state the SI unit for force 5.3.4.3 measure weight on different objects. 5.3.4.5 state the relationship between weight and mass. 5.3.4.6 state the difference between weight and mass. 5.3.4.7 perform calculations involving weight and mass.
Atmospheric Pressure	5.3.5 understand pressure and know the wide application of atmospheric pressure in everyday life.	5.3.5.1 define atmospheric pressure. 5.3.5.2 describe the effects of atmospheric pressure. 5.3.5.3 use a simple mercury barometer to measure atmospheric pressure. 5.3.5.4 use isobar patterns on weather charts to predict type of weather.
5.4-Motion ***(10 periods)***		
Linear Motion	5.4.1 show understanding of motion in a straight line and the relationship between variables	5.4.1.1 define distance, displacement, speed, velocity and acceleration. 5.4.1.2 distinguish between distance and displacement. 5.4.1.3 distinguish between speed and velocity. 5.4.1.4 describe linear motion. 5.4.1.5 calculate the average speed of a body moving in a straight line.

Uniform and Non-uniform motion	5.4.2 show understanding of uniform and non-uniform motion.	5.4.2.1 identify motion with non-uniform velocity. 5.4.2.2 identify motion with uniform velocity. 5.4.2.3 plot distance-time graphs for non-uniform motion 5.4.2.4 plot distance-time graphs for uniform motion. 5.4.2.5 describe qualitatively motion of objects falling in a fluid. 5.4.2.6 explain qualitatively the concept of 'terminal velocity'.
5.5-Properties of Light ***(22 periods)***		
Reflection of Light	5.5.1 know the reflecting properties of light.	5.5.1.1 demonstrate reflection on a plane mirror. 5.5.1.2 demonstrate reflection on an uneven surface. 5.5.1.3 identify angles of incidence and reflection and their relationship. 5.5.1.4 state uses of plane and curved mirrors.
Refraction and Dispersion	5.5.2 know the bending and splitting properties of light.	5.5.2.1 demonstrate refraction through water, glass block and prisms 5.5.2.2. demonstrate refraction by lenses. 5.5.2.3 measure the focal length of converging lenses. 5.5.2.4 identify uses of optical instruments. 5.5.2.5 list the different colour components of light in the order of their ability to refract. 5.5.2.6 demonstrate the phenomenon of light dispersion. 5.5.2.7 explain the phenomenon of rainbow formation.
The Eye	5.5.3 understand the structure and function of the eye.	5.5.3.1 identify the main parts of the eye 5.5.3.2 describe the functions of parts of the eye. 5.5.3.3 describe how we see. 5.5.3.4 conduct an experiment to demonstrate the ability of the eye lens to focus images on the retina.
Eye Defects and Diseases	5.5.4 know different types of eye defects and their methods of correction.	5.5.4.1 describe different types of eye defects and their correction methods. 5.5.4.2 identify causes, signs and treatment of eye diseases.
Applications of Light	5.5.5 appreciate the various applications of light.	5.5.5.1 identify parts of a simple camera. 5.5.5.2 describe functions of parts of a camera. 5.5.5.3 state the uses of different colours in communication.
5.6-Heat Energy ***(8 periods)***		
Effects of Heat	5.6.1 acquire knowledge of heat and its effects.	5.6.1.1 describe qualitatively, expansion and contraction in solids, liquids and gases. 5.6.1.2 identify uses of expansion in everyday life. 5.6.1.3 identify problems of expansion and contraction in everyday life.

Methods and Applications Heat Transfer	5.6.2 understand methods of heat transfer and apply these in everyday life.	5.6.2.1 conduct experiments to distinguish between bad conductors and good conductors of heat. 5.6.2.2 conduct experiments to illustrate convection. 5.6.2.3 conduct experiments to distinguish between good and bad emitters/absorbers of heat. 5.6.2.4 identify some of the everyday phenomenon and consequences of conduction, convection and radiation. 5.6.2.5 explain some of the natural phenomena caused by convection, conduction and radiation.
Temperature Regulation	5.6.3 understand insulation in animals.	5.6.3.1 explain insulation effects of fat in animals. 5.6.3.2 describe how different animals are adapted to keep cool and warm.

