KENYA INSTITUTE OF CURRICULUM DEVELOPMENT

A skilled and Ethical Society

PRIMARY SCHOOL CURRICULUM DESIGN

SCIENCE & TECHNOLOGY

GRADE 5

First Published 2017

Revised 2024

ISBN: 978-9914-724-50-9

Published and printed by Kenya Institute of Curriculum Development

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
CABINET SECRETARY,
MINISTRY OF EDUCATION

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.

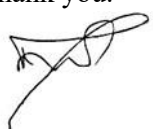
Consistent periodical review of the curriculum is also critical in the realisation of the Vision and Mission of the on-going curriculum reforms as enshrined in the Sessional Paper No. I of 2019 whose title is: *Towards Realizing Quality, Relevant and Inclusive Education and Training for Sustainable Development* 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.



DR. BELIO R. KIPSANG, CBS
PRINCIPAL SECRETARY STATE DEPARTMENT FOR
EARLY LEARNING AND BASIC EDUCATION
MINISTRY OF EDUCATION

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.

PROF. CHARLES O. ONG'ONDO, PhD., MBS.
DIRECTOR/CHIEF EXECUTIVE OFFICER
KENYA INSTITUTE OF CURRICULUM DEVELOPMENT

TABLE OF CONTENTS

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 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 in 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 which are required in Integrated Science and Pre-technical and Pre-career studies at the lower secondary level. These enable learners to prepare for Science, Technology, Engineering and Mathematics (STEM) in subsequent levels of 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 area as advocated for by John Dewey's social constructivist theory which emphasises 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 the course, 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	1.1. Classification of plants	14
	1.2. Invertebrates	16
	1.3. The Human Breathing system	18
2.0. Matter	2.1. Mixtures	14
	2.2. Water Pollution	18
3.0. Force and Energy	3.1. Floating and Sinking	14
	3.2. Sound Energy	14
	3.3. Heat transfer	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 1.0: LIVING THINGS AND THEIR ENVIRONMENT

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
1.0 Living Things and their Environment	**1.1 Classification of Plants** (14 lessons) • Classification of plants (*flowering and non-flowering plants*). • Parts and functions of flowers.	By the end of the sub-strand, the learner should be able to: a) classify plants into flowering and non-flowering, b) describe functions of parts of a flower, c) outline the importance of flowers in nature, d) appreciate the importance of flowers in nature.	The learner is guided to: • use print and non-print materials to search for images of flowering and non-flowering plants and share, • take a walk in their locality to observe, identify and categorise plants into flowering and non-flowering, • draw a flower and label parts, • discuss functions of parts of a flower and share with peers, • discuss the importance of flowers in nature with peers, • use digital applications to draw, paint and label flowers. ***Note:*** *Learners are guided on precautions to take when handling plants as they study flowering and non-flowering plants.*	How are plants classified?

Core Competencies to be developed: Creativity and imagination: The learner reflects and draw accurate images as they draw a flower and label parts. Digital literacy**:** The learner acquire digital manipulative skills as they use digital applications to draw, paint and label flowers.
Values: Unity: The learner appreciates sharing of the available resources amicably as they draw a flower and label parts.
Pertinent and Contemporary Issues (PCIs): Environmental Conservation**:** The learner conserves the environment by not destroying plants as they observing, identifying and categorising plants into flowering and non-flowering in their natural habitat.
Link to Other Learning Areas: Creative Arts: The use of digital applications to draw, paint and label flowers is linked to drawing and painting in Creative Arts.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
Living Things and their Environment	**Vertebrates** (16 lessons) • General characteristics of vertebrates • Groups of vertebrates (mammals, birds, reptiles, fish and amphibians; structural features only)	By the end of the sub-strand the learner should be able to: a) describe general characteristics of vertebrates, b) classify vertebrates into their main groups, c) appreciate the importance of vertebrates in the environment.	Learners is guided to: • search for information from print and non-print material on the general characteristics of vertebrates and share with peers, • explore the school compound and adjacent environment to observe and identify characteristics of vertebrates, • discuss with peers the characteristics of different groups of vertebrates, study their main characteristics. **Note:** *The learners are guided to observe safety precautions when handling different animals.* **Project:** making a portfolio of different categories of vertebrates in their locality.	What are the key features of vertebrates?

