REPUBLIC OF KENYA
MINISTRY OF EDUCATION

PRIMARY SCHOOL CURRICULUM DESIGN

SCIENCE AND TECHNOLOGY
FOR LEARNERS WITH PHYSICAL IMPAIRMENT

GRADE 5

KENYA INSTITUTE OF CURRICULUM DEVELOPMENT
A Skilled and Ethical Society

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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, 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 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, feedback from curriculum implementers and other stakeholders led to rationalisation and review of the basic education curriculum.

The reviewed Grade Five Curriculum designs for learners with Physical Impairment build on competencies attained by learners at Grade Four. Emphasis at this grade is the development of basic literacy, numeracy and skills for interaction with the environment.

The curriculum designs present 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, key inquiry questions, core competencies, Pertinent and Contemporary Issues (PCIs), values, and 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.

HON. EZEKIEL OMBAKI MACHOGU, CBS
CABINET SECRETARY,
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PREFACE

The Ministry of Education (MoE) nationally implemented Competency Based Curriculum (CBC) in 2019. Grade One is the first grade of Primary education level while Grade Six is the final grade of the level in the reformed education structure.

The reviewed Grade Five Curriculum furthers implementation of the CBC from Grade Four in Primary level. The curriculum provides opportunities for learners to focus in a field of their choice to form a foundation for further education and training and/or gain employable skills. This is very 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 nurturing every learner's potential.

Therefore, the Grade Five Curriculum designs for learners with Physical Impairment are intended to enhance the learners' development in 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 designs will guide teachers to effectively facilitate learners to attain the expected learning outcomes for Grade Five and prepare them for smooth transition to Grade Six. Furthermore, it is my hope that teachers will use the adapted 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, review and 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, that responds to the demands of the 21st Century and the aspirations captured in the Constitution of Kenya 2010, the Kenya Vision 2030, East African Community Protocol, International Bureau of Education Guidelines and the United Nations Sustainable Development Goals (SDGs).

KICD receives its funding from the Government of Kenya to facilitate successful achievement of the 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 Five curriculum designs for learners with Physical Impairment were developed and adapted 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 for the support of the Government of Kenya, through the MoE and the development partners for policy, resource and logistical support. Specifically, special thanks to the Cabinet Secretary-MoE and the Principal Secretary – State Department of Basic Education,

I also wish to acknowledge the KICD curriculum developers and other staff, all teachers, educators who took part as panellists; the Semi-Autonomous Government Agencies (SAGAs) and representatives of various stakeholders for their roles in the development and adaptation of the Grade Five Curriculum designs for learners with Physical Impairment. In relation to this, I acknowledge the support of the Chief Executive Officers of the Teachers Service Commission (TSC) and the Kenya National Examinations Council (KNEC) for their support in the process of developing and adapting these designs. Finally, I am very grateful to the KICD Council Chairperson and other members of the Council for very consistent guidance in the process.

I assure all teachers, parents and other stakeholders that this curriculum design will effectively guide the implementation of the CBC at Grade Five and preparation of learners with Physical Impairment for transition to Grade Six.

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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 and Nutrition	4
7.	Social Studies	3
8.	Creative Arts	6
	Pastoral/Religious Instruction Programme	1
Total		**35**

LEVEL LEARNING OUTCOMES

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

a) Communicate appropriately using verbal and or non-verbal modes in a variety of contexts.
b) Apply acquired knowledge, skills, values and attitudes in everyday life.
c) Demonstrate social skills, moral and religious values for positive contribution to society.
d) Exploit one's talents for individual development and self-fulfilment.
e) Explore, manipulate, manage and conserve the environment for learning and sustainable development.
f) Use digital literacy skills for learning and enjoyment.
g) Value Kenya's rich and diverse cultural heritage for harmonious living.
h) Appreciate the need for, and importance of interdependence of people and nations.

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.

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.

