KENYA INSTITUTE OF CURRICULUM DEVELOPMENT
A Skilled and Ethical Society

JUNIOR SCHOOL CURRICULUM DESIGN

INTEGRATED SCIENCE

GRADE 8

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FOREWORD

The Government of Kenya is committed to ensuring that policy objectives for Education, Training, and Research meet the aspirations of the Constitution of Kenya 2010, the Kenya Vision 2030, the National Curriculum Policy 2019, the United Nations Sustainable Development Goals (SDGs), and the regional and global conventions to which Kenya is a signatory. Towards achieving the mission of basic education, the Ministry of Education (MoE) has successfully and progressively rolled out the implementation of the Competency Based Curriculum (CBC) at Pre-Primary, Primary and Junior School levels.

The implementation of the Competency Based Curriculum involves monitoring and evaluation to determine its success. After the five-year implementation cycle, a summative evaluation of the primary education cycle was undertaken to establish the achievement of learning outcomes as envisaged in the Basic Education Curriculum Framework. The Government of Kenya constituted a Presidential Working Party on Education Reforms (PWPER) in 2022 to address salient issues affecting the education sector. PWPER made far-reaching recommendations for basic education that necessitated curriculum review. The recommendations of the PWPER, monitoring reports, summative evaluation of the primary education cycle and feedback from curriculum implementers and other stakeholders led to rationalisation and review of the basic education curriculum.

The reviewed Grade 8 curriculum designs build on competencies attained by learners at the end Grade 7. Further, they provide opportunities for learners to continue exploring and nurturing their potential as they prepare to transit to Senior School.

The curriculum designs present the National Goals of Education, essence statements, general and specific expected learning outcomes for the subjects as well as strands and sub-strands. The designs also outline suggested learning experiences, suggested key inquiry questions, core competencies, Pertinent and Contemporary Issues (PCIs), values, and the assessment rubric. It is my hope that all government agencies and other stakeholders in Education will use the designs to plan for effective and efficient implementation of the CBC.

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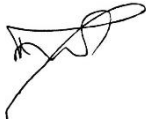
PREFACE

The Ministry of Education (MoE) nationally implemented the Competency Based Curriculum (CBC) in 2019. Grade 8 is the second grade of Junior School in the reformed education structure.

The reviewed Grade 8 curriculum furthers implementation of the CBC from Grade 7 at the primary education level. The main feature of this level is a broad curriculum for the learner to explore talents, interests, and abilities before selection of pathways and tracks at the Senior School education level. This is very critical in the realisation of the Vision and Mission of the ongoing curriculum reforms as enshrined in the Sessional Paper No. I of 2019: *Towards Realizing Quality, Relevant and Inclusive Education and Training for Sustainable Development* in Kenya. The Sessional Paper explains the shift from a Content-focused Curriculum to a focus on **Nurturing Every Learner's potential.**

Therefore, the Grade 8 curriculum designs are intended to enhance the learners' development of the CBC core competencies, namely: Communication and Collaboration, Critical Thinking and Problem-solving, Creativity and Imagination, Citizenship, Digital Literacy, Learning to Learn, and Self-efficacy.

The curriculum designs provide suggestions for interactive and differentiated learning experiences linked to the various sub-strands and the other aspects of the CBC. They also offer several suggested learning resources and a variety of assessment techniques. It is expected that the design will guide teachers to effectively facilitate learners to attain the expected learning outcomes for Grade 8 and prepare them for a smooth transition to Grade 9. Furthermore, it is my hope that teachers will use the designs to make learning interesting, exciting, and enjoyable.



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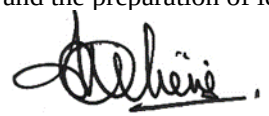
ACKNOWLEDGEMENT

The Kenya Institute of Curriculum Development (KICD) Act Number 4 of 2013 (Revised 2019) mandates the Institute to develop and review (*SNE adapt*) curricula and curriculum support materials for basic and tertiary education and training. The curriculum development process for any level of education involves thorough research, international benchmarking, and robust stakeholder engagement. Through a systematic and consultative process, the KICD conceptualised the Competency Based Curriculum (CBC) as captured in the Basic Education Curriculum Framework (BECF) 2017. The curriculum responds to the demands of the 21st Century and the aspirations captured in the Constitution of Kenya 2010, the Kenya Vision 2030, the East African Community Protocol, the International Bureau of Education Guidelines and the United Nations Sustainable Development Goals (SDGs).