UNIT 6.0: HEALTH AND SAFETY		
6.5-Hygienic Surroundings ***(10 periods)***		
Subtopics	***General Objectives***	***Specific Objectives***
	Learners should be able to:	*Learns should be able to:*
Living Safely	6.5.1 demonstrate skills needed to live safely.	6.5.1.1 explain how common injuries can be prevented. 6.5.1.2 demonstrate principles of safe physical movement. 6.5.1.3 demonstrate the use of recommended safety and protective devices. 6.5.1.4 prevent possible hazards in immediate environment.
Ventilation	6.5.2 appreciate the importance of proper ventilation in the house.	6.5.2.1 describe air movement within a building. 6.5.2.2 discuss the need for good ventilation. 6.5.2.3 construct a house model to achieve good ventilation.
Sanitation	6.5.3 understand the importance of proper sewage disposal and employ healthy refuse disposal practices.	6.5.3.1 explain the need for proper disposal of domestic refuse and sewage. 6.5.3.2 describe hygienic ways of disposing sewage. 6.5.3.3 describe methods of disposing domestic refuse.

UNIT 7.0: THE HUMAN BODY		
7.3-Communication in Humans ***(8 periods)***		
Subtopics	***General Objectives***	***Specific Objectives***
	Learners should be able to:	*Learners should be able to:*
Communicating by Using Senses	7.3.1 understand the use of senses in communication by animals.	7.3.1.1 explain communication 7.3.1.2 communicate in different ways including listening, speaking, seeing, tasting, touching and smelling. 7.3.1.3 identify sense organs and their stimuli 7.3.1.4 describe one method that humans use to enhance their sense of sight.
The Nervous System	7.3.2 understand the nervous system and its ability to respond to stimuli in the environment..	7.3.2.1 state the main components of the nervous system. 7.3.2.2 explain the functions of the nervous system. 7.3.2.3 distinguish between a voluntary and involuntary action. 7.3.2.4 demonstrate simple reflex action. 7.3.2.5 describe a learned-reflex action.
Hormones	7.3.3 understand hormones as chemical messengers in the body.	7.3.3.1 describe hormones. 7.3.3.2 identify some hormones and their sources. 7.3.3.3 describe the function of each hormone. 7.3.3.4 name at least two medical conditions that are caused by hormonal imbalance.

UNIT 8.0: ELECTRICITY AND MAGNETISM		
8.1-Electrical Energy ***(12 periods)***		
Subtopics	***General Objectives***	***Specific Objectives***
	Learners should be able to:	*Learners should be able to:*
Electric Circuits	8.1.7 understand the nature and flow of electricity.	8.1.7.1 draw circuit diagrams using symbols. 8.1.7.2 demonstrate the difference between a series and parallel circuit. 8.1.7.3 construct series and parallel circuits.
Electric Current	8.1.8 understand the nature of electric current.	8.1.8.1 state the SI unit for electric current 8.1.8.2 define electric current. 8.1.8.3 measure the electric current through a component in an electric circuit. 8.1.8.4 demonstrate that current is the same at every point in a series circuit. 8.1.8.5 demonstrate that current from the source is the sum of the currents in the separate branches of a parallel circuit.
Potential Difference	8.1.9. understand potential difference (p.d.).	8.1.9.1 explain potential difference (p.d.). 8.1.9.2 state the SI unit for potential difference. 8.1.9.3 measure the potential difference across a circuit component 8.1.9.4 demonstrate that the sum of p.ds across components in a series circuit is equal to the terminal p.d. across the circuit 8.1.9.5 demonstrate that the p.ds across components in a parallel circuit is the same as the terminal p.d.