GENERAL LEARNING OUTCOMES

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

1) Interact with the environment for learning and sustainable development.
2) Apply digital literacy skills appropriately for communication, learning and enjoyment.
3) Appreciate the contribution of science and technology in the provision of innovative solutions.
4) Use scientific knowledge to observe and explain the natural world.
5) Make functional discoveries that impact individuals and the wider society.
6) 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
1.0 Living things and their Environment	**1.1 Classification of plants** (14 lessons) • Classification of plants *(flowering and non-flowering plants)* • Parts and function 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: ● Collaboratively use print and non-print materials to do a library search for images of flowering and non-flowering plants and share. Adjust light/ glare on the screens of the digital devices appropriately for learners who are sensitive to light. Preferentially seat the learners while using digital/adapted digital devices according to their individual needs. Learners who may not turn pages use	How are plants classified?

			page turners for print media. ● Take a walk in their locality to observe, identify and categorise plants into flowering and non-flowering. Learners with mobility difficulties could be given physical support by peers, learner support assistant or teacher as they take a walk. ● Draw/ trace a flower and label parts. Learners could use adapted writing materials or draw on appropriate digital devices. ● Collaboratively discuss functions of parts of a flower and share with	

			peers. Learners with speech difficulties could use alternative modes of communication during discussion. • Discuss the importance of flowers in nature with peers. • Use digital applications to draw, paint and label flowers. Learners could use adapted writing materials or draw on appropriate digital devices. ***Note:*** *Learners are guided on precautions to take when handling plants as they study flowering and non-flowering plants.*	

Core competencies to be developed: • Self-efficacy: The learner effectively discusses functions of parts of a flower with peers. • Digital literacy**:** The learner uses digital applications to draw, paint and label flowers.
Values: Unity: The learner appreciates the effort of others while observing, identifying and classifying plants into flowering and non-flowering.
Pertinent and Contemporary Issues (PCIs): Environmental Conservation**:** The learner conserves the environment when 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**
1.0 Living things and their Environment	**1.2 Vertebrates** (16 lessons) • General characteristics of vertebrates • Groups of vertebrates*: (mammals, birds, reptiles, fish and amphibians;*	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: • Do a library search for information from print and non-print material on the general characteristics of vertebrates and share with peers. Adjust light/ glare on the screens of	Which are the key features of vertebrates?

	structural features only)		the digital devices appropriately for learners who are sensitive to light. Preferentially seat the learners while using digital/adapted digital devices according to their individual needs. • Explore the school compound and adjacent environment to observe and identify characteristics of vertebrates. Learners with mobility difficulties could be given physical support by peers, learner support assistant or teacher as they explore.	

			• Use print and non-print material to do a library search for information on characteristics of different groups of vertebrates, study their main characteristics, discuss and share. Learners with speech difficulties could use alternative modes of communication. They could use adapted writing materials or type on appropriate digital devices to summarise. Learners who may not turn pages to use page turners for print media. **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.	

Core competencies to be developed:

- Communication and collaboration: The learner contributes to discussions on main characteristics of vertebrates.
- Creativity and Imagination: The learner 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 takes necessary precautions while handling animals.
- Animal welfare**:** The learner takes care of animals they use in study.

Link to other learning areas:

- Agriculture and Nutrition: The information on characteristics of animals as living things is linked to the study of livestock in Agriculture and Nutrition.
- Creative Arts: Making of a portfolio of different categories of vertebrates is linked designing in Creative Arts

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Questions
1.0 Living Things and their Environment	**1.3 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) outline 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. Learners who may not turn pages use page turners for print media. ● Draw/trace the human breathing system and label the main parts. They could use adapted writing materials or draw on appropriate digital devices. ● Do a library search for information on the functions of main parts of the human breathing system and share with peers. Adjust light/ glare on the screens of the digital devices appropriately for learners who are sensitive to light. Preferentially seat the learners while using	1. How does the human breathing system function? 2. How does one ensure a healthy breathing system?

			digital/adapted digital devices according to their individual needs. ● Collaboratively discuss symptoms and prevention of common conditions and diseases that affect the human breathing system and share, ● Use simulation software, online interactive platforms or digital images to illustrate major parts of the human breathing system. Adjust light/ glare on the screens of the digital devices appropriately for learners who are sensitive to light. Preferentially seat the learners while using digital/adapted digital devices according to their individual needs. **Project:** Learners are guided to collaboratively make models of the human breathing system using locally available materials in purposive groups.	