KICD receives its funding from the Government of Kenya to facilitate the achievement of its stipulated mandate and implementation of the Government and Sector (Ministry of Education -MoE) plans. The Institute also receives support from development partners targeting specific programmes. The revised Grade 8 curriculum designs were developed with the support of the World Bank through the Kenya Primary Education Equity in Learning Programme (KPEELP); a project coordinated by MoE. Therefore, the Institute is very grateful to the Government of Kenya, through the MoE and the development partners for the policy, resource, and logistical support. Specifically, special thanks goes to the Cabinet Secretary-MoE and the Principal Secretary - State Department of Basic Education.

We also wish to acknowledge the KICD curriculum developers and other staff, all teachers and educators who took part as panelists; the Semi-Autonomous Government Agencies (SAGAs), and representatives of various stakeholders for their roles in the development of the Grade 8 curriculum designs. In relation to this, we acknowledge the support of the Chief Executive Officers of the Teachers Service Commission (TSC) and the Kenya National Examinations Council (KNEC) during the process of developing these designs. Finally, we are very grateful to the Chairperson of the KICD Council and other members of the Council for the very consistent guidance throughout the process.

We assure all teachers, parents and other stakeholders that this curriculum design will effectively guide the implementation of the CBC in Grade 8 and the preparation of learners for transition to Grade 9.



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NATIONAL GOALS OF EDUCATION

Education in Kenya should:

1. **Foster nationalism and patriotism and promote national unity**

   The people of Kenya belong to different communities, races and religions, but these differences need not divide them. They must be able to live and interact as Kenyans. It is a paramount duty of education to help young people acquire this sense of nationhood by removing conflicts and promoting positive attitudes of mutual respect, to live together in harmony and foster patriotism, to make a positive contribution to the life of the nation.

2. **Promote the social, economic, technological, and industrial needs for national development**

   Education should prepare the youth of the country to play an effective and productive role in the life of the nation.

   a) **Social Needs**

      Education in Kenya must prepare children for changes in attitudes and relationships which are necessary for the smooth progress of a rapidly developing modern economy. There is bound to be a silent social revolution following the wake of rapid modernisation. Education should assist our youth to adapt to this change.

   b) **Economic Needs**

      Education in Kenya should produce citizens with the skills, knowledge, expertise and personal qualities that are required to support a growing economy. Kenya is building up a modern and independent economy that requires an adequate and relevant domestic workforce.

   c) **Technological and Industrial Needs**

      Education in Kenya should provide learners with the necessary skills and attitudes for industrial development. Kenya recognises the rapid industrial and technological changes taking place, especially in the developed world. We can only be part of this development if our education system is deliberately focused on the knowledge, skills and attitudes that will prepare our young people for these changing global trends.

3. **Promote individual development and self-fulfilment**

   Education should provide opportunities for the fullest development of individual talents and personality. It should help children to develop their potential interests and abilities. A vital aspect of individual development is the building of character.

4. **Promote sound moral and religious values**
Education should provide for the development of knowledge, skills and attitudes that will enhance the acquisition of sound moral values and help children to grow up into self-disciplined, self-reliant and integrated citizens.

5. **Promote social equity and responsibility**
Education should promote social equality and foster a sense of social responsibility within an education system that provides equal educational opportunities for all. It should give all children varied and challenging opportunities for collective activities and corporate social service irrespective of gender, ability or geographical environment.

6. **Promote respect for and development of Kenya's rich and varied cultures**
Education should instil in the youth of Kenya an understanding of past and present cultures and their valid place in the contemporary society. Children should be able to blend the best of traditional values with the changing requirements that must follow rapid development to build a stable and modern society.

7. **Promote international consciousness and foster positive attitudes towards other nations**
Kenya is part of the international community. It is part of the complicated and interdependent network of peoples and nations. Education should therefore lead the youth of the country to accept membership of this international community with all the obligations and responsibilities, rights and benefits that this membership entails.

8 Promote positive attitudes towards good health and environmental protection
Education should inculcate in young people the value of good health for them to avoid indulging in activities that will lead to physical or mental ill health. It should foster positive attitudes towards environmental development and conservation. It should lead the youth of Kenya to appreciate the need for a healthy environment.

LESSON ALLOCATION

S/No	Learning Area	Number of Lessons Per Week (40 Minutes Per Lesson)
1.	English	5
2.	Kiswahili / Kenya Sign Language	4
3.	Mathematics	5
4.	Religious Education	4
5.	Social Studies	4
6.	Integrated Science	5
7.	Pre-Technical Studies	4
8.	Agriculture	4
9.	Creative Arts and Sports	5
	Pastoral /Religious Instructional Program	1*
Total		**40 + 1***

LEARNING OUTCOMES FOR JUNIOR SCHOOL

By end of Junior School, the learner should be able to:
1. Apply literacy, numeracy and logical thinking skills for appropriate self-expression.
2. Communicate effectively, verbally and non-verbally, in diverse contexts.
3. Demonstrate social skills, spiritual and moral values for peaceful co-existence.
4. Explore, manipulate, manage, and conserve the environment effectively for learning and sustainable development.
5. Practise relevant hygiene, sanitation and nutrition skills to promote health.
6. Demonstrate ethical behaviour and exhibit good citizenship as a civic responsibility.
7. Appreciate the country's rich and diverse cultural heritage for harmonious co-existence.
8. Manage pertinent and contemporary issues in society effectively.
9. Apply digital literacy skills for communication and learning.

