KENYA INSTITUTE OF CURRICULUM DEVELOPMENT
A skilled and Ethical Society

UPPER PRIMARY SCHOOL

SCIENCE & TECHNOLOGY CURRICULUM DESIGN

GRADE 4

First Published 2017

Revised 2024

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LESSON ALLOCATION AT UPPER PRIMARY

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

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.

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) Demonstrate mastery of number concepts to solve problems in day to day life
c) Demonstrate social skills, moral and religious values for positive contribution to society
d) Develop one's interests and talents for personal fulfilment
e) Make informed decisions as local and global citizens of a diverse, democratic society in an interdependent world.
f) Explore, manipulate, manage and conserve the environment effectively for learning and sustainable development
g) Acquire digital literacy skills for learning and enjoyment.
h) Appreciate the country's rich, diverse cultural heritage for harmonious living

ESSENCE STATEMENT

Science and Technology is a learning area which engages in the human pursuit to understand the relationships between the living and 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 pre-requisite skills which are required in Integrated Science and Pre-technical and Pre-career studies at the Junior School level. These enable learners to prepare for Science, Technology, Engineering and Mathematics (STEM) in subsequent levels of the education cycle. Inquiry based learning (IBL), Project based learning (PBL), Problem based learning (PBL) and Social Scientific Issue learning (SSI) approaches will be employed throughout the learning experiences in this area as advocated for by John Dewey's social constructivist theory which emphasises the learner should be given an opportunity to learn through hands-on activities. Engineering design shall be used as a pedagogical strategy to bridge science concepts with other learning areas to solve simple open-ended problems, develop creative thinking and analytical skills among learners, make decisions, and consider alternative solutions to address a variety of situations.

SUBJECT GENERAL LEARNING OUTCOMES

By the end of the course, the learner should be able to:

- Interact with the environment for learning and sustainable development.
- Apply digital literacy skills appropriately for communication, learning and enjoyment.
- Appreciate the contribution of science and technology in the provision of innovative solutions.
- Use scientific knowledge to observe and explain the natural world.
- Make functional discoveries that impact individuals and the wider society.
- 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.

Strands in Science & Technology
1. Living things and their environment
2. Matter
3. Force and Energy

STRAND 1.0 LIVING THINGS AND THEIR ENVIRONMENT

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

				leaves), ● discuss in groups the functions of external parts of plants and share with peers, ● use digital applications to draw, paint and label 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, discuss and record characteristics of plants as living things.
- **Digital literacy**: The learner uses digital applications 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.

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.

Links to other Learning areas:
- The information on characteristics of plants as living things is linked to study different types of crops in Agriculture and Nutrition.

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

			● search for information from print and non-print materials on main differences between vertebrates and invertebrates and share with peers, ● Identify vertebrates and invertebrates in their locality. **Note:** *Learners observe safety precautions and take care of animals during the learning activities.* **Project:** Learners are guided to make a portfolio of vertebrates and invertebrates.	

Core competencies to be developed:

- **Communication and collaboration:** The learner contributes to group decision making by participating actively as they discuss characteristics of animals as living things.
- **Creativity and Imagination:** The learner discovers new ways of 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.

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:
The information on characteristics of animals as living things is linked to the study of livestock in Agriculture and Nutrition.

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.	The learners is guided to; ● use print and non-print material to observe and identify parts of the human digestive system, ● draw and label the human digestive system, ● discuss symptoms of an unhealthy digestive system, record and share with peers, ● collaboratively discuss and develop a plan on ways of maintaining a healthy digestive system, record findings and share, ● use simulation software, online interactive platforms or digital images to illustrate the human digestive system.	1. What makes up the digestive system? 2. How is a healthy digestive system maintained?

Core competencies to be developed:
- **Learning to learn:** The learner reflects on ways of maintaining a healthy digestive system.
- **Digital literacy**: The learner uses simulation software, online 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.

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

Link to other learning areas:
- The content on ways of maintaining a healthy digestive system is linked to the study of personal hygiene and hygienic handling of food in Agriculture and Nutrition.

Assessment Rubric				
Indicators	**Exceeds expectations**	**Meets expectations**	**Approaches expectations**	**Below expectations**
Identifying characteristics of plants and animals	Identifies characteristics of plants and animals comprehensively	Identifies characteristics of plants and animals	Identifies some characteristics of plants and animals	Identifies some characteristics of plants and animals with prompts
Describing functions of external parts of a plant	Describes functions of external parts of a plant in-depth	Describes functions of external parts of a plant	Describes functions of external parts of a plant partially	Describes functions of external parts of a plant superficially
Identifying parts of the human digestive system	Identifies parts of the human digestive system exhaustively	Identifies parts of the human digestive system	Identifies some parts of the human digestive system partially	Identifies some parts of the human digestive system with prompts
Developing a plan of maintaining a healthy human digestive system	Develops a plan of maintaining a healthy human digestive system purposively	Develops a plan of maintaining a healthy human digestive system	Develops a plan of maintaining a healthy human digestive system partially	Develops a sketchy plan of maintaining a healthy human digestive system

STRAND 2.0 MATTER

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question (s)
2.0 Matter	**2.1 Properties of matter** **(14 lessons)** ● Meaning of matter ● States of matter *(solid, liquid and gas)* ● Properties of matter *(shape, volume and mass)* ● Importance of the different states of matter	By the end of the sub strand the learner should be able to: a) categorise substances in the environment into the three states of matter, b) describe the properties of the three states of matter, c) appreciate the importance of the different states of matter in day to day life.	**The learner is guided to:** ● brainstorm on the meaning of matter and identify its different states *(solid, liquid and gases),* ● collect and group different substances from the environment into the three states of matter collaboratively, ● carry out activities to demonstrate the properties of the three states of matter *(shape, volume and mass)* with peers, ● discuss the importance of the different states of matter in day to day life, ● where possible use digital devices to observe the characteristics of the three states of matter.	What are the properties of matter?