Core Competencies to be developed: Communication and collaboration: The learner acquires speaking and listening skills as they contribute in the discussions on main characteristics of vertebrates. Creativity and Imagination: The learner acquires manipulative skills as they skilfully designs and develops a portfolio on vertebrates.
Values: Responsibility: The learner observes safety precautions when handling different animals.
Pertinent and Contemporary Issues (PCIs): Safety and security: The learner observes necessary precautions while handling animals.
Link to Other Learning Areas: Agriculture and Nutrition: The learner links information on characteristics of animals as living things is linked to the study of livestock in Agriculture. Creative Arts: Making of a portfolio of different categories of vertebrates is linked to designing in Creative Arts

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Questions
Living Things and their Environment	**1.2 The Human Breathing System** (18 lessons) ● Parts of the breathing system and their functions (*nose, trachea, lungs, diaphragm*). ● Symptoms and prevention of common conditions and diseases of the breathing system (*common colds, coughs, COVID-19, allergy and asthma).*	By the end of the sub-strand the learner should be able to: a) identify the main parts of the human breathing system, b) describe the functions of parts of the human breathing system, c) coutline the symptoms and prevention measures for common conditions and diseases of the breathing system, d) appreciate the need for maintaining a healthy breathing system.	Learners is guided to; • use print and non-print material to identify the human breathing system, • draw the human breathing system and label the main parts, • use print or non-print media to search for information on the functions of main parts of the human breathing system and share with peers, • discuss symptoms and prevention of common conditions and diseases that affect the human breathing system and share, • use simulation or digital images to illustrate major parts of the human breathing system. **Project:** Learners are guided to make models of the human breathing system using locally available materials.	1. What makes up the human breathing system? 2. What enhances a healthy breathing system?

Core Competencies to be developed: Creativity and Imagination: The learner reflects on appropriate images as they design different ways of modelling the human breathing system using locally available material. Digital literacy: The learner acquires digital manipulative skills as they use simulations or digital images to illustrate major parts of the human breathing system.
Values: Love: The learner develop caring attitude towards self and others' health as they discuss symptoms and prevention of common conditions and diseases that affect the human breathing system. Responsibility: The learner shows accountability in protecting self and others as they study prevention of common conditions and diseases that affect the human breathing system.
Pertinent and Contemporary Issues (PCIs): Preventive health and communicable diseases**:** The learner learns how to take prevent diseases as they discuss symptoms and prevention of common conditions and diseases that affect the human breathing system.
Link to Other Learning Areas: Agriculture and Nutrition: The information on symptoms and prevention of common conditions and diseases that affect the human breathing system is linked to personal hygiene in Agriculture and Nutrition.

Suggested Assessment Rubric

Level / Indicator	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Ability to describe functions of parts of a flower.	The learner describes functions of all parts of a flower, giving illustration(s).	The learner describes functions of all parts of a flower.	The learner describes functions of most parts of a flower.	The learner describes functions of a few parts of a flower.
Ability to classify vertebrates into their main groups.	The learner classifies vertebrates into their main groups correctly, giving examples from the locality.	The learner classifies vertebrates into their main groups correctly.	The learner classifies most of the vertebrates into their main groups correctly.	The learner classifies a few vertebrates into their main groups.
Ability to describe the functions of main parts of the human breathing system.	The learner describes the functions of main parts of the human breathing system correctly and comprehensively	The learner describes the functions of main parts of the human breathing system correctly.	The learner describes the functions of main parts of the human breathing system partially.	The learner describes the functions of main parts of the human breathing system, with prompt.
Ability to outline the symptoms and prevention measures for common conditions and diseases of the breathing system.	The learner outlines all the symptoms and prevention measures for common conditions and diseases of the breathing system correctly and exhaustively.	The learner outlines all the symptoms and prevention measures for common conditions and diseases of the breathing system correctly.	The learner outlines most of the symptoms and prevention measures for common conditions and diseases of the breathing system correctly.	The learner outlines a few symptoms and prevention measures for common conditions and diseases of the breathing system correctly even with assistance.