ESSENCE STATEMENT

Science is a dynamic, collaborative human endeavour that enables use of distinctive ways of logistical valuing, thinking, and working to understand natural phenomena in the biological, physical and technological world. The emphasis of science education at Junior School level is to enhance learners' scientific thinking through learning activities that involve planning, designing, measuring, observing, evaluating procedures, examining evidence, and analysing data. This is envisaged in the Kenya Vision 2030, which states in part that; "The achievement of the vision greatly depends on Science, Technology and Innovation." Equally, Sessional Paper No.1 of 2005 highlights the fact that "for a breakthrough towards industrialisation, achievement of the desired economic growth targets and social development, a high priority needs to be placed on the development of human capital through education and training by promoting the teaching of Sciences and Information Technology." Both Sessional Paper No. 14 of 2012 and Sessional Paper 1 of 2019 equally underscore the need for sustainable basic and higher education, with an emphasis on Science, Technology and Innovation.

Integrated Science, as a learning area, is therefore expected to inculcate a scientific culture, and enhance scientific literacy among learners to enable them make informed choices in their personal lives and approach their challenges in a systematic and logical manner. This learning area intends to enable learners to practically explore and discover knowledge within their environment, and in the laboratory to allow understand themselves and relate with their environment through application of scientific principles and ideas. It will equip learners with the relevant basic integrated scientific knowledge, skills, values and attitudes needed for their own survival and/or career development. Concepts in Integrated Science are presented as units within which there are specific strands that build on the competencies acquired in Science and Technology at Upper Primary School level. This provides the learner with the basic requisite knowledge, skills, values and attitudes necessary for specialisation in pure sciences (Physics, Chemistry, and Biology), Applied Sciences, Careers and Technology Studies (CTS), and Technical and Engineering offered in the STEM pathway at Senior School. Integrated Science is taught through inquiry-based learning approaches with an emphasis on the 5Es: engagement, exploration, explanation, elaboration, and evaluation.

SUBJECT GENERAL LEARNING OUTCOMES

By the end of Junior School, the learner should be able to:

1. Acquire scientific knowledge, skills, values and attitudes to make informed choices on career pathways at Senior School.
2. Select, improvise and safely use basic scientific tools, apparatus, materials and chemicals effectively in everyday life.
3. Explore, manipulate, manage and conserve the environment for learning and sustainable development.
4. Practise relevant hygiene, sanitation and nutrition skills to promote good health.
5. Apply the understanding of body systems with a view to promote and maintain good health.
6. Develop capacity for scientific inquiry and problem solving in different situations.
7. Appreciate the use of scientific knowledge, skills, principles, and practices in everyday life.
8. Apply acquired scientific knowledge, skills, principles and practices in everyday life.

SUMMARY OF STRANDS AND SUB-STRANDS

Strands	Sub Strands	Suggested Number of Lessons
1.0 Mixtures, Elements and Compounds	1.1 Elements and Compounds	18
	1.2 Physical and chemical changes	22
	1.3 Classes of fire	20
2.0 Living Things and the Environment	2.1 The Cell	20
	2.2 Movement of materials in and out of the cell	16
	2.3 Reproduction in human beings	18
3.0 Force and Energy	3.1. Transformation of Energy	20
	3.2. Pressure	16
Total Number of Lessons		**150**

Note: The suggested number of lessons per sub-strand may be less or more depending on the context.