UNIT 9: THE SOLAR SYSTEM		
9.1 Earth Systems ***(4 periods)***		
Subtopics	***General Objectives***	***Specific Objectives***
	Learners should be able to:	*Learners should be able to:*
Structure of the Earth	9.1.2 understand the structure of the earth and the energy transformations within it.	9.1.2.1 identify different layers of the earth. 9.1.2.2 explain "earthquakes and tsunamis" in terms of energy transmission by waves within the earth crust 9.1.2.3 discuss the effects of earth-quakes, volcanoes, floods and drought on people's lives. 9.1.2.4 investigate how the actions of human beings may have contributed to increase in natural disasters.

FORM 3

UNIT 1.0: SCIENCE, TECHNOLOGY AND SOCIETY		
1.4- Information and Communication Technology ***(4 periods)***		
Subtopics	***General Objectives***	***Specific Objectives***
	Learners should be able to:	*Learners should be able to:*
Technology Communication Tools	1.4.1. understand the role of technology as it applies to communication.	1.4.1.1 use various media and formats to communicate scientific information and ideas. 1.4.1.2 assess the impact on society of having limitless access to information provided by communication networks. 1.4.1.3 discuss the cultural impact of global communication. 1.4.1.4 identify potential careers in ICT.

UNIT 2.0: PLANTS, ANIMALS AND THEIR ENVIRONMENT		
2.3-Managing Natural Resources ***(4 periods)***		
Subtopics	***General Objectives***	***Specific Objectives***
	Learners should be able to:	*Learners should be able to:*
Pollution	2.3.3 know types, sources and methods of prevention of pollution.	2.3.3.1 explain pollution. 2.3.3.2 describe types of pollution. 2.3.3.3 describe common sources of pollution. 2.3.3.4 discuss problems caused by pollution. 2.3.3.5 describe methods of controlling pollution. 2.3.3.6 investigate effects of air and water pollution on our health. 2.3.3.7 identify the most common pollutant in their locality. 2.3.3.8 investigate measures taken to prevent pollution in their locality

UNIT 3.0: MATERIALS AND THEIR PROPERTIES		
3.1-The Nature of Matter ***(32 periods)***		
Subtopics	***General Objectives***	***Specific Objectives***
	Learners should be able to:	*Learners should be able to:*
Atoms and molecules	3.1.7 understand the particulate structure of matter.	3.1.7.1 define the terms atom and molecule. 3.1.7.2 draw the structure of atoms of the first 20 element. 3.1.7.3 distinguish between an atom and a molecule.
Elements	3.1.8 show basic understanding of elements found in the universe.	3.1.8.1 define the term element. 3.1.8.2 identify elements by their symbols. 3.1.8.3 identify common elements found in living and non-living matter.
Periodic Table	3.1.9 understand and appreciate the significance of the periodic table in classifying elements.	3.1.9.1 extract information from the periodic table. 3.1.9.2 translate from element name to symbol and vice versa. 3.1.9.3 describe periodic trends.
Compounds and Mixtures	3.1.10 know the distinction between compounds and mixtures.	3.1.10.1 define the terms compound and mixture. 3.1.10.2 identify common compounds and their constituent elements. 3.1.10.3 identify mixtures and their constituents. 3.1.10.4 distinguish between compounds and mixtures.
Boiling and Melting Points of Pure Substances	3.1.11 recognise the effects of impurities on the boiling point and melting point of pure substances.	3.1.11.1 determine the boiling and melting points of different substances. 3.1.11.2 plot and interpret a heating and cooling curve for a pure substance. 3.1.11.3 determine the effect of impurities on the melting point and boiling point of pure substances.
Separation Techniques	3.1.12. acquire knowledge and skills on basic purification techniques.	3.1.12.1 carry out purification techniques. 3.1.12.2 interpret simple chromatogram. 3.1.12.3 explain the differences between distillation and evaporation 3.1.12.4 identify some applications of separation methods in real life situations.
3.2-Acids and Bases ***(36 periods)***		
Classes of Acids and Bases	3.2.2 understand the nature of acids and bases.	3.2.2.1 define pH. 3.2.2.2 investigate the properties of strong acids and weak acids. 3.2.2.3 investigate the properties of strong alkalis and weak alkalis. 3.2.2.4 distinguish between a base and an alkali. 3.2.2.5 explain the difference between the strength and concentration of a substance.

