REPUBLIC OF KENYA

MINISTRY OF EDUCATION

UPPER PRIMARY LEVEL DESIGNS

SUBJECT

SCIENCE AND TECHNOLOGY

GRADE 6

KENYA INSTITUTE OF CURRICULUM DEVELOPMENT

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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 Kenya Constitution 2010, the Kenya Vision 2030, the United Nations Sustainable Development Goals (SDGs) and the Regional and Global conventions to which Kenya is a signatory. In relation to this, the Ministry of Education (MoE) embarked on curriculum reforms that culminated in the full implementation of the Competency Based Curriculum (CBC) in January, 2019 from the level of Early Years Education (Pre-Primary 1 and 2, and Lower Primary Grade 1, 2 and 3). This was followed by the roll out of the curriculum in Grade 4 in 2020. In readiness for the progression of the Grade 4 cohort, the curriculum designs for Grade 5 were developed.

Grade 6 designs have now been developed. These curriculum designs are intended to ensure that the core competencies attained by learners at Grade 5 are enhanced even as further opportunities are provided for identification and nurturing of every learner's potential as learners prepare to transit to Junior Secondary school.

The curriculum designs include the general and specific learning outcomes for the learning areas (subjects) as well as strands and sub - strands. The designs also outline suggested learning experiences, key inquiry questions, assessment rubric, pertinent and contemporary issues, values and Community Service Learning (CSL) activities.

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 Competency Based Curriculum.

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PREFACE

The Ministry of Education (MoE) is currently implementing the second phase of the curriculum reforms with the roll out of the Competency Based Curriculum (CBC) at Grade 4 in 2020. This is the first cohort of the Upper Primary level in the new education structure. Grade 5 and 6 designs have also been developed.

Grade 6 being the final stage of the upper primary level is very critical in the realization 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 6 curriculum designs 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 also continue to link the activities in the main learning areas to the other aspects of the CBC including links to Pertinent and Contemporary Issues (PCIs), Values and Community Service Learning (CSL). The designs also offer several suggested interactive learning activities and variety of assessment techniques. It is expected that the curriculum designs will guide the teachers to enable learners attain the expected learning outcomes for Grade 6 and prepare them effectively for the next Grade.

It is my expectation that the teacher will use the designs to make learning interesting, exciting and enjoyable.

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ACKNOWLEDGEMENT

The Kenya Institute of Curriculum Development (KICD) Act Number 4 of 2013 (Revised 2018) mandates the Institute to develop curricula and curriculum support materials for basic and tertiary education and training, below the university. The curriculum development process for any level involves thorough research, international benchmarking and robust stakeholder engagement. Through this systematic and consultative process, the KICD conceptualised the Competency Based Curriculum (CBC) as captured in the Basic Education Curriculum Framework (BECF), that responds to the demands of the 21st Century and the aspirations captured in the Kenya Constitution 2010, Kenya and the Kenya Vision 2030, East African Commission Protocol and the United Nations Sustainable Development Goals.

KICD obtains its funding from the Government of Kenya to enable the successful achievement of the stipulated mandate and implantation of the Government and Sector (Ministry of Education (MoE) plans. The Institute also receives support from development partners targeting specific programmes. The Grade 6 curriculum designs have been developed with the support of the World Bank through the Kenya Secondary Education Quality Improvement Program (SEQIP) commissioned by the MoE. Therefore, the Institute is very grateful for the support of the Government of Kenya, through the MoE and the development partners for the policy, resource and logistical support. Specifically, special thanks to the Cabinet Secretary – MoE and the Principal Secretary – State Department of Early Learning and Basic Education,

We 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 various roles in the development of the Grade 6 curriculum designs. In relation to this, we acknowledge the support of the Secretary - Teachers Service Commission (TSC) and the Chief Executive Officer of the Kenya National Examinations Council (KNEC) for their support in the process of developing these designs.

Finally, we are very grateful to the KICD Council Chairperson Dr. Sara Ruto and other members of the Council for very consistent guidance in the process. we assure all teachers, parents and other stakeholders that these curriculum designs will effectively guide the implementation of the CBC at Grade 6 and preparation of learners for Grade 7.

PROF. CHARLES O. ONG'ONDO
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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.