STRAND 2.0: MIXTURES

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Matter	**2.1 Mixtures** (14 Lessons) • Meaning of mixtures • Types of mixtures (*heterogeneous and homogeneous*). • Examples of mixtures (*solid-solid, solid-liquid and liquid -liquid*). • Methods of separating heterogeneous mixtures (*Winnowing, picking, sieving, using magnet, filtering, decanting, separating funnel*).	By the end of the sub-strand the learner should be able to: a) classify mixtures as homogeneous or heterogeneous, b) apply appropriate methods to separate heterogeneous mixtures, c) outline the applications of separating mixtures in day-to-day life, d) appreciate different methods of separating mixtures in day-to-day life.	The learner is guided to: • brainstorm on the meaning of a mixture, give examples at home and school, • carry out activities to categorise mixtures as homogeneous (uniform) and heterogeneous (non-uniform), • carry out activities to separate heterogeneous mixtures, • carry out activities to demonstrate ways of separating mixtures in day-to-day life.	What are the applications of mixture separation in day- to-day life?
Core Competencies to be developed: Critical thinking and imagination: The learner acquires reflects on the best ways of separating different mixtures as they carry out activities to demonstrate ways of separating mixtures. Learning to learn: The learner learns new methods separating mixtures through their own experiences as they carry out activities with peers to separate different types of mixtures.				

Values: Social justice: The learner gives others equal opportunities in sharing responsibilities as they carry out activities to separate heterogeneous mixtures.
Pertinent and Contemporary Issues (PCIs): Health Issues: The learner learns how to separate mixtures to remove impurities in cleaning of water for domestic usage as they carry out activities to demonstrate ways of separating mixtures.
Link to other subjects: Agriculture and Nutrition: The learner applies the knowledge on separating mixtures in agricultural processes like straining milk, winnowing grains and straining honey.

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Matter	**2.2 Water Pollution** (18 lessons) • Meaning of the term water pollution. • Common water pollutants. • Effects of polluted water on living things • Methods of reducing water pollution. • Basic methods of water treatment (*boiling, filtration, chemical treatment, solar treatment).*	By the end of the sub-strand the learner should be able to: a) identify water pollutants in the water sources, b) outline the effects of water pollution in day-to-day life, c) identify methods of reducing water pollution in the water sources, d) apply appropriate methods of water treatment, e) advocate for safe water sources in the locality.	The learner is guided to: • brainstorm on water pollutants in water sources, • discuss with peers the effects of water pollution in day-to-day life, • discuss with peers the different methods of reducing water pollution, • observe safety measures when working in a water-polluted environment *(Example: practise use of gumboots and gloves),* • carry out activities to demonstrate methods of water treatment, • use visual aids or digital devices to identify water pollutants and their effects in day-to-day life. **Project:** Learners to make functional water filters using locally available materials.	What are the dangers of water pollution?

Core competencies to be developed: Creativity and imagination: The learner reflects and comes up with new ideas in making functional water filters using locally available materials.
Values: Responsibility: The learner practices being responsible in playing different role as they carry out activities to demonstrate methods of water treatment Peace: The learner learns how to share available materials amicably as they carry out activities to demonstrate methods of water treatment.
Pertinent and Contemporary Issues (PCIs): Health Issues**:** The learner practices health preventive measures on water born diseases as they carry out activities to demonstrate basic methods of water treatment.
Link to other Learning areas: Agriculture and Nutrition: knowledge and skills on ways of reducing pollutants are used to obtain clean water for domestic use in Agriculture and Nutrition.

