KENYA INSTITUTE OF CURRICULUM DEVELOPMENT

A Skilled and Ethical Society

PRIMARY SCHOOL EDUCATION CURRICULUM DESIGN

SCIENCE AND TECHNOLOGY

GRADE 4

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FOREWORD

The Government of Kenya (GoK) 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, National Curriculum Policy 2018, 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 Kenya Institute of Curriculum Development (KICD) reviewed the curriculum and rationalised the number of learning areas in 2024. The review and rationalisation process was informed by several factors, among them, the recommendations of the Presidential Working Party on Education Reforms (PWPER) and reports of the continuous curriculum monitoring and evaluation activities.

The reviewed curriculum designs build on competencies attained earlier by learners. The designs prepare the learner for smooth transition to the next level. The designs will also afford the learner opportunities for developing requisite competencies and enable them to interact with other people and the environment around them.

The key components of the curriculum designs include the National Goals of Education, the essence statement, general and specific learning outcomes as well as the strands and sub strands. Suggested learning experiences, key inquiry questions, core competencies, Pertinent and Contemporary Issues (PCIs), values and assessment rubrics are also outlined in the curriculum designs.

It is expected that all Government agencies and other stakeholders in Education will use the designs to plan for the effective and efficient implementation of the Competency Based Curriculum.

Thank you.

HON. EZEKIEL OMBAKI MACHOGU, CBS
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PREFACE

The Ministry of Education (MoE) rolled out the Competency Based Curriculum (CBC), nationally in 2019, following a national convention in 2017 where the *Basic Education Curriculum Framework* (BECF) was adopted by stakeholders and a national pilot of the curriculum in the Early Years of Education (EYE) in 2018. According to the UNESCO IBE requirements, a curriculum should be reviewed every five years. So, the review of CBC was due from 2023. In view of this, the reviewed curriculum designs will enhance the implementation of CBC since it corporates the lessons learnt from the implementation of CBC so far.

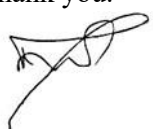
Consistent periodical review of the curriculum is also critical in the realisation of the Vision and Mission of the on-going curriculum reforms as enshrined in the Sessional Paper No. I of 2019 whose title is: *Towards Realizing Quality, Relevant and Inclusive Education and Training for Sustainable Development* in Kenya. The Sessional Paper explains the shift from a content-focused curriculum to a focus on producing an engaged, empowered and ethical citizen.

Therefore, the reviewed curriculum designs will facilitate the inculcation of core competencies in CBC, which are identified as: 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 strands and sub strands and other aspects of the CBC. The designs also outline suggested learning resources and varied assessment techniques. It is expected that the use of these designs will lead to enhanced learning outcomes at various levels, prepare the learner for smooth transition to subsequent grades and make learning enjoyable.

The MoE requests all stakeholders to keep giving feedback on the curriculum designs to inform the review during the next cycle.

Thank you.



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ACKNOWLEDGEMENT

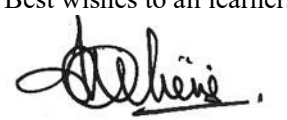
The Kenya Institute of Curriculum Development (KICD) Act Number 4 of 2013 (Revised 2019) mandates the Institute to develop and review curricula and curriculum support materials for basic and tertiary education and training. The curriculum development process is guided by research, international best practices as well as stakeholder engagement. The Institute conceptualised the Competency Based Curriculum (CBC) in consultation with the Ministry of Education and other stakeholders. According to the *Basic Education Curriculum Framework* (KICD, 2017) the conceptualisation of CBC was informed by 21st Century learning needs, the Constitution of Kenya 2010, the Kenya Vision 2030, the East African Community Protocol, the International Bureau of Education (IBE) Guidelines and the United Nations Sustainable Development Goals (SDGs).

KICD is funded by the Kenya Government to discharge its mandate. The institute also receives support from development partners targeting specific programmes. The reviewed 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. KICD wishes to most sincerely thank the Government of Kenya, through the MoE and other development partners. More specifically, KICD appreciates the Cabinet Secretary - MoE and the Principal Secretary – State Department of Basic Education,

Additionally, the Institute expresses gratitude to all the KICD staff members, teachers, university lecturers, MoE staff, Semi-Autonomous Government Agencies (SAGAs) and representatives of various stakeholders; among others, for their contributions to the development of the reviewed curriculum designs. Finally, KICD acknowledges the Chief Executive Officers of the Teachers Service Commission (TSC) and the Kenya National Examinations Council (KNEC) as well as the KICD Council for supporting the curriculum review process.