SUGGESTED TIME ALLOCATION

#	Subject	Lessons Per Week
	Mathematics	5
	Physical and Health Education	5
	English language	4
	Kiswahili Language KSL for learners who are deaf	4
	Science and Technology	4
	Agriculture	3
	Creative Arts (Art and craft, Music)	3
	Home science	3
	Religious Education (CRE/IRE/ HRE)	3
	Social Studies (Citizenship, Geography, History)	3
	Other Languages	2
	Pastoral Programme and Instructions	1
	TOTAL	**40**

GENERAL LEARNING OUTCOMES FOR MIDDLE SCHOOL EDUCATION

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

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

SCIENCE AND TECHNOLOGY

General learning outcomes

By the end of upper primary 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, 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.

Strand	Sub Strand Sub-Sub strand	Specific learning outcomes	Suggested learning experiences	Key inquiry question
1.0 LIVING THINGS	1.1 Plants 1.1.1 Parts of a plant **(8 lessons)**	By the end of the Sub Strand, the learner should be able to: a) Identify different plants found in the locality b) Identify different parts of a plant in the environment c) Discuss the functions of the various parts of a plant in the environment d) Appreciate the different plants in the community.	Learners are guided • On an excursion in their locality to identify different parts of plants such as trees, shrubs, herbs and grasses • To collect different types of plant (*hint*: Collect small herbaceous plants with all parts). • To identify the different parts of the plants collected (root, leaves, stem, flowers, and fruits). • To draw and label the different parts of a plant. • To investigate the functions of different parts of a plant (roots – absorb water and anchorage, stems – support and food storage, leaves – make food and removing excess water, flowers – produce fruits , fruits – store food and protect seeds). • To use visual aids and digital devices to identify the functions of the different parts of a plant.	Why is a plant body differentiated into different parts?

			Project: Make mountings showing different parts of a plants**.**	

Core competences to be developed: Communication and collaboration as they work in groups; Self efficacy as they carry out tasks; Digital literacy as they demonstrate the functions of parts of plants

PCIs: • Environmental conservation as they collect plants and parts of plants; Safety as they identify and collect plants and avoid collecting poisonous plants. • Citizenship as they study and appreciate the unique plants in their community.	**Values:** • Respect as they carry out activities together • Responsibility as they collect the plants • Unity as they work together in groups.
Links to other learning areas: • Agriculture (food production) • Art and Craft (as they sketch the parts of the plant) • Religious education to appreciate God's creation	**Community Service Learning:** • Caring for plants at home

Indicators	**Exceeds expectation**	**Meets expectation**	**Approaches expectation**	**Below expectation**
Identifying different plants in the community	Consistently and correctly identifies plants in their environment	Correctly identifies plants in their environment	Correctly identifies **some** plants in their environment	Identifies only a few plants in the environment
Identifying parts of plants in the community	Consistently and correctly identifies parts of plants in the community	Correctly identifies parts of plants in the community	Correctly identifies parts of some plants in the community	Identifies a few parts of plants in the community

Strand	Sub Strand Sub-Sub strand	Specific learning outcomes	Suggested learning experiences	Key inquiry question
1.0 LIVING THINGS	1.2 Plants 1.2.1 Types of roots **(6 lessons)**	By the end of the Sub Strand, the learner should be able to: a) Differentiate between fibrous and tap roots in plants b) Group plants in the locality based on the type of roots. c) Appreciate that plants have different types of roots for different functions.	Learners are guided to • Collect different types of plants with the roots. • Observe the different types of roots on the plants collected. • Group the collected plants based on the types of roots. • Use visual aids and digital devices to identify different types of roots. • Mount different types of roots	Why do plants need roots?

Core competences to be developed:
- Communication and collaboration as they work in groups
- Self-efficacy as they correctly carry out tasks
- Digital literacy as they observe the different types of roots using digital devices
- Learning to learn as they group plants based on different types of roots

PCIs:	**Values:**
• Environmental Conservation as they collect plants in controlled quantities • Safety as they take precautions when collecting plants.	• Respect as they work together • Responsibility as they share tasks • Unity as they work together in groups.

Links to other learning areas:	Community Service Learning:
• Agriculture (food production and weed control) • Art and Craft (as they mount different parts) • Religious education to appreciate God's creation.	• Caring for plants at home (especially during weeding).