Core competencies to be developed: • Creativity and Imagination: The learner designs different ways of modelling the human breathing system using locally available material. • Digital literacy: The learner uses simulation software, online interactive platforms or digital images to illustrate major parts of the human breathing system.
Values: • Love: The learner portrays a caring attitude while taking care of the 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 discusses 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 parts of a flower correctly and comprehensively.	The learner describes functions of parts of a flower correctly.	The learner describes functions of most parts of a flower correctly.	The learner describes functions of a few parts of a flower correctly.
Ability to classify vertebrates into their main groups.	The learner classifies vertebrates into their main groups correctly	The learner classifies vertebrates into	The learner classifies most vertebrates into their main groups correctly.	The learner classifies a few vertebrates into their

	and consistently.	their main groups correctly.		main groups.
Ability to describe the functions of main parts of the human breathing system.	The learner describes the functions of 5 parts of the human breathing system correctly and comprehensively.	The learner describes the functions of 5 parts of the human breathing system correctly.	The learner describes the functions of 4-3 parts of the human breathing system correctly.	The learner describes the functions of 2-1 parts of the human breathing system correctly.
Ability to outline the symptoms and prevention measures for common conditions and diseases of the breathing system.	The learner outlines the symptoms and prevention measures for common conditions and diseases of the breathing system correctly and exhaustively.	The learner outlines the symptoms and prevention measures for common conditions and diseases of the breathing system correctly.	The learner outlines the symptoms or prevention measures for most common conditions or diseases of the breathing system correctly.	The learner outlines the symptoms or prevention measures for a few common conditions and diseases of the breathing system.

STRAND 2.0: MIXTURES

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question
2.0 Matter	**2.1 Mixtures** (14 Lessons) • Meaning of mixtures • Types of mixtures *(heterogeneous and homogeneous) examples of (solid-solid, solid-liquid and liquid - liquid)* Separating heterogeneous mixtures *(Winnowing, picking, sieving, using magnet, Filtering, decanting,*	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 and take notes on the meaning of a mixture, give examples at home and school. Learners with speech difficulties could use alternative modes of communication. They could use adapted writing materials or type on appropriate digital devices to take notes. • Categorise mixtures as homogeneous (uniform) and heterogeneous (non-uniform), • Carry out activities to separate heterogeneous mixtures in purposive groups. Learners with manipulation difficulties could use alternative functional parts of the body,	How are mixtures categorised?

	separating funnel)		given physical support by peers to carry out the activity. Adapted working surfaces should be provided. Extra time could be allowed for learners to complete the task.	

Core competencies to be developed:

- Communication and collaboration: The learner contributes to team decision making as they separate mixtures using appropriate methods.
- Learning to learn: The learner reflects on 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 work when separating mixtures.

Pertinent and Contemporary Issues (PCIs):

Social-economic issues (financial literacy): The learner appreciates applications of separating mixtures in day to day life as a process of value addition.

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.	The learner is guided to: • Brainstorm on water pollutants in water sources and take notes. Learners with speech difficulties could use alternative modes of communication. They could use adapted writing materials or type on appropriate digital devices to take notes. • Discuss the effects of water pollution in day to day life and write/type summary. • Discuss different methods of reducing water pollution, • Observe safety measures when working in a water polluted environment *(example: practice use of gumboots and gloves),* • Carry out activities to demonstrate methods of water treatment. Learners with manipulation difficulties could use alternative functional parts of the body, given physical	Why is it important to treat water?

			support by peers to carry out the activity. Adapted working surfaces should be provided. Extra time could be allowed for learners to complete the task. • Use visual aids or digital/adapted digital devices to identify water pollutants and their effects in day to day life. Adjust light/ glare on the screens of the digital devices appropriately for learners who are sensitive to light. Preferentially seat the learners while viewing charts or using digital/adapted digital devices according to their individual needs. **Project:** Learners to make functional water filters using locally available materials.	
Core competencies to be developed: Creativity and imagination: The learner comes up with new ideas in making functional water filters using locally available materials.				