STRAND 1.0: MIXTURES, ELEMENTS AND COMPOUNDS

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
1.0 Mixtures, Elements and Compounds	**1.1 Elements and Compounds** (18 lessons) • *Atoms, elements, molecules and compounds,* • *Symbols of common elements (oxygen, carbon, hydrogen, nitrogen, iron, aluminium, copper, silver, gold, chlorine, sodium, mercury, lead),* • *Word equations for reactions of elements to form compounds (sodium chloride, water, carbon dioxide,*	By the end of the sub strand, the learner should be able to: a) explain the relationship between an atom, an element, a molecule and a compound, b) assign symbols to selected elements, c) write word equations to represent reactions of selected elements to form compounds, d) outline the applications of common elements in the society,	The learner is guided to: ● discuss the meaning of atoms, elements, molecules and compounds, ● collaboratively sample labelled containers of different substances, identify and record the elements or compounds on the containers, ● collaboratively represent selected elements using symbols, ● use word equations to represent reactions of elements to form compounds, ● identify elements in selected compounds (*compounds with only two elements),* ● explore the importance and value of common elements and compounds in day-to-day life,	Why is it important to use symbols for representing elements in day-to-day life?

	copper oxide, aluminium oxide), • *Uses of some common elements in the society (jewellery, construction, electricity, food nutrients, minerals elements, medals.*	e) appreciate the information on packaging labels of commonly consumed substances.	• use digital or print media to search for information on atoms, elements, molecules and compounds or observe simulations of atoms, elements, molecules and compounds.	
Core Competencies to be developed: ● Learning to learn: the learner reflects on their own experiences as they identify elements and compounds on labels of containers. ● Communication and Collaboration: the learner writes clearly the symbols of elements, compounds, word equations.				
Pertinent and Contemporary Issues (PCIs) Financial literacy: the learner explores the value of common elements and compounds in society as they learn about importance and value of common elements and compounds in day-to-day life.				
Values: Unity: the learner cooperates and harmoniously works with others while identifying elements and compounds from sample-labelled containers of different substances.				
Links to other learning areas: The learner is able to relate the use of ingredients and items made from the common elements and compounds learnt in Agriculture.				

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
1.0. Mixtures, Elements and Compounds	**1.2 Physical and chemical changes** (22 lessons) ● *Kinetic theory of matter,* ● *Heating curve,* ● *Effects of impurities on boiling point and melting point,* ● *Physical and chemical changes (both temporary and permanent changes),* ● *Applications of physical and chemical*	By the end of the sub strand, the learner should be able to: a) describe the characteristics of particles in the three states of matter, b) explain the effects of impurities on boiling point and melting point of a substance, c) distinguish between physical and chemical changes in substances, d) outline applications of change of state of matter in day-to-day life, e) appreciate the applications of change of state of matter in	The learner is guided to: ● Carry out activities to demonstrate the characteristics of particles in the three states of matter, ● perform experiments to demonstrate diffusion in liquids and gases, *for example use of water and ink to illustrate kinetic theory of matter,* ● carry out experiments to determine the boiling and melting points of pure and impure substances, ● draw the heating curve and discuss the trends, ● discuss the effects of impurities on boiling point and melting point of a substance, ● carry out experiments to demonstrate physical and	How does the movement of particles in matter affect its properties?

	changes in day-to-day life.	day-to-day life.	chemical changes in substances, ● discuss the applications of physical and chemical changes in day-to-day life, ● use digital or print media to search for the information on movement of particles in the different states of matter.	

Core Competencies to be developed:

- Critical thinking and Problem solving: the learner uses logical reasoning during the discussion of the characteristics of particles in the three states of matter.
- Digital literacy: the learner gains digital literacy as they use digital media and search for the information on movement of particles in the different states of matter.

Pertinent and Contemporary Issues (PCIs):

Safety and Security: the learner observes safety to avoid burns while carrying out simple experiments to determine the boiling and melting points of pure and impure substances with peers.

Values:

Unity: the learner cooperates and harmoniously works with peers as they carry out simple experiments to determine the boiling and melting points of pure and impure substances.

Link to other learning areas:

The learner relates concept of change of state of matter to preserve food in Agriculture.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
1.0 Mixtures, Elements and Compounds	**1.3 Classes of fire** (20 Lessons) ● *Causes of fire (classes of fire),* ● *Fire triangle and Fire control (breaking the fire triangle and use of fire extinguishers),* ● *Dangers of fires.*	By the end of the sub strand, the learner should be able to: a) identify causes of fire in nature, b) explain the role of the components of fire triangle in the spread of fire, c) describe ways of controlling different classes of fires, d) acknowledge the dangers of fires in nature.	The learner is guided to: ● discuss the possible causes of fire in nature, ● discuss the role of the components of fire triangle in the spread of fire, ● brainstorm on the different classes of fire, ● discuss the dangers of fires in the environment, ● collaboratively practice fire control measures, ● discuss rights to safety information on flammable substances, ● use digital devices or print media to search for information on fire control measures. **project:** Learner is guided to prepare posters on classes of fires and their control measures and hang them in places where they can be seen.	What are the dangers of fire in nature?