Indicators	Exceeds expectation	Meets expectation	Approaches expectation	Below expectation
Differentiating between fibrous and tap roots	Consistently and correctly differentiates between fibrous and tap roots	Correctly differentiates between fibrous and tap roots	Sometimes differentiates between fibrous and tap roots	Rarely differentiates between fibrous and tap roots
Grouping plants in their locality based on the type of roots.	Consistently and correctly groups plants in their locality based on the type of roots.	Correctly groups plants in their locality based on the type of roots.	Sometimes groups plants in their locality based on the type of roots.	Rarely groups plants in their locality based on the type of roots.

Strand	Sub Strand Sub-Sub strand	Specific learning outcomes	Suggested learning experiences	Key inquiry question
1.0 LIVING THINGS	1.3 Animals 1.3.1 Invertebrates **(12 lessons)**	By the end of the Sub Strand the learner should be able to: a) Categorise invertebrates in the animal kingdom b) Identify characteristics of each group of invertebrate c) Appreciate that invertebrates are many and varied and are of importance to man.	Learners are guided • On safety precautions in handling various invertebrates. • To explore the school and neighbourhood to observe and identify different invertebrates. • Use digital devices to access, observe and identify different invertebrates. • To discuss characteristics of; insects; spiders and ticks; millipedes and centipedes; snails and slugs. • To make a photo album of categories of different animals without backbones in the locality	Why do invertebrates occur in very many and varied forms?

Core competences to be developed:

- Digital literacy as they use digital devices to access and observe animals without backbones
- Communication and collaboration as they work in groups
- Patriotism as they appreciate animals without backbones in their locality
- Critical thinking and problem solving as they group animals without backbones according to different characteristics
- Imagination and creativity as they make photo albums of animals without backbones

PCIs: • Environmental Conservation as they maintain habitat for different animals • Safety as they avoid dangerous animals • Health education as the they discuss dangers caused by mosquitos	**Values:** • Responsibility by showing dedication and commitment in taking care of animals.
Links to other subjects: • Home science (communicable diseases) • Agriculture (ticks and tsetse fly control	**Community Service Learning:** • **C**learing bushes and stagnant water in the locality to reduce breeding grounds to reduce

Indicators	**Exceeds expectation**	**Meets expectation**	**Approaching expectation**	**Below expectation**
Grouping of the invertebrates.	Consistently and correctly groups all the invertebrates	Correctly groups all the invertebrates	Groups most of the invertebrates	Groups a few or none of the invertebrates.
Identify characteristics of each group of invertebrates.	Consistently and correctly identifies all characteristics of each group.	Correctly identifies characteristics of each group.	Identifies most of the characteristics of each group.	Identifies a few or none the characteristics of each group.

STRAND	SUB-STRAND	SPECIFIC LEARNING OUTCOMES	SUGGESTED LEARNING EXPERIENCES	KEY INQUIRY QUESTIONS
LIVING THINGS AND THEIR ENVIRONMENT	1.4 Human circulatory system **(12 Lessons)**	By the end of the Sub Strand the learner should be able to: a) Identify the main parts of the human circulatory system (a) Discuss parts of the heart and their functions in the circulatory system (b) Describe types of blood vessels and their functions in the circulatory system (c) Describe the components of blood and state their functions in the circulatory system (d) Identify the major blood groups in the ABO system. (e) Discuss the role of blood groups in blood transfusion	Learners • Observe a chart and draw a diagram of the human circulatory system (Heart, Arteries, Veins, and Capillaries). • Download a video/ model and observe parts of the heart and the pumping of the heart. • Download a video and observe the components of blood and brainstorm on their functions. • In groups make a model showing components of blood. • In groups, brainstorm on the ABO human blood groups	1. What is the importance of human circulatory system?

			• In groups, discuss the importance of blood groups in transfusion	

ASSESSMENT RUBRICS

Indicator	Exceeds expectation	Meets expectation	Approaches expectation	Below expectation
Describing parts and functions of the heart	With ease, correctly describes all parts of the heart and explains their functions.	Correctly describes all parts of the heart and explains their functions	Correctly describes some parts of the heart and explains their functions	With guidance correctly describes some parts of the heart and explains their functions
Describing the types and functions of the blood vessels	With ease, correctly describes types of blood vessels and their functions.	Correctly describes types of blood vessels and their functions.	Correctly describes two types of blood vessels and their functions.	With assistance, correctly describes types of blood vessels and their functions.
Describing components of blood and their functions.	With ease correctly describes the components of blood and their functions.	Correctly describes the components of blood and states their functions.	Correctly describes some components of blood and states their functions.	With assistance, correctly describes some components of blood and states their functions.
Describing the ABO blood groups and their importance in transfusion	With ease, correctly describes the major blood groups and explains their importance in transfusion.	Correctly describes all the major blood groups.	Correctly describes some of the major blood groups	With assistance, correctly describes some of the major blood groups