Values: • Responsibility: The learner observes safety precautions when working in a water polluted environment. • Peace: The learner shows care by not hurting others while practising methods of water treatment.
Pertinent and Contemporary Issues (PCIs): Health Issues (preventive health): The learner carries 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 is 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 carry out appropriate methods of separating heterogeneous mixtures.	The learner carries out 5 appropriate methods of separating heterogeneous mixtures correctly and comprehensively.	The learner carries out 5 appropriate methods of separating heterogeneous mixtures correctly.	The learner carries out 4-3 appropriate methods to separate heterogeneous mixtures correctly.	The learner carries out 2-1 appropriate method of separating heterogeneous mixtures correctly.
Ability to outline methods of reducing water pollution in the water sources.	The learner outlines 4 methods of reducing water pollution in the water sources correctly and comprehensively.	The learner outlines 4 methods of reducing water pollution in the water sources correctly.	The learner outlines 3 methods of reducing water pollution in the water sources correctly.	The learner outlines 2-1 methods of reducing water pollution in the water sources 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 and 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: ● Use different objects to demonstrate floating and sinking in water *(use dry wood, stone, metals, plastic, cork, buoy & feathers),* Adapted working surfaces should be provided. ● Carry out activities to classify objects in the environment into those that float and those that sink in water. Learners with manipulation difficulties could use alternative functional parts of the body, given physical support by peers to carry out the activity. Adapted working surfaces should be provided. Extra time could be allowed for learners to complete the task. ● Carry out activities to verify how shape, weight and size affect floating and sinking of objects in water (*normal bottle tops,*	1. Why do some materials float and others sink? 2. How are floaters useful in day to day life?

			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 the applications of floating and sinking in day to day life *(swimming, diving, use of lifesavers, water transport, floods, drowning, surfing).* Learners with speech difficulties could use Alternative modes of Communication. ● Use digital/adapted digital or print media to search for: ○ Effects of flooding and mitigation measures, ○ The use of floaters as life savers. Adjust light/ glare on the screens of the digital devices appropriately for learners who are sensitive to light. Preferentially seat the learners while doing search using digital/adapted digital devices according to their individual needs.	

			Project: Learners make lifesavers from floaters made of locally available materials such as rubber tubes, wood or plastics.	

Core competencies to be developed:

- Communication and Collaboration: The learner exercises teamwork while carrying out activities to observe and classify objects in the environment 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 lifesavers.

Values:

- Integrity: The learner gives honest observations and records real results while carrying out activities to classify objects in the environment into those that float or sink in water.
- Responsibility**:** The learner shows resilience in accomplishing tasks in making lifesavers made from locally available materials such as rubber tubes, wood or plastics.

Pertinent and Contemporary Issues (PCIs):

Disaster Risk Reduction**:** The learner crafts ways of mitigating the negative effects of flooding as they use digital or print media to search for effects of flooding and the use of floaters as life savers.

Link to other Learning Areas:

Agriculture and Nutrition**:** The learner relates the concept of floating and sinking to fish farming and irrigation.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Questions
3.0 Force and Energy	**3.2 Sound Energy** (14 lessons) • Sources of sound • 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 and take notes. *(vibrating air, vibrating strings, vibrating drums)*. Learners with manipulation difficulties could use alternative functional parts of the body, given physical support by peers to carry out the activity. Adapted working surfaces should be provided. Extra time could be allowed for learners to complete the task. ● 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*	1. How is sound produced? 2. How does loud sound affect the environment?

			hall, a forest, a valley, between tall buildings). • Discuss the effects of loud sound in the environment with peers and do a presentation. Learners with speech difficulties could use Alternative modes of Communication. They could use adapted writing materials or type on appropriate digital devices to summarise. ● Use digital/adapted digital or print media to do a library search for the effects of loud sound in day to day life. Adjust light/ glare on the screens of the digital devices appropriately for learners who are sensitive to light. Preferentially seat the learners while searching using digital/adapted digital devices according to their individual needs. ● Discuss the role of the government in addressing sound pollution and present for	

			peers. ● **PROJECT 1**: In purposive groups, learners to make a sound producing instrument from locally available materials *(for example: bell, drum, guitar, wind instruments, etc).* ● **PROJECT 2**: In purposive groups 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 uses appropriate digital technology to create and add sound effects using the "Sound" blocks in Scratch.				
Values: Responsibility: The learner practises how to minimise 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 subjects: Creative Arts**:** The learner relates the concept of sound energy to music.				