Core Competencies to be developed: ● Citizenship: the learner enhances active community life skills by making posters on classes of fires and their control measures and hanging them at the places where they can be seen. ● Communication and Collaboration: the learner acquires listening, speaking, and recording skills as they discuss the causes of fire, dangers of fire and rights to safety
Pertinent and Contemporary Issues (PCIs): Safety and Security: the learner learns how to take care of self and others when handling fire, as the learner discusses the dangers of fires in the environment.
Values: ● Respect: the learner observes rules of engagement while working with peers to classify fire according to the cause and suggest control measures. ● Responsibility: the learner accommodates each other's views and opinions as they discuss rights to safety information on flammable substances.
Link to other learning areas: The learner practices safety measures to prevent fire accidents in nature as a life skill in Social Studies**.**

Suggested Assessment Rubric

Levels / Indicator	Exceeds expectations	Meets expectations	Approaches expectations	Below expectations
Ability to assign symbol to elements.	The learner assigns symbols to all elements provided correctly and systematically.	The learner assigns symbols to all elements provided correctly.	The learner assigns symbols to most of the elements provided correctly.	The learner assigns symbols to a few elements provided correctly.
Ability to write word equation for reactions of elements to form compounds.	The learner writes word equation for all given reactions correctly, giving illustrations.	The learner writes word equation for all given reactions correctly.	The learner writes word equation for most of the reactions correctly.	The learner writes word equation for a few reactions correctly.
Ability to describe the characteristics of particles in the three states of matter.	The learner describes the characteristics of particles in all the three states comprehensively.	The learner describes the characteristics of particles in all the three states of matter correctly.	The learner describes the characteristics of particles in the two states of matter correctly.	The learner describes the characteristics of particles in one state of matter correctly.
Ability to distinguish between physical and chemical changes.	The learner distinguishes between physical and chemical changes elaborately and comprehensively.	The learner distinguishes between physical and chemical changes correctly.	The learner distinguishes between physical and chemical changes partially.	The learner partially distinguishes between physical and chemical changes leaving some points.

Ability to outline applications of physical and chemical changes.	The learner outlines applications of physical and chemical changes exhaustively.	The learner outlines applications of physical and chemical changes Correctly.	The learner partially outlines most of the applications of physical and chemical changes correctly.	The learner outlines a few applications of the physical and chemical changes correctly.
Ability to identify classes of fires in nature.	The learner identifies all classes of fires in nature exhaustively.	The learner identifies all the classes of fire in nature correctly.	The learner identifies most of the classes of fire in nature correctly.	The learner identifies a few classes of fire in nature correctly.
Ability to describe ways of controlling fires.	The learner describes ways of controlling all classes comprehensively.	The learner describes ways of controlling all classes of fires correctly.	The learner describes ways of controlling most of the classes of fires correctly.	The learner describes ways of controlling a few classes of fires correctly.

STRAND 2.0: LIVING THINGS AND THEIR ENVIRONMENT

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Living Things and their Environment	**2.1 The Cell** (20 lessons) ● *Cell structure as seen under a light microscope (plant and animal cells),* ● *Preparation of temporary slides of plant cells,* ● *Magnification of cells seen under the light microscope.*	By the end of the sub-strand the learner should be able to: a) describe the structure of plant and animal cells as observed under a light microscope, b) describe the functions of components of cells seen under the light microscope, c) compare plant and animal cells as observed under a light microscope, d) determine the magnification of cells under the light microscope, e) appreciate the role of cells in living things.	The learner is guided to: ● collaboratively prepare, mount, observe and draw plant cells as seen under a light microscope, (*include a reminder on how to use and care for a light microscope),* ● observe, draw and label the parts of an animal cells seen from permanent slides under the light microscope, ● use print and non-print material to search for information on functions of components of plant and animal cells as seen under the light microscope, ● discuss the similarities and differences between plant and animal cells as seen under a light microscope,	What makes up plant and animal cells?

			• calculate magnification of specimens at various objective lenses of the light microscope.	

Core Competencies to be developed:

- Learning to learn: the learner learns how to prepare, mount, observe, and draws plant cells as seen under a light microscope.
- Self-efficacy: the learner successfully prepares and observes specimens under the light microscope.

Pertinent and Contemporary Issues (PCIs)

Environmental conservation: the learner safely disposes off waste materials generated from experiments on the study of cells.

Values

- Unity: the learner displays team spirit as they prepare, mount, observe, and draw plant cells as seen under a light microscope.
- Responsibility: the learner performs assigned roles as they observe, draw and label animal cells on permanent slides as seen under the light microscope.

Link to other learning areas:

The concept of multiplication is learnt in Mathematics as the learner carries out multiplication of objective lens and eye piece lens to get the magnification.