Strand	Sub Strand	Specific learning outcomes	Suggested learning experiences	KEY INQUIRY QUESTIONS
1.0 LIVING THINGS	1.5.1 Reproductive systems **(8 lessons)**	By the end of the Sub Strand the learner should be able to: a) Identify major parts of the male and female reproductive system in a human being b) Discuss the functions of major parts of the male and female reproductive system. c) Describe the physical changes that take place during adolescence. d) Discuss implications of the physical changes in adolescence. e) Appreciate that physical changes in boys and girls during adolescence have social and reproductive implications.	• Learners to use visual aids to observe and identify the parts of the human male and female reproductive systems. (*Use of videos and graphic images of the reproductive organs not required*). • In groups, learners to discuss the functions of the parts of the male and female reproductive systems. (*Male; penis, testis, urethra and glands. Female; vagina, cervix, uterus, oviduct, and ovaries. Detailed internal structures of testis and ovaries not required*). • Learners discuss in groups the implications of changes that come with the adolescence. (*social and health)*	7. What are the roles of the male reproductive system in humans?

Core competences to be developed: • Self-efficacy as they become aware the physical changes that occur during adolescence • Digital literacy as they digital devices to observe and identify the physical changes during adolescence • Communication and collaboration as they work in groups.	
PCIs: • Life skills on self-awareness and how to deal with changes during adolescence • Human sexuality as they learn about human reproductive system • Health – taking care of their bodies for personal hygiene • Citizenship – gender differences as a result of sexual differences.	**Values:** • Responsibility as they take of their bodies • Respect for one another as they learn about the uniqueness of their bodies.
Links to other Learning areas: • Home science (hygiene during adolescence) • Art and craft (drawing the body parts) • Religious Education (Appreciating God's creation)	**Community Service Learning:** • Taking care of the body for proper hygiene

Indicators	Exceeds expectation	Meets expectation	Approaches expectation	Below expectation
Identification of parts of the male and female reproductive systems of a human being	Consistently and Accurately identifies all parts of the male and female reproductive systems	Accurately identifies all parts of the male and female reproductive systems	Accurately identifies most parts of the male and female reproductive systems	Identifies a few or none of the parts of male and female reproductive systems.

Stating the functions of parts of the male and female reproductive system of a human being	**Consistently and accurately** state all the functions of parts of the male and female reproductive system	**Accurately** state all the functions of parts of the male and female reproductive system	**Accurately** state most of the functions of parts of the male and female reproductive	**S**tates the functions few or none of the parts of the male and female reproductive system
Identifying the physical changes that occur during adolescence.	Correctly and consistently identifies the physical changes that occur during adolescence.	Correctly identifies the physical changes that occur during adolescence.	Correctly identifies most of the physical changes that occur during adolescence.	Unable to Correctly and identify or identifies a few of the physical changes that occur during adolescence.
Implications that come with the adolescence.	Consistently and correctly give implications that come with the adolescence.	Correctly give implications that come with the adolescence.	Give most implications that come with the adolescence.	Gives a few or none of the implications that come with the adolescence.

Strand	Sub Strand	Specific learning outcomes	Suggested learning experiences	Key inquiry question
2.0 Environment	**1.1 Water conservation (6 Lessons)**	By the end of the Sub Strand the learner should be able to: a) Discuss the meaning of water conservation in the environment b) Explain the importance of conserving water at home c) Describe ways of conserving water at home d) Demonstrate ability to use water at home and in school economically. e) Develop an interest in conserving water.	• Learners are guided to discuss the meaning of conserving water. • Learners explore their locality how water is conserved. • Learners are guided to discuss ways of conserving water (Hint: Simple examples of reducing, Re-using and Recycling). • Learners are guided to discuss the importance of conserving water • Learners participate in communal activities to conserve water	1. What is water conservation? 2. How can water be conserved in the locality?

Core competences to be developed:

- Communication and collaboration as learners carry out the activity to separate solid mixtures
- Imagination and creativity as they make the sieve
- Critical thinking and problem solving as learners decide on method to use separate solid mixtures

PCIs :

- **Life skills** – decision making as they make sieves which can be turned into an income generating activity**.**
- **Health**-when taking precaution as they use different methods of separating solid mixtures.