May God bless all the individuals and respective institutions who in one way or another supported the curriculum review process. Indeed, these designs will effectively guide the implementation of the CBC at Primary level, thereby preparing the learner to transition to the Junior School.

Best wishes to all learners and curriculum implementers.



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NATIONAL GOALS OF EDUCATION

1. **Foster nationalism, patriotism, and promote national unity**
   Kenya's people belong to different communities, races and religions and should be able to live and interact as one people. Education should enable the learner acquire a sense of nationhood and patriotism. It should also promote peace and mutual respect for harmonious co-existence.

2. **Promote social, economic, technological and industrial needs for national development**
   Education should prepare the learner to play an effective and productive role in the nation.

   a) **Social Needs**
      Education should instil social and adaptive skills in the learner for effective participation in community and national development.

   b) **Economic Needs**
      Education should prepare a learner with requisite competences that support a modern and independent growing economy. This should translate into high standards of living for every individual.

   c) **Technological and Industrial Needs**
      Education should provide the learner with necessary competences for technological and industrial development in tandem with changing global trends.

3. **Promote individual development and self-fulfilment**
   Education should provide opportunities for the learner to develop to the fullest potential. This includes development of one's interests, talents and character for positive contribution to the society.

4. **Promote sound moral and religious values**
   Education should promote acquisition of national values as enshrined in the Constitution. It should be geared towards developing a self-disciplined and ethical citizen with sound moral and religious values.

5. **Promote social equity and responsibility**
   Education should promote social equity and responsibility. It should provide inclusive and equitable access to quality and differentiated education; including learners with special educational needs and disabilities. Education should also provide the learner with opportunities for shared responsibility and accountability through service learning.

6. **Promote respect for and development of Kenya's rich and varied cultures**
   Education should instil in the learner appreciation of Kenya's rich and diverse cultural heritage. The learner should value own and respect other people's culture as well as embrace positive cultural practices in a dynamic society.

7. **Promote international consciousness and foster positive attitudes towards other nations**
   Kenya is part of the interdependent network of diverse peoples and nations. Education should therefore enable the learner to respect, appreciate and participate in the opportunities within the international community. Education should also facilitate the learner to operate within the international community with full knowledge of the obligations, responsibilities, rights and benefits that this membership entails.

8. **Good health and environmental protection**
   Education should inculcate in the learner the value of physical and psychological well-being for self and others. It should promote environmental preservation and conservation, including animal welfare for sustainable development.

LESSON ALLOCATION AT UPPER PRIMARY

S/No	Learning Area	Number of Lessons per Week
1.	English	5
2.	Kiswahili / Kenya Sign Language	4
3.	Mathematics	5
4.	Religious Education	3
5.	Science & Technology	4
6.	Agriculture	4
7.	Social Studies	3
8.	Creative Arts	6
	Pastoral/Religious Instruction Programme	1
Total		**35**

LEVEL LEARNING OUTCOMES FOR PRIMARY SCHOOL EDUCATION

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

a) Use verbal and or non-verbal cues to convey information in varied contexts.
b) Demonstrate mastery of number concepts to solve problems in day to day life.
c) Use appropriate social skills, moral and religious values to positively impact the society.
d) Develop individual talents and interests for self-efficacy.
e) Make informed decisions as local and global citizens of a diverse, democratic society in an interdependent world.
f) Devise innovative strategies for environmental conservation and sustainability.
g) Apply digital literacy skills for learning and enjoyment.
h) Appreciate Kenya's rich and diverse cultural heritage for harmonious living.

ESSENCE STATEMENT

Science and Technology is a learning area which engages in the human pursuit to understand the relationships between the living and non-living universe. Science is a discipline that deals with explanations and predictions about nature and the universe while technology is the application of science to create devices that can solve problems and do tasks.

The achievement of Kenya Vision 2030 greatly depends on Science, Technology and Innovation. 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. This is also highlighted in the Sessional Paper 14, 2012, which stresses the need for sustainable basic and higher education, with an emphasis on science, technology and innovation (ST&I). This makes it necessary for Science and Technology to be taught at Upper Primary Education level.

