REPUBLIC OF KENYA

MINISTRY OF EDUCATION

UPPER PRIMARY CURRICULUM DESIGN

SCIENCE AND TECHNOLOGY

GRADE 4

FOR LEARNERS WITH VISUAL IMPAIRMENT

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 Four Curriculum designs for learners with visual impairment build on competencies attained by learners at Grade Three.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,

MINISTRY OF EDUCATION

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 Four Curriculum furthers implementation of the CBC from Grade Three 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 Four Curriculum designs for learners with visual 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 Four and prepare them for smooth transition to Grade Five. 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 and review (*SNE adapt*) curricula and curriculum support materials for basic and tertiary education and training. The curriculum development process for any level of education involves thorough research, international benchmarking and robust stakeholder engagement. Through a systematic and consultative process, the KICD conceptualised the Competency Based Curriculum (CBC) as captured in the Basic Education Curriculum Framework (BECF) 2017, 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 Four curriculum designs for learners with visual 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 panelists, the Semi-Autonomous Government Agencies (SAGAs) and representatives of various stakeholders for their roles in the development and adaptation of the Grade Four curriculum designs for learners with visual 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 Four and preparation of learners with visual impairment for transition to Grade Five.

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DIRECTOR/CHIEF EXECUTIVE OFFICER

KENYA INSTITUTE OF CURRICULUM DEVELOPMENT

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NATIONAL GOALS OF EDUCATION

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

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

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

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

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

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

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

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

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

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

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

LESSON ALLOCATION FOR UPPER PRIMARY

S/ No.	Learning Area	No. of Lessons
1.	English for Learners with Visual Impairment	5
2.	Kiswahili for Learners with Visual Impairment	4
3.	Mathematics for Learners with Visual Impairment	5
4.	Religious Education	3
5.	Science & Technology for Learners with Visual Impairment	4
6.	Agriculture & Nutrition for Learners with Visual Impairment	4
7.	Social Studies for Learners with Visual Impairment	3
8.	Creative Arts for Learners with Visual Impairment	6
9.	Pastoral/ Religious Instruction Programme	1
	Total	**35**

NOTE: Braille skills for learners with blindness to be implemented as Non-formal (Co-Curricular) Programmes.

GENERAL LEARNING OUTCOMES FOR PRIMARY EDUCATION

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-fulfillment
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 nonliving 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 visual impairment with pre-requisite skills, which are required in Integrated Science and Pre-technical studies at the Junior School level. These enable learners with visual impairment to prepare for Science, Technology, Engineering and Mathematics (STEM) in subsequent levels of the education cycle. Inquiry based learning (IBL), Project based learning (PBL), Problem based learning (PBL) and Social Scientific Issue learning (SSI) approaches will be employed throughout the learning experiences in this area as advocated for by John Dewey's social constructivist theory, which emphasises that learner with visual impairment, 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 with visual impairment, 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. Plants	12
	1.2. Animals	12
	1.3. Human digestive system	16
2.0 Matter	2.1. Properties of matter	14
	2.2. Management of solid waste	16
	2.3. Water conservation	12
3.0 Force and Energy	3.1. Force and its effects	12
	3.2. Light	14
	3.3 Heat	12
Total Number of Lessons		120

NOTE:

The suggested number of lessons per Sub Strand may be less or more depending on the context.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question (s)
1.0 Living things and their Environment	**1.1 Plants** (12 lessons) ● *Characteristics of plants as living things* ● *Functions of external parts of plants*	By the end of the sub strand, the learner should be able to: a) identify characteristics of plants as living things, b) describe functions of external parts of plants, c) appreciate the need to care for plants.	● Learners are guided to search for information from print, non-print or braille materials on characteristics of plants as living things and discuss with peers. ● In pairs, learners are guided to take a walk in the school compound and adjacent environment to observe, discuss and record evidence that plants: grow, reproduce, remove waste, respond to changes in their environment and die. Learners with blindness are guided to manipulate various plants to identify their characteristics. Learners with blindness are given verbal description of observable characteristics of plants in the environment. Hint:*(observes safety while handling different types of plants)* ● Learners with low vision observe young plants or seedlings, draw and label their parts and share with peers. Learners with blindness are guided to manipulate a young	Why are plants grouped as living things?

			plant, mount and label the parts of the plants. *(roots, stems and leaves)* ● In groups, learners discuss the functions of external parts of plants and share with peers. ● Learners with low vision are guided to use digital applications to draw, paint and label external parts of a plant. Learners with blindness are guided to model external parts of a plant.	