Suggested Assessment Rubric

Level / Indicator	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Ability to classify mixtures as homogeneous or heterogeneous.	The learner classifies mixtures as homogeneous or heterogeneous correctly, giving examples from the locality.	The learner classifies mixtures as homogeneous or heterogeneous correctly.	The learner classifies most of the mixtures as homogeneous or heterogeneous correctly.	The learner classifies a few mixtures as homogeneous or heterogeneous correctly.
Ability to apply appropriate methods of separating heterogeneous mixtures.	The learner applies all appropriate methods of separating heterogeneous mixtures correctly, giving illustration.	The learner applies all appropriate methods of separating heterogeneous mixtures correctly.	The learner applies most of the appropriate methods of separating heterogeneous mixtures correctly.	The learner applies a few appropriate methods of separating heterogeneous mixtures with prompt.
Ability to identify methods of reducing water pollution in the water sources.	The learner identifies all methods of reducing water pollution in water sources correctly, giving examples from the locality.	The learner identifies all methods of reducing water pollution in the water sources correctly.	The learner identifies most of the methods of reducing water pollution in water sources correctly.	The learner identifies a few methods of reducing water pollution in water sources correctly.
Ability to apply appropriate methods of water treatment.	The learner applies all appropriate methods of water treatment correctly and systematically.	The learner applies all appropriate methods of water treatment correctly.	The learner applies most of the appropriate methods of water treatment correctly.	The learner applies a few appropriate methods of water treatment correctly.

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 Floating and Sinking** (14 lessons) • Floating and sinking. • Factors that affect floating and sinking of objects in water (*shape, weight and size*). • Applications of floating and sinking.	By the end of the sub-strand the learner should be able to: a) classify objects as floating or sinking in water, b) identify factors that affect floating and sinking of objects in water, c) explain applications of floating and sinking in day-to-day life, d) appreciate the use of floaters as life savers.	The learner is guided to: • carry out activities using different objects to demonstrate floating and sinking in water *(use dry wood, stone, metals, plastic, cork, buoy & feathers),* • carry out activities to classify objects into those that float and those that sink in water, • carry out activities to show how shape, weight and size affect floating and sinking of objects in water (*normal bottle tops, crushed bottle tops, same quantity of plasticine in different shapes, containers of same size and weight; one filled with sand and the other one feathers or cotton wool,* • discuss with peers the applications of floating and sinking in day-to-day life *(swimming, diving, use of lifesavers, water transport, floods, drowning, surfing),* • use digital or print media to search for: effects of flooding and the use of floaters as life savers. **Project**: Learners to make lifesaving floaters from locally available materials.	1. Why do some materials float and others sink? 2. How are floaters useful in day-to-day life?

Core Competencies to be developed: Communication and Collaboration: The learner acquires spirit of teamwork while carrying out activities to observe and classify objects into those that float and those that sink in water. Critical thinking and problem solving: The learner explores a variety of locally available materials that can be used to make lifesaving floaters as they
Values: Integrity: The learner gives honest observations and records real results while carrying out activities to classify objects into those that float or sink in water. Responsibility: The learner plays different roles as they carry out activities to make lifesaving floaters from locally available materials.
Pertinent and Contemporary Issues (PCIs): Disaster Risk Reduction: The learner learns how to contribute in water lifesaving strategies as they carry out activities to make lifesaving floaters from locally available materials.
Link to Other Learning Areas: Agriculture and Nutrition**:** The learner relates the concept of floating and sinking to fish farming and irrigation in Agriculture and Nutrition.