This learning area builds on the competencies introduced at the Lower Primary under the learning area of Environmental Activities and equips the learner with pre-requisite skills required in Integrated Science and Pre-technical Studies at the Junior School level. These enable learners to prepare for Science, Technology, Engineering and Mathematics (STEM) in subsequent levels of the education cycle. Inquiry-based learning (IBL), project-based learning (PBL), problem-based learning (PBL) and social scientific issue learning (SSI) approaches will be employed throughout the learning experiences in this learning area as advocated by John Dewey's social constructivist theory, which emphasises that the learner should be given an opportunity to learn through hands-on activities. Engineering design shall be used as a pedagogical strategy to bridge science concepts with other learning areas to solve simple open-ended problems, develop creative thinking and analytical skills among learners, make decisions, and consider alternative solutions to address a variety of situations.

SUBJECT GENERAL LEARNING OUTCOMES

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

a) Interact with the environment for learning and sustainable development.
b) Apply digital literacy skills appropriately for communication, learning and enjoyment.
c) Appreciate the contribution of science and technology in the provision of innovative solutions.
d) Use scientific knowledge to observe and explain the natural world.
e) Make functional discoveries that impact individuals and the wider society.
f) Use innovative approaches as well as critical thinking and problem-solving skills to stimulate scientific inquiry, at the local, national and global levels for lifelong learning.

SUMMARY OF STRANDS AND SUB STRANDS

Strands	Sub-Strands	Suggested Number of Lessons
1.0 Living Things and their Environment	Plants	12
	Animals	12
	Human digestive system	16
2.0 Matter	2.1. Properties of matter	14
	Management of solid waste	16
	Water conservation	12
3.0 Force and Energy	3.1. Force and its effects	12
	3.2. Light	14
	3.3 Heat	12
Total Number of Lessons		120

NOTE:

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

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
1.0 Living Things and their Environment	**Plants** (12 lessons) • Characteristics of plants as living things. • Functions of external parts of plants.	By the end of the sub-strand, the learner should be able to: a) identify characteristics of plants as living things, b) describe functions of external parts of plants, c) appreciate the need to care for plants.	The learner is guided to: • search for information from print and non-print materials on characteristics of plants as living things and discuss with peers, • take a walk in the school compound and adjacent environment to observe, discuss and record evidence that plants: *grow, reproduce, remove waste, respond to changes in their environment and die* **Note:** *observes safety while handling different types of plants,* • observe young plants/seedlings, draw and label their parts and share with peers *(roots, stems and leaves),* • discuss the functions of external parts of plants and share with peers, • use digital applications to draw, paint and label external parts of a plant.	Why are plants grouped as living things?
Core Competencies to be developed: Communication and Collaboration: The learner develops speaking and listening skills as they discuss the functions of external parts of plants. Digital literacy: The learner develops manipulative skills as they interact with digital media to draw, paint and label external parts of a plant.				

Values: Unity: The learner cooperates in taking turns while they observe young plants/seedlings, draw and label their parts and share with peers. Respect: The learner listens to and appreciates others' opinions during discussions on the characteristics of plants.
Pertinent and Contemporary Issues (PCIs): Safety and Security: The learner observes safety while handling different types of plants as they take a walk in the school compound and adjacent environment to observe, discuss and record characteristics of plants as living things.
Link to Other Learning Areas: Agriculture and Nutrition: The learner uses information on characteristics of plants as living things in the study of different types of crops.

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
1.0 Living Things and their Environment	**1.2 Animals** (12 lessons) ● Characteristics of animals as living things. ● Vertebrates and invertebrates.	By the end of the sub-strand, the learner should be able to: a) identify the characteristics of animals as living things, b) distinguish vertebrates from invertebrates in the environment, c) appreciate the need to care for animals.	The learner is guided to: • take a walk in the school compound and adjacent environment to observe, discuss and record evidence that animals: *feed, grow, breathe, reproduce, remove waste, move, respond to changes in their environment and die,* • search for information from print and non-print materials on characteristics of animals as living things and discuss the findings with peers, • search for information from print and non-print materials on main differences between vertebrates and invertebrates and share with peers, • take a walk in the school compound and immediate environment to identify vertebrates and invertebrates in their locality. **Note:** *Learners observe safety precautions and take care of animals during the learning activities.*	Why are animals grouped as living things?