Core competencies to be developed:

- **Communication and Collaboration:** The learner recognises the value of others as they collaboratively take a walk in the school compound and adjacent environment to observe, manipulate, discuss and record characteristics of plants as living things.
- **Digital literacy:** The learner uses digital applications using digital devices with assistive technology to draw, paint and label external parts of a plant.

Values:

- **Unity:** The learner cooperates with others while taking a walk in the school compound and adjacent environment to observe, discuss and record evidence that plants.
- **Respect:** The learner listens to and appreciates others' opinion during discussions on the characteristics of plants.

Pertinent and Contemporary Issues (PCIs):

Safety and Security: The learner observes safety while handling different types of plants (poisonous and non-poisonous) as they take a walk in the school compound and adjacent environment to observe, discuss and record characteristics of plants as living things.

Link to other Learning areas: **Agriculture and Nutrition**: The learner uses information on characteristics of plants as living things in the study of different types of crops.
Suggested learning resources Digital devices with assistive technology such as adapted keyboards, screen readers and screen magnifier, Young plants, Braille materials and equipment, Glue, Manilla papers or cardboard, Print materials in appropriate font size and colour contrast.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question (s)
1.0 Living things and their Environment	**1.2 Animals** (12 lessons) ● *Characteristics of animals as living things* ● *Vertebrates and invertebrates*	By the end of the sub strand, the learner should be able to: a) identify the characteristics of animals as living things, b) distinguish vertebrates from invertebrates in the environment, c) appreciate the need to care for animals.	● In pairs, learners take a walk in the school compound and adjacent environment to observe, discuss and record evidence that animals: feed, grow, breathe, reproduce, remove waste, move, respond to changes in their environment and die. Learners with blindness are guided to manipulate harmless animals or their respective model to identify their characteristics. The learners are guided to feed a young one of an animal ● Learners are guided to search for information from print, braille or non-print materials on characteristics of animals as living things and discuss the findings with peers. ● Learners are guided to search for information from print, non-print or braille materials on main differences between vertebrates and invertebrates and share with peers. ● Learners are guided to identify vertebrates and invertebrates in their locality. Learners with blindness to manipulate models of different	Why are animals grouped as living things?

			vertebrates and invertebrates. The learners are given verbal descriptions on the differences between vertebrate and invertebrates. **Note:** *Learners to observe safety precautions and take care of animals during the learning activities.* **Project:** Learners make a portfolio of vertebrates and invertebrates. Learners with blindness are given one on one orientation on how to take pictures. Learners to take pictures of different vertebrate and invertebrates.	
Core competencies to be developed: ● **Communication and collaboration:** The learner contributes to group decision making by participating actively as they discuss characteristics of animals as living things. ● **Creativity and Imagination**: The learner discovers new ways of doing things as they design and develop a portfolio of vertebrates and invertebrates.				
Values: • **Responsibility:** The learner takes care of the environment as they take a walk in the school compound and adjacent environment to observe characteristics of animals. • **Respect:** The learner appreciates divergent ideas from peers as they discuss the main differences between vertebrates and invertebrates.				
Pertinent and Contemporary Issues (PCIs): ● **Animal welfare:** The learner takes care of animals during the learning activities. ● **Safety and security:** The learner observes safety when handling animals.				

Link to other learning areas: **Agriculture and Nutrition:** The learner uses the information on characteristics of animals as living things in the study of livestock.
Suggested Learning Resources: Models of different vertebrates and invertebrates, Braille materials and equipment, Young one of an animal, Camera, Print materials in appropriate font and colour contrast.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question (s)
1.0 Living things and their Environment	**1.3 Human digestive system** (16 lessons) ● *Parts of the human digestive system* (*mouth, gullet, stomach, small intestines, large intestines, rectum, anus)* ● *Healthy digestive system (dental hygiene, deworming, healthy eating)* ● *Symptoms of unhealthy digestive system, (stomach ache/pain, bloating, worms, diarrhoea, vomiting, constipation)*	By the end of the sub strand, the learner should be able to: a) identify parts of the human digestive system, b) develop a plan of maintaining a healthy human digestive system, c) appreciate the importance of a healthy human digestive system.	● Learners with low vision are guided to use chart in appropriate font and colour contrast or digital devices with assistive technology to identify parts of the human digestive system. Learners with blindness are guided to manipulate tactile charts or models of human digestive system to identify its parts. ● Learners with low vision are guided to draw and label the human digestive system. Learners with blindness are guided to manipulate a model or tactile diagram of the human digestive system to identify its parts. ● In groups, learners discuss symptoms of an unhealthy	How is a healthy digestive system maintained?