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Living Things and their Environment	**2.2 Movement of Materials in and out of the cell** (16 lessons) • *Diffusion and Osmosis,* • *Demonstration of diffusion and osmosis,* • *Role of diffusion and osmosis in living things (Absorption of water, nutrients in the intestines, gases in the lungs).*	By the end of the sub-strand the learner should be able to; a) outline the process of diffusion and osmosis in cells, b) demonstrate diffusion and osmosis in living things, c) explain the role of diffusion and osmosis in living things, d) appreciate the importance of diffusion and osmosis in living things.	The learner is guided to: • use print and non-print material to search for information on the processes involved in the movement of materials in and out of a cell, discuss with peers *(cover diffusion and osmosis),* • carry out experiments to demonstrate diffusion in plant materials and share the findings with peers, • carry out experiments to demonstrate osmosis using visking tubing and plant materials, and share their findings with peers, • search for information from print and non-print media on the roles of diffusion and osmosis in living things and discuss with peers.	How do materials move in and out of a cell?

Core Competencies to be developed: • Communication and Collaboration: the learner acquires writing skills while recording findings from experiments to demonstrate diffusion and osmosis. • Self-efficacy: the learner executes assigned tasks successfully while carrying out experiments to demonstrate diffusion and osmosis.
Values: • Respect: the learner appreciates the opinions of peers when discussing the roles of diffusion and osmosis in living things. • Responsibility: the learner executes assigned roles while carrying out experiments to demonstrate diffusion and osmosis.
Pertinent and Contemporary Issues (PCIs): Environmental conservation: the learner learns how to disposes of waste materials from experiments to demonstrate diffusion and osmosis appropriately.
Link to other learning areas: The learner is able to link the information on diffusion and osmosis to absorption of water and mineral salts from the soil by crops in Agriculture.

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Living Things and their Environment	**2.3 Reproduction in human beings** (18 lessons) • *The menstrual cycle in human beings (omit details of hormonal control),* • *Challenges related to the menstrual cycle (include irregular periods, irregular bleeding, and pain),* • *Process of fertilisation and implantation (cover fusion of sperm with the egg and implantation of blastocyst in the uterus),* • ***Note:** -details on*	By the end of the sub-strand the learner should be able to: a) outline the menstrual cycle and its related challenges in human beings, b) develop a plan to manage challenges related to menstrual cycle in human beings, c) describe fertilisation and implantation in human beings, d) outline symptoms of STIs in human beings, e) explain prevention measures for common STIs in human beings, f) appreciate the need for a healthy reproductive system.	The learner is guided to: • search for information from print or non-print media on the menstrual cycle, • search for information from print or non-print media on challenges related to the menstrual cycle, • discuss management of challenges related to the menstrual cycle, • study illustrations/charts on the process of fertilisation and implantation, • search for information from print and non-print materials on symptoms of common STIs and their prevention, and discuss with peers.	How best can challenges related to the menstrual cycle be managed?

	formation of blastocyst not necessary • *Symptoms and prevention of common STIs (HIV& Aids, Gonorrhea, Syphilis, Herpes - Avoid details of causative agent)*			

Core Competencies to be developed:

- Learning to learn: the learner organises own learning while searching for information from print and non-print materials on symptoms of common STIs and their prevention.
- Self-efficacy: the learner appreciates and successfully manages challenges related to the menstrual cycle.

Values:

- Love: the learner shows empathy and embraces those with menstrual challenges.
- Respect: the learner shows open-mindedness while discussing symptoms of common STIs and their prevention.

Pertinent and Contemporary Issues (PCIs):

Health promotion issues: the learner discusses challenges related to the menstrual cycle and prevention of common STIs.

Link to other learning areas:

The information on common STIs is linked to communicable diseases in Agriculture.

Suggested Assessment Rubric				
Levels / **Indicator**	**Exceeds expectations**	**Meets expectations**	**Approaches expectations**	**Below expectations**
Ability to compare plant and animal cells as observed under a light microscope.	The learner compares plant and animal cells as observed under a light microscope comprehensively.	The learner compares plant and animal cells as observed under a light microscope.	The learner partially compares plant and animal cells as observed under a light microscope.	The learner partially compares plant and animal cells as observed under a light microscope leaving out some points.
Ability to explain the role of diffusion and osmosis in living things.	The learner explains the role of diffusion and osmosis in living things comprehensively.	The learner explains the role of diffusion and osmosis in living things.	The learner explains the role of diffusion and osmosis in living things partially.	The learner explains the role of diffusion or osmosis in living things partially, leaving out some key points.
Ability to demonstrate diffusion and osmosis in living things.	The learner demonstrates diffusion and osmosis in living things systematically.	The learner demonstrates diffusion and osmosis in living things.	The learner partially demonstrates diffusion and osmosis in living things.	The learner partially demonstrates diffusion or osmosis in living things.
Ability to outline the menstrual cycle and its related challenges in human beings.	The learner outlines the menstrual cycle and its related challenges in human beings comprehensively.	The learner outlines the menstrual cycle and its related challenges in human beings.	The learner partially outlines the menstrual cycle and its related challenges in human beings.	The learner partially outlines the menstrual cycle or its related challenges in human beings.