			Project: Learners are guided to make a portfolio of vertebrates and invertebrates.	
Core Competencies to be developed: Communication and collaboration: The learner contributes to group decision making by participating actively as they discuss characteristics of animals as living things. Creativity and Imagination**:** The learner discovers new ways of solving problems of keeping records as they design and make a portfolio of vertebrates and invertebrates.				
Values: Responsibility: The learner takes care of the different materials they use as they search for information from print and non-print materials on main differences between vertebrates and invertebrates and share with peers. Respect**:** The learner appreciates divergent ideas from peers as they discuss their findings on characteristics of animals as living things.				
Pertinent and Contemporary Issues (PCIs): Animal welfare: The learner takes care of animals during the learning activities. Safety and security**:** The learner observes safety when handling animals.				
Link to Other Learning Areas: Agriculture and Nutrition: The learner uses the information on characteristics of animals as living things in the study of livestock.				

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question (s)
1.0 Living Things and their Environment	**Human Digestive System** (16 lessons) ● Parts of the human digestive system (*mouth, gullet, stomach, small intestines, large intestines, rectum, anus*). ● Healthy digestive system (*dental hygiene, deworming, healthy eating*). ● Symptoms of unhealthy digestive system (*stomach ache/pain, bloating, worms, diarrhoea, vomiting, constipation*).	By the end of the sub-strand, the learner should be able to: a) identify parts of the human digestive system, b) develop a plan of maintaining a healthy human digestive system, c) appreciate the importance of a healthy human digestive system.	The learner is guided to; • use print and non-print material to observe and identify parts of the human digestive system, • draw and label the human digestive system, • discuss symptoms of an unhealthy digestive system, record and share with peers, • collaboratively discuss and develop a plan on ways of maintaining a healthy digestive system, • use interactive platforms or digital images to illustrate the human digestive system.	1. What makes up the digestive system? 2. How is a healthy digestive system maintained?
Core Competencies to be developed: Learning to learn: The learner reflects on ways of maintaining a healthy digestive system as they develop a plan on ways of maintaining a healthy digestive system.				

Digital literacy: The learner develops manipulative skills in using digital media as they use interactive platforms or digital images to illustrate the human digestive system.
Values: Unity: The learner strives to achieve a common goal of maintaining a healthy digestive system as they discuss and develop a plan on ways of maintaining a healthy digestive system. Respect: The learner appreciates others' opinions while discussing the symptoms of an unhealthy digestive system.
Pertinent and Contemporary Issues (PCIs): Health issues: The learner practices how to observe and maintain healthy digestive system such as dental hygiene, regular deworming and healthy eating as they plan on ways of maintaining a healthy digestive system.
Link to Other Learning Areas: Agriculture and Nutrition**:** The learner studies ways of maintaining a healthy digestive system in personal hygiene and hygienic handling of food.

Suggested Assessment Rubric

Level / Indicator	Exceeding Expectations	Meeting Expectations	Approaching Expectations	Below Expectations
Ability to identify characteristics of plants and animals.	The learner accurately identifies all characteristics in plants and animals giving illustrations.	The learner accurately identifies all characteristics of plants and animals.	The learner accurately identifies most of the characteristics of plants and animals.	The learner identifies a few characteristics of either plants or animals.
Ability to describe functions of external parts of a plant.	The learner correctly and comprehensively describes functions of external parts of a plant.,	The learner correctly describes functions of external parts of a plant.	The learner partially describes functions of external parts of a plant.	The learner describes functions of external parts of a plant with prompt.
Ability to identify parts of the human digestive system.	The learner identifies all parts of the human digestive system correctly giving illustrations.	The learner identifies all parts of the human digestive system correctly.	The learner identifies most parts of the human digestive system.	The learner identifies a few parts of the human digestive system.
Ability to develop a plan of maintaining a healthy human digestive system.	The learner correctly and innovatively develops a plan of maintaining a healthy human digestive system.	The learner correctly develops a plan of maintaining a healthy human digestive system.	The learner partially develops a plan of maintaining a healthy human digestive system.	The learner develops a plan of maintaining a healthy human digestive system given hints.