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Force and Energy	**3.2 Sound Energy** (14 lessons) • Sources of sound *(vibrating air, vibrating strings, vibrating drums)*. • Movement of sound in nature. • Effects of loud sound. • Role of sound in day-to-day life.	By the end of the sub-strand, the learner should be able to: a) identify sources of sound in nature, b) demonstrate the movement of sound in nature, c) describe effects of loud sound in day-to-day life, d) appreciate the role of sound in day-to-day life.	The learner is guided to: • carry out activities to identify sources of sound, • carry out an activity to demonstrate that sound travels in all directions from a source *(listening to a loud sound from a common speaker from different directions and around corners),* • carry out an activity to demonstrate reflection of sound; echo *(use of two tubes placed alongside a wall, a cliff, a large hall, a forest, a valley, between tall buildings),* • discuss with peers the effects of loud sound in the environment, • use digital or print media to search for the effects of loud sound in day-to-day life, • discuss the role of the government in addressing sound pollution.	1. How is sound produced? 2. What are the effects of loud sound?

			Project 1: Learners to make a sound-producing instrument from locally available materials *(for example: bell, drum, guitar, wind instruments, etc.).* **Project 2**: Create a sound game using Scratch	
Core Competencies to be developed: Creativity and Imagination: The learner experiments different ways of making sound-producing instruments using locally available materials. Digital literacy: The learner acquires digital manipulative skills as they use appropriate digital technology to create and add sound effects using the "Sound" blocks in Scratch.				
Values: Responsibility: The learner learns how to minimise the effects of loud sound in the environment as they discuss with peers the effects of loud sound in the environment.				
Pertinent and Contemporary Issues (PCIs): Citizenship: The learner acquires awareness on human rights and responsibilities as they discuss the role of the government in addressing sound pollution. Socio-Economic Issues: The learner creates awareness on sound pollution as they discuss with peers the effects of loud sound in the environment.				
Link to Other Learning Area: Creative Arts**:** The learner relates the concept of sources of sound to making musical instruments.				

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Force and Energy	**3.3 Heat transfer** (12 lessons) • Modes of heat transfer in nature (*conduction, convection* and radiation). • Classification of conductors of heat into good or poor conductors. • Uses of heat transfer in day-to-day life. • Safety precautions when handling heat.	By the end of the sub-strand the learner should be able to: a) demonstrate the modes of heat transfer in nature, b) classify conductors of heat into good or poor conductors, c) explain the uses of heat transfer in day-to-day life, d) acknowledge safety precautions when handling heat.	The learner is guided to: • brainstorm on the meanings of the terms *conduction, convection and radiation* as used in heat transfer, • perform experiments to demonstrate the modes of heat transfer, • carry out experiments to identify good and poor conductors of heat, • discuss with peers applications of heat transfer in day-to-day life *(cooking, melting, freezing, maintaining body temperature, insulation),* • use digital or print media to search for applications of heat transfer in day-to-day life, • discuss with peers safety precautions when handling heat, • discuss with peers various ways of responding to fire emergencies.	How is heat transferred through materials in nature?

			Project 1: Learners to make oven gloves using locally available materials. **Project 2**: Learners to make a fireless cooker.	
Core competencies to be developed: Self-efficacy**:** The learner displays self-confidence as they perform experiments to demonstrate the modes of heat transfer.				
Values: Social justice: The learner practices sharing of resources equitably as they perform experiments to identify good and poor conductors of heat.				
Pertinent and Contemporary Issues (PCIs): Social-Economic Issues: The learner exercises fire emergency response measures as they discuss various ways of responding to fire emergencies.				
Link to Other Learning areas: Agriculture and Nutrition: The learner links the concept of heat transfer in choosing of appropriate material for knitting the oven gloves.				