Values:

- **Love** and **Respect** as they carry out activities in groups
- **Responsibility** as they show dedication and commitment in group activities.

Link to other Learning areas:

- Home science - hygiene as they wash their hands after handling the materials
- Agriculture in handling of farm products
- Mathematics when taking measurements of materials to make a sieve
- Languages in discussion as they carry out activities.

Community service learning:

- Guidance by adults to make sieves.

Indicators	Exceeds expectation	Meets expectation	Approaches expectation	Below expectation
Importance of conserving water	Consistently and correctly explains the importance of conserving water	Correctly explains the importance of conserving water	Cannot explain clearly importance of water conservation.	Cannot explain importance of water conservation.
Ways of conserving water	Consistently and Correctly describes all ways of conserving water	Correctly describes all ways of conserving water	Describes most ways of conserving water	Describes a few or none of the ways of conserving water

Strand	Sub Strand Sub Sub strand	Specific learning outcomes	Suggested learning experiences	Key inquiry question
3.0 Interacting with Computing Devices	3.1 Handling data (spreadsheets) **(12 lessons)**	By the end of the Sub Strand, the learner should be able to: a) Create Spreadsheet document on a computing device b) Edit a spreadsheet document in a computing device c) Carry out simple operations on data in spreadsheet d) Save a spreadsheet document on a computing device. e) Retrieve a spreadsheet document from a computing device. f) Observe safety when using computing devices in their locality g) Appreciate the use of spreadsheet in everyday life h) Create and maintain a personal assessment portfolio in spreadsheet.	• Using computing devices, learners to practice how to create a Spreadsheet document and key in information. • Using computing devices, learners to practice how to edit a Spreadsheet document. • Learners to practice how to save and retrieve Spreadsheet documents stored in different locations of their computing devices • In groups, learners to discuss and observe safety precautions when using computing devices. **Project: Learners to c**reate and maintain a personal assessment portfolio in spreadsheet to cover one term.	1. Which functions can be performed in Spreadsheet?

Core competences to be developed: • Digital literacy when using digital devices • Learning to learn – when learning how to save and retrieve information from a computing device • Creativity and imagination - creating a personal assessment portfolio in Spreadsheet • Problem solving – using Spreadsheet to assist in documentation and record keeping	
PCIs: • Safety – observing safety as they avoid misuse of information when using a computing device • Disaster risk reduction – by using the computing devices and their accessories safely.	**Values**: • Love and respect for each other as they work in groups • Unity – teamwork as learners work together in groups • Responsibility – learners showing dedication and commitment in their activities
Links to other Learning areas: • English – typing of English words as they use Spreadsheet processor • Mathematics – using numerals as they create documents in Spreadsheet.	**Community Service Learning**: • Learners discussing with their family members to learn about Spreadsheet documents.

Indicators	Exceeds expectation	Meets expectation	Approaches expectation	Below expectation
Create an Spreadsheet document in a computing device	Correctly and consistently create an Spreadsheet document	Correctly create an Spreadsheet document	Sometimes create an Spreadsheet document	Tried but unable to create an Spreadsheet document

Edit an spreadsheet document in a computing device	Correctly and consistently edit an spreadsheet document	Correctly edit an Spreadsheet document	Sometimes edit an Spreadsheet document	Tried but unable to edit an Spreadsheet document
Carry out simple operations on data in spreadsheet	**Correctly and accurately carry** out simple operations on data in spreadsheet	**Correctly carry** out simple operations on data in spreadsheet	**Sometimes carry** out simple operations on data in spreadsheet	Tried but unable to **carry** out simple operations on data in spreadsheet
Save an spreadsheet document on a computing device	Correctly and consistently Save an spreadsheet document on a computing device	Correctly Save an spreadsheet document on a computing device	Sometimes save an spreadsheet document on a computing device	Tried but unable to save an spreadsheet document on a computing device
Retrieve an spreadsheet document from a computing device.	Correctly and consistently retrieve an spreadsheet document from a computing device	Correctly retrieve an spreadsheet document from a computing device	Sometimes retrieve an spreadsheet document from a computing device	Tried but unable to retrieve an spreadsheet document from a computing device
Observe safety when using computing devices in their locality	Correctly and consistently observe safety when using computing devices in their locality	Correctly observe safety when using computing devices in their locality	Sometimes observe safety when using computing devices in their locality	Tried but unable to observe safety when using computing devices in their locality

Create and maintain a personal assessment portfolio in spreadsheet	Correctly and consistently creates and maintain a personal assessment portfolio in spreadsheet	Correctly create and maintain a personal assessment portfolio in spreadsheet	Sometimes create and maintain a personal assessment portfolio in spreadsheet	Tried but unable to create and maintain a personal assessment portfolio in spreadsheet.