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Matter	**2.1 Properties of Matter** (14 lessons) ● Meaning of matter ● States of matter (*solid, liquid and gas*). ● Properties of matter (*shape, volume and mass*). ● Importance of the different states of matter.	By the end of the sub-strand, the learner should be able to: a) categorise substances in the environment into the three states of matter, b) describe the properties of the three states of matter, c) appreciate the importance of the different states of matter in day-to-day life.	The learner is guided to: • brainstorm on the meaning of matter and identify its different states,, • collect and group different substances from the environment into the three states of matter collaboratively, • carry out activities to demonstrate the properties of the three states of matter with peers, • discuss the importance of the different states of matter in day-to-day life, • use digital or print media to search for more information on the characteristics of the three states of matter.	What are the properties of matter?
Core Competencies to be developed: Communication and collaboration: The learner shares different roles as they works with peers to collect and group different substances from the environment into the three states of matter and carry out activities that show properties of matter. Digital literacy: The learner develops digital manipulative skills as they interact with digital technology to observe the properties of the three states of matter.				

Values: Unity: The learner shares available resources amicably as they carry out activities to demonstrate the properties of the three states of matter with peers.
Pertinent and Contemporary Issues (PCIs): Heath issues -preventive health: The learner practices preventive health measures such as avoiding blowing air into the same balloon with others as they carry out activities to demonstrate the properties of the three states of matter with peers.
Link to Other Learning Area: Mathematics: The learner uses the knowledge of properties of matter to measure the volume and mass of different substances.

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Matter	**2.2 Management of Solid Waste** (16 lessons) ● Types of solid wastes (*decomposing and non-decomposing (plastic, metals, food wrappers, kitchen waste*). ● Dangers of solid waste to the environment. ● Managing wastes in places (*classrooms, schools, home, public functions*). ● Methods of managing solid waste (*reuse, reduce and recycl*e). ● Safety measures during solid waste management *(wearing protective gear and use of appropriate tools)*.	By the end of the sub-strand the learner should be able to: a) classify solid waste into decomposable and non-decomposable, b) describe the dangers of solid waste to the environment, c) apply appropriate methods to manage solid waste in the environment, d) appreciate the need for proper management of solid waste in the	The learner is guided to: • walk around the school compound and its environment to identify solid waste in the environment, • discuss with peers the meaning of decomposable and non-decomposable solid waste, • collect solid waste in the school, sort and classify them into decomposing and non-decomposing, • discuss the dangers of solid waste to the environment and present in class, • discuss methods of managing different types of waste in their environment (*To include Re-using, Recycling and Reducing),* **Hint:** *Include common waste in school and environment such as kitchen, animal waste, plastics, e-waste, metals and glasses,* • practice observe proper safety measures in solid waste	How is solid waste dangerous to the environment?

		environment.	management • use digital or print media to search for more information on ways of managing different types of solid waste. **Projects:** 1. Learners to make dustbins for safe disposal of waste at home and in school using locally available materials, 2. Make toys or ornaments from solid waste.	
Core Competencies to be developed: Critical thinking and problem solving: The learner reflects and practices good ways of managing different types of waste in their environment as they collect solid waste in the school, sort and classify them into decomposing and non-decomposing. Learning to learn: The learner explores ways of making dustbins, toys or ornaments from locally available materials				
Values: Responsibility: The learner plays different roles from other peers as they use locally available materials to make dustbins, toys and ornaments. Patriotism: The learner practices carrying out community service activities as they collect solid waste in the school, sort and classify them into decomposing and non-decomposing.				
Pertinent and Contemporary Issues (PCIs): Health issues: The learner learns about preventive health measures as they discuss the dangers of solid waste to the environment and presents in class. Socio-economic issues; environmental education: The learner discusses ways of managing different types of solid waste in their environment and generate outcome out of the locally available waste by making dustbins, toys and ornaments.				
Link to Other Learning Area: Creative arts: The learner uses knowledge on management of solid waste to make ornaments and dustbins.				

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Matter	**2.3 Water Conservation** (12 Lessons) ● Meaning of water conservation. ● Methods of conserving water (**cover:** *Simple examples of Reducing water wastage, Reusing water and Recycling water*). ● Importance of water conservation.	By the end of the sub-strand, the learner should be able to: a) explain the meaning of water conservation in the environment, b) describe methods of conserving water at home and school, c) outline the importance of conserving water at home and school, d) develop interest in conserving water at home and school.	The learner is guided to: • brainstorm on how water is wasted at home and school, • discuss with peers the meaning of water conservation, • explore their locality and observe how water is conserved, • discuss with peers ways of conserving water. • discuss the importance of conserving water, • practise responsible use of water at home and school. **Project:** Prepare posters to sensitise the community (school and home) on the importance of water conservation.	Why is it important to conserve water?
Core Competencies to be developed: Critical thinking and Problem Solving: The learner practises responsible use of water at home and school as they explore their locality and observe how water is conserved with peers. Citizenship: The learner identifies water wastage as a problem affecting society and sensitises the community on the importance of water conservation.				