Reactions of Acids with Bases	3.2.3 understand common chemical reactions of acids with bases.	3.2.3.1 investigate the characteristic properties of acids in reactions with bases. 3.2.3.2 identify applications of acid-base reactions in everyday life. 3.2.3.3 demonstrate physical and chemical changes in acid-base reactions. 3.2.3.4 carry out neutralisation reactions between acids and alkalis. 3.2.3.5 write word equations for reactions of acids with bases.
Reactions of Acids with Metals	3.2.4 understand common chemical reactions of acids with metals.	3.2.4.1 investigate the characteristic properties of acids in reactions with metals. 3.2.4.2 identify applications of acid-metal reactions in everyday life. 3.2.4.3 identify products of reactions between acids and metals. 3.2.4.4 test for hydrogen. 3.2.4.5 write word equations for reactions of acids with metals.
Reactions of Acids with Carbonates	3.2.5 understand common chemical reactions of acids and carbonates.	3.2.5.1 investigate the characteristic properties of acids in reactions with carbonates. 3.2.5.2 identify applications of acid-carbonate reactions in everyday life. 3.2.5.3 identify products of reactions between acids and carbonates from a given chemical equation. 3.2.5.4 write word equations for reactions of acids with carbonates.
Rate of Chemical Reactions	3.2.6 understand the qualitative effect of some variables on the rate of a chemical reaction	3.2.6.1 design an experiment to determine the effect of different variables on the rate of a reaction. 3.2.6.2 record data obtained from an investigation involving chemical reaction(s). 3.2.6.3 interpret data from an investigation involving chemical reaction(s) 3.2.6.4 identify applications of rates of reaction in everyday life
Simple Household Chemical Reactions	3.2.7 conduct some simple household chemical reactions.	3.2.7.1 investigate traditional ways of making soap. 3.2.7.2 make simple soap. 3.2.7.3 write the word equation that summarises the reaction of soap production. 3.2.7.4 soften hard water chemically
3.5-Metals and Non-metals ***(26 periods)***		
Properties and Uses of Metals and Non-metals	3.5.1 know the properties and uses of metals and non-metals.	3.5.1.1 state the physical and chemical properties of metals 3.5.1.2 state the physical and chemical properties of non-metals. 3.5.1.3 compare uses of metals and non-metals with reference to their properties.
The Chemical Process of Rusting	3.5.2 know and appreciate the reaction of metals with oxygen.	3.5.2.1 investigate reactions of metals with water. 3.5.2.2 define oxidation. 3.5.2.3 demonstrate how rusting occurs. 3.5.2.4 demonstrate methods of preventing rusting.
Carbon	3.5.3 know the properties of the different forms of carbon	3.5.3.1 define allotrope. 3.5.3.2 list allotropes of carbon. 3.5.3.3 state the properties of carbon allotropes. 3.5.3.4 relate the structure of carbon allotropes to their uses

Mining Techniques	3.5.4 understand the processes of extracting metals from their ores.	3.5.4.1 describe the process of extracting iron from its ores. 3.5.4.2 describe the chemical reactions involved in the extraction of iron 3.5.4.3 describe the process of extracting copper from its ores. 3.5.4.4 describe the chemical reactions involved in the extraction of copper. 3.5.4.5 define an alloy. 3.5.4.6 state constituent elements of common alloys. 3.5.4.7 explain the importance of alloys to industry.
Rock, Minerals and Ores	3.5.5 know and appreciate the resources found in the Earth's crust.	3.5.5.1 distinguish between rocks, minerals and ores. 3.5.5.2 identify minerals and ores found in Botswana. 3.5.5.3 distinguish between precious minerals, non-precious minerals and gemstones. 3.5.5.4 discuss steps involved in the production of gemstones until they reach the market.
Radioactive Materials	3.5.6 appreciate the existence of radioactive emissions.	3.5.6.1 describe the process of radioactivity. 3.5.6.2 identify radioactive materials. 3.5.6.3 discuss the dangers of exposure to radioactive emissions. 3.5.6.4 describe the safe handling and storage of radioactive material in a laboratory. 3.5.6.5 discuss merits and demerits of harnessing nuclear energy.