			digestive system, record and share with peers. ● In pairs, learners are guided to discuss and develop a plan on ways of maintaining a healthy digestive system. ● Learners with low vision are guided to use interactive platforms or digital images to illustrate the human digestive system. Learners with blindness listen to audio clips on human digestive system to identify its parts.	

Core competencies to be developed:

- **Learning to learn**: The learner reflects on ways of maintaining a healthy digestive system.
- **Digital literacy:** The learner uses interactive platforms or digital images to illustrate the human digestive system.

Values:

- **Unity:** The learner collaborates with others while discussing ways of maintaining a healthy digestive system.
- **Respect:** The learner appreciates others' opinions while discussing the symptoms of an unhealthy digestive system.

Pertinent and Contemporary Issues (PCIs):

Health Promotion issues: The learner observes dental hygiene, regular deworming and healthy eating as ways of maintaining a healthy digestive system.

Link to other learning areas:

Agriculture and Nutrition: The learner studies ways of maintaining a healthy digestive system in personal hygiene and

hygienic handling of food.
Suggested Learning Resources: Charts in appropriate font and colour contrast, Models human digestive system, Tactile diagram of human digestive system, Braille materials and equipment, Digital devices with assistive technology such as adapted keyboards, screen readers and screen magnifier, Print materials in appropriate font and colour contrast.

Suggested Assessment Rubric

Level **Indicators**	**Exceeds expectations**	**Meets expectations**	**Approaches expectations**	**Below expectations**
Ability to: • Identify characteristics of plants and animals • Describe functions of external parts of a plant • Identify parts of the human digestive system • Develop a plan of maintaining a healthy human digestive system	The learner demonstrates four skills.	The learner demonstrates three skills.	The learner demonstrates two skills.	The learner demonstrates one skill or none.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question (s)
2.0 Matter	**2.1 Properties of matter** (14 lessons) ● *Meaning of matter* ● *States of matter (solid, liquid and gas)* ● *Properties of matter (shape, volume and mass)* ● *Importance of the different states of matter.*	By the end of the sub strand, the learner should be able to: a) categorise substances in the environment into the three states of matter, b) describe the properties of the three states of matter, c) appreciate the importance of the different states of matter in day to day life.	• Learners brainstorm on the meaning of matter and identify its different states. Learners with blindness are guided to manipulate solid, liquid and smell gases responsibly. • Learners are guided to collect and group different substances from the environment into the three states of matter. Learners with blindness are paired with sighted peers to give them orientation on how to group the materials they have collected from the environment. • Learners are guided to carry out activities to demonstrate the properties of the three states of matter. Learners with blindness are guided to weigh different materials, determine their shape and measure their volumes using appropriate apparatus.	Why do we study the properties of matter?

			• In groups, learners discuss the importance of the different states of matter in day-to-day life. • Learners are guided use digital devices with assistive technology, print or braille materials to search for characteristics of the three states of matter.	

Core competencies to be developed:

- **Communication and collaboration**: The learner works with peers to carry out activities that show properties of matter
- **Digital literacy:** The learner interacts with digital technology to observe the properties of the three states of matter.

Values:

- **Unity:** The learner collaborates with others when collecting different substances from the environment.

Pertinent and Contemporary Issues:

- **Heath Promotion Issues** (preventive health): The learner avoids blowing air into the same balloon with others.

Link to other learning area:

- Mathematics: The learner uses the knowledge of properties of matter to measures the volume and mass of different substances.