Values Integrity: The learner practices how use available water sparingly as they explore their locality and observe how water is conserved.
Pertinent and Contemporary Issues (PCIs): Socio-economic issues; financial literacy: The learner learns how to reduce cost of water by reducing water wastage as they explore their locality and observe how water is conserved.
Link to Other Learning Area: Agriculture and Nutrition: The learner uses knowledge of appropriate water conservation practices in irrigation such as adopting drip irrigation and mulching.

Suggested Assessment Rubric

Level / Indicators	Exceeding Expectations	Meeting Expectations	Approaching Expectations	Below Expectations
Ability to describe the properties of the three states of matter.	The learner describes the properties of the three states of matter correctly, giving examples from the locality.	The learner describes the properties of the three states of matter correctly.	The learner describes the properties of two of the three states of matter correctly.	The learner describes the properties of one of the three states of matter correctly.
Ability to manage solid waste in the environment.	The learner manages solid waste in the environment properly and actively engages in promoting reuse, reduce, recycle activities.	The learner manages solid waste in the environment properly.	The learner partially manages solid waste in the environment.	The learner manages solid waste in the environment with help.
Ability to outline the importance of conserving water at home and school.	The learner outlines the importance of conserving water at home and school giving examples from the locality.	The learner outlines the importance of conserving water at home and school.	The learner outlines a few the importance of conserving water at home and school.	The learner outlines the importance of conserving water at home or school with prompt.

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Force and Energy	**3.1 Force and its Effect** (12 lessons) ● Types of forces (*force of gravity and force of friction*). ● Effects of force on objects *(change of shape, start motion, stop moving objects, increase speed, decrease speed, change direction and hold objects together*). ● Uses of force in day-to-day life.	By the end of the sub-strand, the learner should be able to: a) describe types of forces in nature, b) demonstrate the effects of force on objects in nature, c) describe the uses of force in daily life, d) appreciate the importance of force in day-to-day life.	The leaner is guided to: • brainstorm on the meaning of the term force as used in science, • carry out activities that demonstrate the existence of force of gravity and force of friction in nature, • carry out activities to demonstrate the effects of force on objects, • use digital or print media to search for, observe and discuss uses of force in day-to-day life, • discuss with peers ways of minimising friction between moving objects *(smoothening surfaces, greasing, oiling, use of rollers, ball bearings),* • discuss the applications of force of friction and force of gravity in day-to-day life.	How does force affect objects?
Core Competencies to be developed: Learning to learn: The learner acquires digital manipulative skills as they use digital devices to search for uses of force in day-to-day life Communication and collaboration: The learner develops speaking and listening skills as they discuss ways of minimising friction between moving bodies.				

Values: Love: The learner cares for one another by avoiding inflicting pain on each other or safely uses available materials as they work with peers to carry out activities that demonstrate the existence of force of gravity and force of friction in nature. Unity: The learner practices taking turns in carrying out certain tasks as they carry out activities that demonstrate the existence of force of gravity and force of friction in nature.
Pertinent and Contemporary Issues (PCIs): Citizenship: The learner exercises leadership as they work in groups while discussing the application of force of friction and force of gravity in day-to-day life.
Link to Other Learning Area: Agriculture and Nutrition: The learner relates the concepts of force of friction in maintenance farm tools and equipment.

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Force and Energy	**3.2 Light** (14 lessons) ● Sources of light. ● Ways of lighting the house (*windows, translucent roofs, artificial lighting*). ● Uses of light (*to see, safety, discourage pests*).	By the end of the sub-strand, the learner should be able to: a) identify the sources of light in nature, b) describe ways of lighting a house in day- to-day life, c) explain the uses of light in day-to-day life, d) appreciate the applications of light in day-to-day life.	The learner is guided to: • brainstorm on the meaning of light, • carry out activities to categorise the sources of light in day-to-day life as natural or artificial, • discuss with peers the ways of lighting a house, • use digital or print media to search for information on sources and uses of light in nature, • discuss with peers the applications of light in day-to-day life.	Why is light important in day-to-day life?
Core competencies to be developed: Digital literacy: The learner acquires digital manipulative skills as they interact with technology to search for sources and uses of light in nature. Communication and Collaboration: The learner contributes to group decision making as they discuss with peers the ways of lighting a house.				