Strand	Sub Strand	Specific learning outcomes	Suggested learning experiences	Key inquiry question
4.0 Matter	**4.1 Properties of matter** **(6 lessons)**	By the end of the Sub-Sub strand the learner should be able to: a) Carry out activities on expansion and contraction in solids, liquids and gases. b) Demonstrate expansion and contraction of matter in everyday life. c) Appreciate importance of expansion and contraction of matter in everyday life.	In groups: • Learners are guided to demonstrate expansion and contraction in solids. • Learners are guided to demonstrate expansion and contraction in liquids • Learners are guided to demonstrate expansion and contraction in gases • Discuss application of expansion and contraction in everyday life.	1. How does heat affect the size of matter? 2. How does cooling affect size of matter?
Core competencies: • Critical thinking when observing and identifying the changes during expansion and contraction • Communication and Collaboration while recording the effects of heat on materials • Imagination and Creativity when comparing the two measurements. • Digital literacy when using computing devices to observe effects of heat on objects.				
PCIs: Safety when handling materials and objects.		**Values:** Responsibility during making of the coil spring to demonstrate different forces; Respect and love when carrying out activities together.		

Links to other learning areas:	Suggested Community Service Learning Activities:
• Agriculture (tools and equipment) • Mathematics; during taking and recording measurements.	• Learners to explore and observe areas where expansion and contraction are used in everyday life.

Suggested Assessment Rubrics

Indicators	Exceeds expectation	Meets expectation	Approaches expectation	Below expectation
Demonstration of the changes in a material when heated (expansion)	With ease ,correctly identifies the changes in a material when heated (expansion)	Correctly identify the changes in a material when heated(expansion)	To some extent, identify the changes in a material when heated(expansion)	Needs assistance to identify the changes in a material when heated(expansion)
Demonstration of the changes in a hot material when it is cooled (contraction)	With ease ,correctly demonstrates the changes in a hot material when it is cooled (contraction)	Correctly demonstrate the changes in a hot material when it is cooled (contraction)	To some extent demonstrates the changes in a hot material when it is cooled (contraction)	Needs assistance to demonstrate the changes in a hot material when it is cooled (contraction)
Application of expansion and contraction of materials in everyday life	Correctly and consistently identifies application of expansion and contraction of materials in everyday life	Correctly identify the application of expansion and contraction of materials in everyday life	To some extent identify the application of expansion and contraction of materials in everyday life	Needs assistance identify the applications expansion and contraction of materials in everyday life

Strand	Sub Strand Sub-Sub strand	Specific learning outcomes	Suggested learning experiences	Key inquiry question
4.0 Matter	**4.2 Composition of air (6 lessons)**	By the end of the Sub Strand, the learner should be able to: a) Investigate the different components of air in the atmosphere. b) Demonstrate that air is a mixture of different gases. c) Categorize uses of the different components of air in nature. d) Show curiosity in learning the different components of air.	Learners to: • Carry out experiments to show the percentage composition of the different components of air • Use a burning candle to demonstrate the presence of oxygen as a component of air • Use digital devices to demonstrate the presence of carbon dioxide as a component of air. • Brainstorm uses of the different components of air in nature. • Observe safety when working with heat	1. What gases make up atmospheric air?
Core competences to be developed: • Communication and collaboration as learners work in groups as they carry out activities to investigate components of air; • Digital literacy as learners use digital devices to observe components of air.				
PCIs: Safety as they work with fire to test the presence of oxygen and carbon dioxide in air			**Values:** Respect for self and each other as they work in groups. Unity as they work in groups	

Link to other Learning areas:	**Community service learning:**
• Mathematics in discussing the proportion of the components of air • Languages as learners communicate when carrying out tasks in groups.	• With the guidance of their parents, learners investigate component of air in their locality