STRAND 3.0: FORCE AND ENERGY

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Force and Energy	**3.1 Transformation of Energy** (20 lessons) • *Forms of energy in nature,* • *Renewable and non-renewable energy sources,* • *Energy transformations in nature,* • *Safety measures associated with energy transformation,* • *Applications of energy transformation in day-to- day life*.	By the end of the sub-strand, the learner should be able to: a) identify forms of energy in nature, b) classify energy sources into renewable or non-renewable, c) demonstrate simple energy transformations in nature, d) describe safety measures associated with energy transformation, e) appreciate the applications of energy transformation in day-to- day life.	The learner is guided to: • discuss and identify forms of energy found in nature *(light, heat, potential, kinetic, gravitational, electrical, sound energy, chemical, nuclear or atomic energy),* • discuss and classify energy sources in nature *(renewable and non-renewable sources),* • use digital or print media to search for information on classification of energy sources in nature, • carry out activities to show energy transformation in day-to-day life (*electrical to heat, chemical to electrical, mechanical to electrical, electrical to light, electrical to sound and potential to kinetic),* • discuss the applications of energy transformations in day-to-day life (*use of a falling object, rubbing both hands, burning of wood,*	1. What are the sources of energy in the environment? 2. How is energy transformation applied in day-to-day life?

			electric bulbs, Light Emitting Diodes (LED), electric heater, steam engine, piezoelectricity, microphone, windmills, electric generator/dynamo, hydroelectric dams, thermocouple, geothermal power plant, solar panel, electric motor), • use digital or print media to search for information on the applications of energy transformations in day-to-day life, • discuss safety measures on energy transformation and mitigation strategies, (*relate to road accidents*; *K.E to P.E; action and reaction, accidents caused by fire, electricity, health hazard from bright light, loud sound*), • relate safety measures during energy transformations to road accidents; K.E to P.E; action and reaction, accidents caused by fire, electricity, health hazard from bright light, loud sound,	

			• use digital or print media to search for information on safety measures on energy transformation and mitigation strategies.	

Core Competencies to be developed:

- Critical thinking and Problem solving: the learner reflects on how to solve energy shortage by transforming energy from one form to another as they discuss examples and applications of energy transformation processes in day-to-day life.
- Creativity and Imagination: the learner experiments with ideas to test workability of energy transformation in day-to-day life.

Pertinent and Contemporary Issues (PCIs):

Safety: the learner learns how to stay safe as they discuss safety measures on energy transformation and mitigation strategies

Values:

- Social justice: the learner plays leadership role and delegate duties as he/she carries out activities to show energy transformation in day-to-day life.
- Love: the learner cares for self and others as they demonstrate the processes of energy transformation in day-to-day life.

Link to other learning areas:

The learner relates the concept of energy transformation to cooking processes in Agriculture.

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Question(s)
3.0 Force and Energy	**3.2 Pressure** (16 lessons) • *Pressure in solids and liquids,* • *Applications of pressure in solids and liquids.*	By the end of the sub-strand, the learner should be able to: a) demonstrate pressure in solids and liquids, b) identify applications of pressure in solids and liquids, c) appreciate the applications of pressure in solids and liquids.	The learner is guided to: • brainstorm on the meaning of pressure as used in science, • carry out activities to demonstrate pressure exerted by solids, • carry out activities to demonstrate pressure in liquids, • discuss the relationship between pressure, area of contact and weight of solids, • describe the relationship between pressure and height of liquids *(qualitative treatment only),* • discuss the applications of pressure in solids and liquids *(syringe, high heeled shoes, cutting tools, car brakes, siphons, bicycle pumps, drinking straw),* • use digital or print media to search for information on the applications of pressure in solids and liquids.	What are the applications of pressure in solids and liquids?

Core Competencies to be developed: ● Communication and Collaboration: the learner acquires listening and speaking skills as they discuss the applications of pressure in solids and liquids. ● Learning to learn: the learner uses digital or print media to search for information on the applications of pressure in solids and liquids.
Pertinent and Contemporary Issues (PCIs): Socio-economic issues: the learner learns how to reduce destructive effects of pressure on surfaces or objects as they carry out activities to demonstrate pressure exerted by solids.
Values: Unity: the learner collaboratively and harmoniously comes together while discussing the applications of pressure in solids and liquids.
Link to other learning areas: The learner relates concepts of pressure to construction in Pre-Technical Studies.