UNIT 5.0: FORCE MOTION AND ENERGY		
5.4-Motion ***(2 periods)***		
Subtopics	***General Objectives***	***Specific Objectives***
	Learners should be able to:	*Learners should be able to:*
Newton's Laws of Motion	5.4.3 understand motion and the relationship between the variables.	5.4.3.1 state Newton's laws of motion 5.4.3.2 use the relationship F=ma in calculations
5.7-Machines ***(6 periods)***		
Simple Machines	5.7.1 know principles of simple machines and their applications in everyday life.	5.7.1.1 use simple machines in daily life situations 5.7.1.2 demonstrate the ability of levers and inclined planes to exert a magnified or reduced force. 5.7.1.3 discuss applications of simple machines in everyday life.
Turning Effect of Force	5.7.2 understand the turning effects of forces and appreciate their role in everyday life.	5.7.2.1 describe the moment of a force. 5.7.2.2 identify moments of force in everyday life situations. 5.7.2.3 demonstrate the principle of moments. 5.7.2.4 calculate the moment of a force about a fixed point.

UNIT 6.0: HEALTH AND SAFETY		
6.6-Caring for Persons with HIV and AIDS ***(2 periods)***		
Subtopics	***General Objectives***	***Specific Objectives***
	Learners should be able to:	*Learners should be able to:*
Preventing HIV and AIDS Infection at Home	6.6.1 show knowledge and skills in the care of people with HIV and AIDS	6.6.1.1 explain the need for counselling of people caring for AIDS patients at home. 6.6.1.2 demonstrate safe and healthy ways of caring for a person with AIDS.

UNIT 7.0: THE HUMAN BODY		
7.4-Body Systems ***(4 periods)***		
Subtopics	***General Objectives***	***Specific Objectives***
	The learners should be able to:	*The learners should be able to:*
The Skeletal System	7.4.1 know the basic physiology of the skeleton, muscles and joints.	7.4.1.1 list the main functions of a human skeleton. 7.4.1.2 describe movement in animals in terms of bones, muscles and joints. 7.4.1.3 explain the importance of good posture and physical exercise to the body.

UNIT 8.0: ELECTRICITY AND MAGNETISM		
8.1-Electrical Energy ***(8 periods)***		
Subtopics	***General Objectives***	***Specific Objectives***
	The learners should be able to:	*The learners should be able to:*
Electric Resistance	8.1.10 demonstrate an understanding of electric resistance.	8.1.10.1 give a simple definition of resistance. 8.1.10.2 state the SI unit for resistance. 8.1.10.3 determine the resistance of a circuit component through experiment. 8.1.10.4 use R=V/I in calculations. 8.1.10.5 describe qualitatively the relationship between resistance, length and cross-sectional area of a conductor. 8.1.10.6 calculate the total resistance of at least two resistors in series 8.1.10.7 calculate the total resistance of not more than three resistors in parallel. 8.1.10.8 explain the functions of a resistor in circuits.

UNIT 9.0: THE SOLAR SYSTEM		
9.2-Astronomy ***(6 periods)***		
Subtopics	***General Objectives***	***Specific Objectives***
	Learners should be able to:	*Learners should be able to:*
Space Exploration	9.2.1 develop interest in the study of nature beyond the Earth.	9.2.1.1 define the term astronomy 9.2.1.2 discuss the possible benefits of space exploration to man. 9.2.1.3 list some of the technology used in space exploration. 9.2.1.4 identify potential careers in space exploration.