Suggested Assessment Rubrics

Indicators	**Exceeds expectation**	**Meets expectation**	**Approaches expectation**	**Below expectation**
Investigate the different components of air in the atmosphere	Correctly and consistently Investigates the percentage composition of the different components of air in the atmosphere	Correctly Investigates the percentage composition of the different components of air in the atmosphere.	Correctly investigates the percentage composition of some of the components of air in the atmosphere	Investigates the percentage composition of a few or none of components of air in the atmosphere.
Demonstrate that air is a mixture of different gases.	Consistently and accurately demonstrates that air is a mixture of different gases	Correctly demonstrates that air is a mixture of different gases.	Need some guidelines to demonstrate that air is a mixture of different gases	Requires assistance to demonstrate that air is a mixture of different gases
Categories uses of the different components of air.	Correctly and consistently categorizes all uses of different components of air.	Correctly categorizes all uses of different components of air.	Categorizes some uses of the different components of air.	Categorizes few uses of different components of air.

Strand	Sub Strand Sub-Sub strand	Specific learning Outcomes	Suggested learning experiences	Key inquiry question
5.0 Force and Energy	5.1Force (Friction) **(6 lessons)**	By the end of the Sub Strand the learner should be able to: a) State the meaning of friction as a force b) Identify advantages and disadvantages of friction as a force c) Demonstrate ways of increasing and reducing friction. d) Appreciate the uses of friction in everyday life.	Learners to • Pull and push objects on smooth and rough surfaces, observe and record. • Discuss the meaning of friction. • Use digital devices to identify effects friction on objects. • Discuss advantages and disadvantages of friction. • Demonstrate ways of increasing and reducing friction in everyday life. **Project:** Learners to make a sand paper using locally available materials	1. What are the advantages and disadvantages of friction? 2. How can friction be increased and be reduced?

Core competences to be developed:

- Critical thinking – illustration of the concept of frictional force between two surfaces in contact
- Communication and Collaboration as learners work in groups to identify the effects of friction on surfaces in contact, pushing and pulling of objects to demonstrate friction
- Creativity and innovation – sharpening of tools and lighting of a match stick to illustrate friction
- Digital literacy – use of digital devices to illustrate friction on different surfaces in contact.

PCIs: • **Safety** - when sharpening pencil and lighting of a match stick, taking care of sharp edges when sharpening tools • **Environmental education**- safe disposal of the waste after sharpening tools.	**Values:** • Responsibility- during pushing and pulling to illustrate friction; • Respect for each other – during observing and recording of friction; • Unity – when carrying out activities of pushing and pulling of objects
Links to other Learning areas: • Agriculture (farm machinery) • Home science (kitchen appliances) • PHE (gym equipment)	**Suggested CSL:** • Learners to make sharpeners using locally available materials for use at home and in the locality.

Suggested Assessment Rubrics

Indicators	Exceeds expectation	Meets expectation	Approaches expectation	Below expectation
Illustrate the concept of friction as a force.	Consistently and accurately illustrate the concept of friction as a force	Correctly illustrate the concept of friction as a force	Illustrate some of the concept of friction as a force.	Need assistance Illustrate the concept of friction as a force
Identify advantages and disadvantages of friction	Consistently and accurately identifies all advantages and disadvantages of friction	Correctly identifies all advantages and disadvantages of friction	Identifies most advantages and disadvantages of friction	Identifies a few advantages and disadvantages of friction
Identify uses of friction in everyday life.	Consistently and correctly identifies all uses of friction in everyday life.	Correctly identifies all uses of friction in everyday life.	Identifies most uses of friction in everyday life.	Needs assistance to identify uses of friction in everyday life.

Ways of increasing and decreasing friction.	Consistently and correctly identifies all ways of increasing and decreasing friction.	Correctly identifies all ways of increasing and decreasing friction.	Identifies most ways of increasing and decreasing friction.	Needs assistance to identify ways of increasing and decreasing friction.

Strand	Sub Strand Sub-Sub strand	Specific learning outcomes	Suggested learning experiences	Key inquiry question
5.0 Force and Energy	5.2 Light Energy **(8 lessons)**	By the end of the Sub Strand, the learner should be able to: a) Demonstrate reflection of light by different materials b) Explain the meaning of reflection as used in light energy. c) Identify application of reflection of light in day to day life. d) Appreciate the importance of reflection of light in their everyday life.	• In groups, learners use different types of materials to demonstrate and observe reflection of light. • The learners are guided to discuss the meaning of reflection. • Learners to use digital devices to observe reflection of light. • Learners discuss the application of reflection of light	1. How does reflection of light occur? 2. How can we apply reflection of light in our day to day life?