Suggested Assessment Rubric

Levels / Indicator	Exceeds expectations	Meets expectations	Approaches expectations	Below expectations
Ability to classify energy sources into renewable or nonrenewable.	The learner classifies energy sources into renewable or non-renewable exhaustively.	The learner classifies energy sources into renewable or non-renewable.	The learner classifies most energy sources into renewable or non-renewable.	The learner classifies a few energy sources into renewable or non-renewable.
Ability to demonstrate simple energy transformations.	The learner demonstrates simple energy transformations in details and comprehensively.	The learner demonstrates simple energy transformations.	The learner partially demonstrates simple energy transformations.	The learner partially demonstrates simple energy transformations, leaving some key points.
Ability to describe safety measures associated with energy transformation.	The learner describes safety measures associated with energy transformation comprehensively.	The learner describes all safety measures associated with energy transformation correctly.	The learner describes most of the safety measures associated with energy transformation correctly.	The learner describes a few safety measures associated with energy transformation correctly.

Ability to demonstrate pressure in solids and liquids.	The learner demonstrates pressure in solids and liquids consistently.	The learner demonstrates pressure in solids and liquids.	The learner partially demonstrates pressure in solids and liquids.	The learner partially demonstrates pressure in solids or liquids.
Ability to identify applications of pressure in solids and liquids.	The learner identifies applications of pressure in solids and liquids exhaustively.	The learner identifies applications of pressure in solids and liquids sufficiently.	The learner identifies most of the applications of pressure in solids and liquids.	The learner identifies few applications of pressure in solids or liquids.

APPENDIX 1: GUIDELINES FOR INTEGRATING COMMUNITY SERVICE LEARNING (CSL) PROJECT

Introduction

Community Service Learning (CSL) is an experiential learning strategy that integrates classroom learning and community service to enable learners reflect, experience and learn from the community. The CSL activity is hosted as a strand in Social Studies. The Social Studies teacher will be expected to coordinate teachers from other learning areas to carry out the integrated CSL class activity. Learners will be expected to apply knowledge, skills, attitudes and values from the different Learning Areas to undertake the integrated CSL class activity. Learners will undertake **one common** integrated class CSL activity following a 6-step milestone approach that is:

Milestone	**Description**
Milestone 1	**Problem Identification** Learners study their community to understand the challenges faced and their effects on community members.
Milestone 2	**Designing a solution** Learners create an intervention to address the challenge identified.
Milestone 3	**Planning for the Project** Learners share roles, create a list of activities to be undertaken, mobilise resources needed to create their intervention and set timelines for execution.
Milestone 4	**Implementation** The learners execute the project and keep evidence of work done.

Milestone 5	**Showcasing /Exhibition and Report Writing** Exhibitions involve showcasing learners' project items to the community and reflecting on the feedback. Learners write a report detailing their project activities and learnings from feedback.
Milestone 6	**Reflection** Learners review all project work to learn from the challenges faced. Learners link project work with academic concepts, noting how the concepts enabled them to do their project, as well as how the project helped to deepen learning of the academic concepts.

Assessment of CSL integrated Activity

Assessment for the integrated CSL activity will be conducted formatively. The assessment will consider both the process and end product. This entails assessing each of the milestone stages of the integrated CSL class activity. It will focus on 3 components namely: skills from various learning areas applied in carrying out the activity, core competencies developed, and values nurtured.

APPENDIX 2: LIST OF ASSESSMENT METHODS, LEARNING RESOURCES AND NON-FORMAL ACTIVITIES

Assessment Methods in Science	Learning Resources	Non-Formal Activities
● Reflections ● Game Playing ● Pre-Post Testing ● Model Making ● Explorations ● Experiments ● Investigations ● Conventions, Conferences, and Debates ● Applications ● Teacher Observations ● Project ● Journals ● Portfolio ● Oral or Aural Question(s) ● Learner's Profile ● Written Tests ● Anecdotal Records	● Laboratory Apparatus and Equipment ● Textbooks ● Software ● Relevant reading materials ● Digital Devices ● Recordings	● Visit the science historical sites. ● Use digital devices to conduct scientific research. ● Organising walks to have live learning experiences. ● Developing simple guidelines on how to identify and solve some community problems. ● Conducting science document analysis. ● Participating in talks by resource persons on science concepts. ● Participating in science clubs and societies ● Attending and participating science and engineering fairs ● Organising and participating in exchange programmes. ● Making oral presentations and demonstrations on science issues.