Suggested Learning Resources

Braille materials and equipment,
Digital devices with assistive technology such as adapted keyboards, screen readers and screen magnifiers,
Print materials in appropriate font and colour contrast,
Digital talking weighing balances,
Adapted apparatus for measuring volume.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question (s)
2.0 Matter	**2.2 Management of solid waste** (16 lessons) ● *Types of solid wastes (decomposing and non-decomposing (plastic, metals, food wrappers, kitchen waste)* ● *Dangers of solid waste to the environment* ● *Managing wastes in places (classrooms, schools, home, public functions)* ● *Methods of managing solid waste (reuse, reduce and recycle)* ● *Safety measures during solid waste management*	By the end of the sub strand the learner should be able to: a) classify solid waste into decomposable and non-decomposable, b) describe the dangers of solid waste to the environment, c) apply appropriate methods to manage solid waste in the environment,	• Learners are guided to manipulate and identify solid waste in the environment. *Hint: learners to observe safety precaution while manipulating the waste.* • In groups, learners discuss the meaning of decomposable and non-decomposable solid waste. • Learners are guided to collect solid waste in the school, sort and classify them into decomposing and non-decomposing. Learners with blindness are paired with sighted peers to guide them collect the waste. Learners with blindness are given one on one orientation on how to classify the waste. *Hint: Learners to observe safety precaution while collecting the waste.* • In pairs, learners discuss the dangers of solid waste to the environment and make presentation.	How is solid waste dangerous to the environment?

		d) appreciate the need for proper management of solid waste in the environment.	• Learners are guided to discuss methods of managing different types of waste in their environment, Hint: *Include common waste in school and environment such as kitchen, animal waste, plastics, e-waste, metals and glasses,* • Learners are guided to use proper safety measures in solid waste management such as wearing protective gears and use of appropriate tools. • Learners are guided to use digital devices with assistive technology, print or braille media to access ways of managing different types of solid waste. **Projects:** 1. Learners to make dustbins for safe disposal of waste at home and in school using locally available materials. 2. Make toys or ornaments from solid waste. Learners with blindness are supported on the aspects of projects that require use of sight such as cutting the materials and taking measurements.	
Core competencies to be developed: ● **Critical thinking and problem solving**: The learner reflects on ways of managing different types of waste in their				

environment.

- **Creativity and imagination**: The learner explores ways of making dustbins for safe disposal of waste at home and in school using locally available materials.

Values:

Responsibility: The learner uses proper safety measures in solid waste management. (wearing protective gears and use of appropriate tools)

Pertinent and Contemporary Issues (PCIs):

- **Health Promotion Issues** (preventive health): The learner discusses the dangers of solid waste to the environment and presents in class.
- **Socio-economic Issues** (environmental education): The learner discusses ways of managing different types of solid waste in their environment.

Link to other Learning area:

Creative arts: The learner uses knowledge on management of solid waste to make ornaments and dustbins.

Suggested Learning Resources

Solid wastes such as papers, plastics, glasses and food waste,
Braille materials and equipment,
Digital devices with assistive technology such as adapted keyboards, screen readers and screen magnifiers,
Print materials in appropriate font and colour contrast.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question (s)
2.0 Matter	**2.3 Water conservation** (12 Lessons) ● *Meaning of water conservation* ● *Methods of conserving water (**cover:** Simple examples of reducing water wastage, Reusing water and Recycling water* ● *Importance of water conservation*	By the end of the sub strand, the learner should be able to: a) explain the meaning of water conservation in the environment, b) describe methods of conserving water at home and school, c) outline the importance of conserving water at home and school, d) develop interest in conserving water at home and school.	• Learners brainstorm on how water is wasted at home and school. • Learners brainstorm on the meaning of water conservation. • Learners explore their locality and observe how water is conserved. Learners with blindness are guided to manipulate different materials that are used to conserve water and are given one on one orientation on how to conserve water. • In groups, learners discuss ways of conserving water such as reducing water wastage and reusing water. • Learners discuss the importance of conserving water. • Learners practise responsible use of water at home and school. **Project:** Prepare print or tactile posters to sensitise the community (school and home) on the importance of water conservation.	Why is it important to conserve water?

Core competencies to be developed:

- **Self -efficacy**: The learner practises responsible behaviour as they conserve water at home and school.
- **Citizenship**: The learner identifies water wastage as a problem affecting the society and sensitises the community on the importance of water conservation.

Values

Integrity: The learners use water appropriately at home and school.
Responsibility: The learners conserve water at home and school.