Suggested Assessment Rubric

Level / Indicator	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Ability to classify objects as floating or sinking in water.	The learner classifies all objects as floating or sinking in water correctly and consistently.	The learner classifies all objects as floating or sinking in water correctly.	The learner classifies most objects as floating and sinking in water correctly.	The classifies a few objects as floating and sinking in water correctly.
Ability to explain applications of floating and sinking	The learner explains all applications of floating and sinking correctly and comprehensively.	The learner explains all applications of floating and sinking correctly.	The learner explains most applications of floating and sinking correctly.	The learner explains a few applications of floating and sinking correctly.
Ability to identify sources of sound in nature.	The learner identifies all sources of sound correctly, giving examples from the locality.	The learner all identifies sources of sound correctly.	The learner identifies most sources of sound correctly.	The learner identifies a few sources of sound correctly.
Ability to describe effects of loud sound in day-to-day life.	The learner describes effects of loud sound correctly and comprehensively.	The learner describes effects of loud sound correctly.	The learner describes most effects of loud sound partially.	The learner describes effects of loud sound, with prompt.
Ability to demonstrate the modes of heat transfer in nature.	The learner demonstrates the three modes of heat transfer correctly and innovatively.	The learner demonstrates the three modes of heat transfer correctly.	The learner demonstrates two of the modes of heat transfer correctly.	The learner to demonstrates one of the modes of heat correctly

APPENDIX I: CSL at Upper Primary (Grade 4-6)

At this level, the goal of the CSL activity is to provide linkages between concepts learnt in the various learning activities and the real-life experiences. Learners begin to make connections between what they learn and the relevance to their daily life. CSL is hosted in the Social Studies learning area. The implementation is a collaborative effort where the class teacher coordinates and works with other subject teachers to design and implement the integrated CSL activity. Though they are teacher-guided, the learners should progressively be given more autonomy to identify problems and come up with solutions. The safety of the learners should also be taken into account when selecting the CSL activity. The following steps for the integrated CSL activity should be staggered across the school terms:

Steps in carrying out the integrated CSL activity
1) Preparation ● Map out the targeted core competencies, values and specific learning areas skills for the CSL activity ● Identify resources required for the activity (locally available materials) ● Stagger the activities across the term (set dates and time for the activities) ● Communicate to learners, parents/caregivers/guardians, school administration, teachers and other relevant stakeholders in the school community ● Identify and develop assessment tools

2) **Implementation of the CSL Activity:**

- Assign roles to learners.
- Ensure every learner actively participates in the activity
- Observe learners as they carry out the CSL activity and record feedback**.**
- Use an appropriate assessment tool to assess both the process and the product (assess learner's work from the beginning to the end product)
- Assess the targeted core competencies, values and subject skills.

3) Reflection on the CSL Activity

Conduct a self-evaluation session with learners on the integrated CSL activity undertaken by discussing the following:

- what went well and why
- what did not go well and why
- what can be done differently next time
- what they have learnt.

There will be **one** integrated CSL activity that will be conducted **annually.** The thematic areas for the integrated CSL activity will be derived from the broader categories of the PCIs and concepts from the various learning areas. Teachers are expected to vary the themes yearly to allow learners to address different PCIs within their contexts. There should be a linkage between the skills from the learning areas and the themes.

The integrated CSL activity will take a Whole School Approach (WSA) where the entire school community is involved (learners, parents/caregivers/guardians, school administration, teachers). Parents/caregivers/guardians are key stakeholders in the

planning and execution of the CSL activity. Although the teacher takes the lead role in the planning and integration of the CSL activity, learners will be expected to participate actively in the whole process.

The CSL activity provides an opportunity for the development of core competencies and the nurturing of various values. The teacher is expected to vary the core competencies and values emphasised in the activity yearly.

Assessment of the CSL Activity

Assessment of the integrated CSL activity will focus on 3 components namely: skills from various learning areas applied in carrying out the activity, and core competencies and values demonstrated. Assessment should focus on both the process and end product of the CSL activity. The teacher will assess learners in groups using various tools such as an observation schedule, checklist or rating scale or any other appropriate tool.

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 the 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 participatie in exchange programmes. ● Make oral presentations and demonstrations on science issues.