Core competences to be developed:

- Digital literacy - learners interact with digital devices to observe different properties of light;
- Critical thinking - learners classify different objects into either transparent, translucent of opaque;
- Creativity and imagination as learners make the functional periscope;
- Communication and Collaboration - learners working together in groups

PCIs: • Safety where learners use personal protection equipment as they make the periscope • Health Education where personal hygiene is observed as they clean their hands after interacting with different objects from the environment.	**Values:** • Unity by learners working together as they do their project • Responsibility by learners carrying out the assigned tasks in the respective groups • Respect by– learners respecting each other's opinion as they work together in their groups.
Links to other Learning areas: • Home Science when lighting up the home • Mathematics when taking measurements of materials to make a periscope.	**Community Service Learning:** • Learners guided by family members to classify locally available materials as transparent, translucent and opaque

Suggested Assessment Rubrics

Indicators	Exceeds expectation	Meets expectation	Approaches expectation	Below expectation
Demonstrate reflection of light	Correctly and consistently demonstrate reflection of light	Correctly demonstrate reflection of light	Needs some little help to demonstrates reflection of light	Needs full guidance to demonstrate reflection of light solid surfaces.
Identify application of reflection of light in day to day life.	Consistently and correctly identifies applications of reflection of light in day to day life	Correctly identifies application of reflection of light in day to day life	Struggles to identify application of reflection of light in day to day life	Unable to identify applications of reflection of light in day to day life

Strand	Sub Strand Sub-Sub strand	Specific learning outcomes	Suggested learning experiences	Key inquiry question
5.0 Force and Energy	**5.3 Machines (Slopes (8 lessons)**	By the end of the Sub Strand the learner should be able to: a) Demonstrate how a slope makes work easier in life b) Identify the various forms of slopes that make work easier in the locality c) Appreciate the use of slopes in everyday life. d) Construct simple slopes for use in daily life.	Learners to • Carry out an activity to observe and record how slopes make work easier • Walk around the school and neighborhood to observe and identify areas where slopes have been used to make work easier. (*Ladder, staircase and ramp*) • Use digital devices to observe the use of slopes. • Discuss how ramp help the physically challenged to move with easy Project: make a simple slope for use in school or at home.	1. How are slopes used in everyday life?
Core competences to be developed: • Critical thinking, Imagination and Creativity when making the simple slope • Communication and Collaboration as learners work in groups • Digital literacy in the use of digital media in demonstrating and observing how slopes work.				

PCIs : • Safety when using personal protective equipment (PPE) and taking care when using various objects to demonstrate with slopes • Environmental education- use of a ladder in reaching high places	**Values:** • Unity, Cooperation and teamwork as they work in groups • Respect for self and others as they perform the activities • Responsibility by being careful and diligent while carrying out activities • Honesty and Integrity as they make the slopes.
Links to other Learning areas: • Agriculture in the use tools and equipment to carry out the projects; • Home Science when they observe hygiene while working.	**Suggested CSL:** Collaboration with community make and use slopes.

Suggested Assessment Rubrics

Indicators	Exceeds expectation	Meets expectation	Approaches expectation	Below expectation
Demonstrate how a slope makes work easier (ladder)	Consistently and accurately demonstrates how an slopes makes work easier	Correctly demonstrates how an slopes makes work easier	Rarely demonstrate how an inclined plane makes work easier	Need assistance to demonstrate how an inclined plane makes work easier
Identify the various forms of slopes that make work easier in the locality	Consistently and accurately Identifies the various forms of slopes in their locality	Correctly Identify the various forms of inclined planes in their locality	Rarely Identify the various forms of slopes in their locality	Need assistance to Identify the various forms of slopes in their locality

STRAND	SUB STRAND	SUGGESTED ASSESSMENT METHODS	SUGGESTED LEARNING RESOURCES	SUGGESTED NON FORMAL ACTIVITIES
1. Living things 2. Environment 3. Matter 4. Force and Energy		a) Question and answer b) Class quizzes, short tests c) Individual performance assessment d) Individual and group assignments e) Project work	• Conventional laboratory resources • Improvised learning resources from the environment	1.Field Work 2.Excursions 3. Games 4.Science Clubs and societies 5 Games.
5.Interacting with Computing devices	Handling data 3.2 Documents in Spreadsheet	• Work book manipulation	• Microsoft Excel • Computer Devices	• Interaction with digital learning devices e.g. computer, smart phones among others