Pertinent and Contemporary Issues (PCIs):

Socio-economic Issues (financial literacy): The learner reduces cost of water by reducing water wastage.

Link to other learning area:

Agriculture and Nutrition: The learner uses knowledge of appropriate water conservation practices for drip irrigation and mulching.

Suggested Learning Resources

Braille materials and equipment,
Digital devices with assistive technology such as adapted keyboards, screen readers and screen magnifiers,
Print materials in appropriate font and colour contrast,
Plastic containers,
Tanks,
Gutters.

Suggested Assessment Rubric

Level / Indicators	Exceeds expectation	Meets expectation	Approaches expectation	Below expectation
Ability to: • Describe the properties of the three states of matter. • Manage solid waste in the environment. • Describe methods of conserving water. • Outline the importance of conserving water.	The learner demonstrates four skills.	The learner demonstrates three skills.	The learner demonstrates two skills.	The learner demonstrates one skill or none.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question (s)
3.0 Force and Energy	**3.1 Force and its effect** (12 lessons) ● *Types of forces (force of gravity and force of friction)* ● *Effects of force on objects (change of shape, start motion, stop moving objects, increase speed, decrease speed, change direction and hold objects together)* ● *Uses of force in day to day life*	By the end of the sub strand, the learner should be able to: a) describe types of forces in nature, b) demonstrate the effects of force on objects in nature, c) describe the uses of force in daily life, d) appreciate the importance of force in day-to-day life.	● Learners brainstorm on the meaning of the term force as used in science. ● Learners are guided to carry out activities that demonstrate the existence of force of gravity and force of friction in nature. Learners with blindness are guided to throw a ball in the air and rub two bodies against each other to demonstrate existence of force of gravity and force of friction respectively. ● Learners are guided to carry out activities to demonstrate the effects of force on objects. Leaners with blindness are given verbal description on the effect of force on bodies, where possible the learners are guided to demonstrate the effect of force on a body. ● Learners are guided to use digital devices with assistive technology, braille or print media to search and discuss uses of force in day-to-day life.	How does force affect objects?

			● In pairs, learners discuss ways of minimising friction between moving objects. ● In groups, learners discuss the applications of force of friction and force of gravity in day-to-day life.	

Core competencies to be developed:

- **Learning to learn:** The learner uses digital devices with assistive technology to search for uses of force in day-to-day life
- **Communication and collaboration:** The learner develops communication skills as they discuss ways of minimising friction between moving bodies.

Values:

- **Love:** The learner cares for one another as they work in groups to carry out activities that demonstrate the existence of force of gravity and force of friction in nature.
- **Unity:** The learner exercises inclusion as they brainstorm on the meaning of the term force as used in science.

Pertinent and Contemporary Issues (PCIs):

Citizenship: The learner exercises leadership as they work in groups while discussing the application of force of friction and force of gravity in day-to-day life.

Link to other learning area:

Agriculture and Nutrition: The learner relates the concepts of force of friction in maintenance farm tools and equipment.

Suggested Learning Resources.
Braille materials and equipment,
Digital devices with assistive technology such as adapted keyboards, screen readers and screen magnifiers,
Print materials in appropriate font and colour contrast,
Ball,
Grease,
Oil,
Ball bearings,
Rollers.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question (s)
3.0 Force and Energy	**3.2 Light** (14 lessons) ● *Sources of light* ● *Ways of lighting the house (windows, translucent roofs, artificial lighting),* ● *Uses of light (to see, safety, discourage pests)*	By the end of the sub strand, the learner should be able to: a) identify the sources of light in nature, b) describe ways of lighting a house, c) explain the uses of light in day to day life, d) appreciate the applications of light in day-to-day life.	● Learners brainstorm on the meaning of light. ● Learners are guided to carry out activities to categorise the sources of light in day-to-day life. Learners with blindness are given verbal descriptions on different sources of light. ● In groups, learners discuss ways of lighting a house such as using windows, translucent roofs and artificial lighting. Learners with blindness are given verbal description on how different sources of light are used to light a house. ● Learners are guided to use digital with assistive technology, print or braille media to search for sources and uses of light in nature.	Why is light important in day-to-day life?

			• Learners discuss the applications of light in day-to-day life.	