Values: Respect: The learner exercises patience with others opinions as they discuss the applications of light in day-to-day life.
Pertinent and Contemporary Issues (PCIs): Citizenship education: The learner reflects and recorgnise the uses of light for safety and security as they discuss the importance of light.
Links to other Learning areas: Pre-technical Studies: The learner seeks alternative cost-effective ways of lighting a house as they discuss ways of lighting a house.

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Force and Energy	**3.3 Heat** (12 lessons) ● Sources of heat (*sun, fire, electricity*). ● Uses of heat (*Cooking, warming, ironing and drying*). ● Safety measures when handling heat ● Importance of heat in daily life.	By the end of the sub-strand, the learner should be able to: a) identify sources of heat in nature, b) demonstrate uses of heat in day-to-day life, c) describe safety measures to observe when using heat, d) appreciate the importance of heat in day-to-day life.	The leaner is guided to: • use digital or print media to search for the meaning of heat, • discuss with peers the sources of heat in nature, • carry out activities to demonstrate the uses of heat in day-to-day life, • discuss safety measures when using heat, • use digital or print media to search for information on safety measures and practices necessary when using heat, • discuss the importance of heat in nature. **Project**: Use locally available materials to make kitchen gloves.	1. What are the safety measures observed when using heat?
Core Competencies to be developed: Learning to learn: The learner gets new information on safety measures as they digital or print media to search for information on safety measures and practices necessary when using heat. Digital literacy: The learner develops digital manipulative skills when interacting with digital media to search for safety measures and practices necessary when using heat.				

Values: Unity: The learner practices sharing available resources amicably as they carry out activities to demonstrate the uses of heat in day-to-day life.
Pertinent and Contemporary Issues (PCIs): Socio-Economic Issues**:** The learner exercises safety and security as they carry out activities to demonstrate the uses of heat in day-to-day life.
Link to Other Learning Area: Agriculture and Nutrition: The learner uses knowledge of heat in hatching of chicks, pest control and cooking utensils.

Suggested Assessment Rubric

Level / Indicator	Exceeding Expectations	Meeting Expectations	Approaching Expectations	Below Expectations
Ability to demonstrate the effects of force on objects in nature.	The learner demonstrates the effects of force on objects in nature correctly and helps others.	The learner demonstrates the effects of force on objects in nature correctly.	The learner partially demonstrates the effects of force on objects in nature correctly.	The learner demonstrates the effects of force on objects in nature even, given hints.
Ability to identify the sources of light in nature.	The learner identifies the sources of light in nature correctly and exhaustively.	The learner identifies the sources of light in nature correctly.	The learner identifies some of the sources of light in nature correctly.	The learner struggles to identify the sources of light in nature even with hints.
Ability to explain the uses of light in day-to-day life.	The learner correctly and comprehensively explains the uses of light in day-to-day life correctly and comprehensively.	The learner explains the uses of light in day-to-day life correctly.	The learner explains most of the uses of light in day-to-day life correctly.	The learner explains a few uses of light in day-to-day life even.

Ability to demonstrate uses of heat in day-to-day life.	The learner demonstrates uses of heat in day-to-day life correctly and helps others.	The learner demonstrates uses of heat in day-to-day life correctly.	The learner demonstrates most of the uses of heat in day-to-day life correctly.	The learner demonstrates a few uses of heat in day-to-day life even with help.
Ability to describe safety measures when using heat.	The learner describes safety measures when using heat correctly and comprehensively.	The learner describes safety measures when using heat correctly.	The learner describes most of the safety measures when using heat correctly.	The learner describes a few safety measures when using heat correctly even with help.

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

Suggested Assessment Methods in Science	Suggested Learning Resources	Suggested 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 questions ● Learner's Profile ● Written tests ● Anecdotal records	● Laboratory apparatus and equipment ● Textbooks ● Software ● Relevant reading materials ● Digital devices ● Recordings	Visit science historical sites ● Use digital devices to conduct scientific research ● Organise walks to have live learning experiences ● Develop simple guidelines on how to identify and solve some community problems ● Conduct science document analysis ● Participate in talks by resource persons on science concepts ● Participate in science clubs and societies ● Attend and participate in science and engineering fairs ● Organise and participate in exchange programmes. ● Make oral presentations and demonstrations on science issues.