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 • 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 and take notes. Learners with speech difficulties could use Alternative modes of Communication. They could use adapted writing materials or type on appropriate digital devices to take notes. ● Perform experiments to demonstrate the modes of heat transfer *(conduction, convection and radiation).* Learners with manipulation difficulties could use alternative functional parts of the body, given physical support by peers to carry out the activity. Adapted working surfaces should be provided.	How is heat transferred through materials in nature?

			Extra time could be allowed for learners to complete the task. ● Carry out experiments to identify good and poor conductors of heat. Learners with manipulation difficulties could use alternative functional parts of the body, given physical support by peers to carry out the activity. Adapted working surfaces should be provided. Extra time could be allowed for learners to complete the task. ● Discuss applications of heat transfer in day to day life *(cooking, melting, freezing, maintaining body temperature, insulation).* ● Use digital/adapted digital devices or print media to do a library search for applications of heat transfer in day to day life. ● Discuss Safety precautions when handling heat.	

			• Discuss various ways of responding to fire emergencies. **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 shares 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 objects as floating or sinking in water correctly and consistently.	The learner classifies objects as floating or sinking in water correctly.	The learner classifies most objects as floating or sinking in water correctly.	The learner classifies a few objects as floating or sinking in water correctly.
Ability to explain applications of floating and sinking.	The learner explains applications of floating and sinking correctly and comprehensively.	The learner explains 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 sources of sound correctly and consistently.	The learner 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 correctly.	The learner describes a few effects of loud sound correctly.
Ability to demonstrate the modes of heat transfer in nature.	The learner demonstrates the 3 modes of heat transfer innovatively.	The learner demonstrates the 3 modes of heat transfer correctly.	The learner demonstrates 2 modes of heat transfer correctly.	The learner demonstrates 1 mode of heat transfer 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 of the CSL activity 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 CSL Activity** ● Assigning 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 Pertinent and Contemporary Issues (PCIs): and concepts from the various Learning Areas. Teachers are expected to vary the themes yearly to allow learners to address different Pertinent and Contemporary Issues (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 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

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 Questions ● Learner's Profile ● Written Tests ● Anecdotal Records	● Laboratory Apparatus and Equipment ● Textbooks ● Speech to text and text to speech software ● Relevant reading materials ● Digital/ adapted digital Devices ● Recordings	● Visit the science historical sites. ● Use digital devices to conduct scientific research. ● Organizing 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 ● Organizing and participating in exchange programmes. ● Making oral presentations and demonstrations on science issues.

NOTE: Assessment methods may be modified to accommodate a learner's diverse needs so that he/she can participate and achieve the learning outcomes. The table below shows how modes of assessment may be adapted for learners with physical impairment:

S/No	Assessment Methods/Modes And Suggested Adaptations	
	Methods	**Suggested Adaptations**
1.	Written assessment	• Typing, stamping or signing • Description of the task as a scribe or learner support assistant writes Audio visual recording of the learner as he/she makes oral responses • Provision of Adapted digital devices and writing/drawing resources • Adjustment of time according to individual needs • Providing illustrations to be interpreted for activities that involve drawing • Use of worksheets
2.	Oral or Aural assessment	• Written responses • Use of AAC (*Augmentative and Alternative modes of Communication) e.g. talking books, gestures, body movement, sign language, alphabet cards, facial expressions* • Adjustment of time according to individual needs
3.	Portfolio	• Use of E-Portfolio • Provision of physical support • Use of assistive technology • Provision of Adapted digital devices and writing/drawing resources • Adjustment of time according to individual needs • Description of how to carry out a practical activity while being audio/video recorded

4.	Practical assessment/ Experiments	• Provision of physical support • Provision of Adapted resources (learner specific) • Description of how to carry out a practical activity while being audio/video recorded • Adjustment of time according to individual needs • Rest intervals according to individual needs • Environmental adaptation
5.	Project	• Provision of physical support • Provision of Adapted resources (learner specific) • Description of how to carry out a practical activity while being audio/video recorded • Adjustment of time according to individual needs • Environmental adaptation

Note: Safety of all learners should be observed during assessment