Core competencies to be developed:

- **Digital literacy**: The learner interacts with technology as they use digital devices with assistive technology to search for sources and uses of light in nature.
- **Communication and Collaboration**: The learner cooperatively works with others while carrying out activities in groups to identify and where possible, illustrate the sources of light.

Values:

Respect: The learner exercises patience with one another as they discuss the applications of light in day-to-day life.

Pertinent and Contemporary Issues (PCIs):

Citizenship education: The learner reflects on the uses of light for safety and security as they discuss the importance of light.
Child Care Protection: The learners exercise how to avoid physical harm caused by lighting when discussing importance of lighting in day-to-day life.

Links to other Learning areas:

Agriculture and Nutrition: The learner applies lighting as a way of eradicating pest in their homes and seeking alternative cost-effective ways.

Suggested Learning Resources.

Braille materials and equipment,
Digital devices with assistive technology such as adapted keyboards, screen readers and screen magnifier,
Print materials in appropriate font and colour contrast,
Sources of light,
Translucent materials.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Force and energy	**3.3 Heat** (12 lessons) ● *Sources of heat (sun, fire, electricity)* ● *Uses of heat (Cooking, warming, ironing and drying)* ● *Safety measures when handling heat (use of kitchen gloves, avoid direct contact with open flames, use of appropriate clothing).* ● *Importance of heat in daily life*	By the end of the sub strand, the learner should be able to: a) identify sources of heat in nature, b) demonstrate uses of heat in day-to-day life, c) describe safety measures to observe when using heat, d) appreciate the importance of heat in day-to-day life.	● Learners use available resources to search for the meaning of heat. ● In pairs, learners discuss the sources of heat. ● Learners are guided carry out activities to demonstrate the uses of heat in day-to-day life. Learners with blindness are given one on one orientation on how to carry out activities that demonstrate use of heat. ● Learners are guided to discuss safety measures when using heat. ● Learners are guided to use digital with assistive technology, print or braille media to search for safety measures and practices necessary when using heat. ● Learners are guided to discuss the importance of heat. **Project**: Learners use locally available materials to make kitchen gloves. Learners with blindness are supported on the aspects of projects that require use of sight such as	1. How is the heat important? 2. Why do we observe safety measures when using heat?

			tracing the palm, taking measurements and cutting the materials.	

Core competencies to be developed:

- **Learning to learn**: The learner reflects on their own work as they use locally available materials to make kitchen gloves.
- **Digital literacy**: The learner interacts with digital media using digital devices with assistive technology to search for safety measures and practices necessary when using heat.

Values:

Unity: The learner cooperates with peers as they discuss in groups the sources of heat.

Pertinent and Contemporary Issues (PCIs):

Socio-Economic Issues: The learner exercises safety and security as they carry out activities to demonstrate the uses of heat in day-to-day life.

Link to other Learning areas:

Agriculture and Nutrition: The learner uses knowledge of heat in hatching of chicks, pests' control and cooking utensils.

Suggested Learning Resources.

Braille materials and equipment,
Digital devices with assistive technology such as adapted keyboards, screen readers and screen magnifiers,
Print materials in appropriate font and colour contrast,
Sources of heat,
Kitchen gloves,
Scissors.

Suggested Assessment Rubric

Level / Indicators	Exceeds expectation	Meets expectation	Approaches expectation	Below expectation

Ability to : • Identify the sources of light in nature. • Use of light in day-to-day life. • Use of heat in day-to-day life. • Observe safety measures when using heat. • Describe safety measures when using heat.	The learner demonstrates five skills.	The learner demonstrates four skills.	The learner demonstrates 2-3 skills.	The learner demonstrates one skill or less.

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 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 three 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 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.

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 in print and braille ● Anecdotal Records	● Adapted laboratory Apparatus and Equipment ● Textbooks in print and braille ● Software ● Relevant reading materials ● Digital Devices with assistive technology ● Recordings	● Visit science historical sites ● Use digital devices with assistive technology to conduct scientific research ● Organising walks to have live learning experiences ● Developing simple guidelines on how to identify and solve some community problems ● Conducting science document analysis ● Participating in talks by resource persons on science concepts ● Participating in science clubs and societies ● Attending and participating science and engineering fairs ● Organizing and participating in exchange programmes. ● Making oral presentations and demonstrations on science issues.