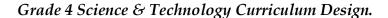| **Core competencies to be developed:** |
|---|
| ● **Communication and collaboration:** The learner works with peers to carry out activities that show properties of matter |
| ● **Digital literacy:** The learner interacts with digital technology to observe the properties of the three states of matter. |
| **Values:** |
| ● **Unity:** The learner collaborates with others when collecting different substances from the environment. |
| **Pertinent and Contemporary Issues:** |
| ● **Heath issues (preventive health):** The learner avoids blowing air into the same balloon with others. |
| **Link to other learning area:** |
| ● **Mathematics**: The learner measures the volume and weight of different substances. |

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question (s)
2.0 Matter	**2.2 Management of solid waste (16 lessons)** ● Types of solid waste*s (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	By the end of the sub strand the learner should be able to: a) classify solid waste into decomposable and non-decomposable, b) describe the dangers of solid waste to the environment, c) apply appropriate methods to manage solid waste in the environment, d) appreciate the need for proper management of solid waste in the environment.	**The Learner is guided to:** ● identify solid waste in the environment with peers, ● discuss the meaning of decomposable and non-decomposable solid waste, ● collect solid waste in the school, sort and classify them into decomposing and non-decomposing collaboratively, ● discuss the dangers of solid waste to the environment and present in class, ● discuss methods of managing different types of waste in their environment (*To include Re-using, Recycling and Reducing)*, Hint: *Include common waste in school and*	How is solid waste dangerous to the environment?

			environment such as kitchen, animal waste, plastics, e-waste, metals and glasses,	
			• use proper safety measures in solid waste management *(wearing protective gears and use of appropriate tools).*	
			• where possible, use digital devices or print media to access and observe ways of managing different types of solid waste.	
			Projects: 1. Learners to make dust bins for safe disposal of waste at home and in school using locally available materials, 2. Make toys or ornaments from solid waste.	

during solid waste management

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 dust bins 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:
- **Health 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 solid waste to make ornaments and dustbins.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question (s)
2.0 Matter	**2.3 Water conservation** **(12 Lessons)** ● Meaning of water conservation ● Methods of conserving water *(cover: Simple examples of reducing water wastage, Reusing water and Recycling water* ● Importance of water conservation	By the end of the sub strand, the learner should be able to: a) explain the meaning of water conservation in the environment, b) describe methods of conserving water at home and school, c) outline the importance of conserving water at home and school, d) develop interest in conserving water at home and school.	The Learner is guided to: ● Brainstorm on how water is wasted at home and school, ● brainstorm on the meaning of water conservation, ● explore their locality and observe how water is conserved with peers, ● discuss ways of conserving water *(simple examples of reducing water wastage, Reusing water and Recycling water),* ● discuss the importance of conserving water, ● practise responsible use of water at home and school.	Why is it important to conserve water?

			Project: Prepare posters to sensitise the community (school and home) on the importance of water conservation.	

Core competencies to be developed:
- **Self -efficacy**: The learner practises responsible use of 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

Pertinent and Contemporary Issues:
- **Socio-economic issues (financial literacy)**: The learner reduces cost of water by reducing water wastage.

Link to other learning area:
- **Agriculture and Nutrition**: use of appropriate water conservation practices like drip irrigation and mulching.

Assessment Rubric				
Indicators/Level	**Exceeds expectation**	**Meets expectation**	**Approaches expectation**	**Below expectation**
Describing the properties of the three states of matter	Correctly describe all the properties of the three states of matter	Correctly describes at least two properties of the three states of matter	Correctly describes some properties of at least two states of matter	Correctly describes the properties of some states of matter
Managing solid waste in the environment	Uses all the appropriate methods(reduce, reuse, recycle) to Manage solid waste in the environment	Uses any two appropriate methods to manage solid waste in the environment	Uses one appropriate method to manage solid waste in the environment	Uses inappropriate methods to manage solid waste in the environment.
Outlining the importance of conserving water	Explicitly outlines the importance of conserving water at home and school	Sufficiently outlines the importance of conserving water at home and school	Partially outlines the importance of conserving water at home and school	Superficially outlines the importance of conserving water at home school

STRAND 3.0 FORCE AND ENERGY

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question (s)
3.0 Force and Energy	**3.1 Force and its effect** **(12 lessons)** ● Types of forces *(force of gravity and force of friction)* ● Effects of force *(change of shape, start motion, stop moving objects, increase speed, decrease speed, change direction and hold objects together)* ● Uses of force in day to day life	By the end of the sub strand, the learner should be able to: a) describe types of forces in nature, b) demonstrate the effects of force on objects in nature, c) describe the uses of force in daily life, d) appreciate the importance of force in day-to-day life.	The leaner is guided to: ● brainstorm on the meaning of the term force as used in science, ● carry out activities that demonstrate the existence of force of gravity and force of friction in nature *(throwing a ball up, stones raised and released to fall, books tipped to fall from a table, objects pulled on rough and smooth surfaces)*, ● carry out activities in groups to demonstrate the effects of force on objects *(change of shape, start motion, stop moving objects, increase speed, decrease speed, change direction and hold objects together)*, ● where possible, use digital devices to search for, observe and discuss uses of force in day-to-day life *(wheelbarrow, tug of war, pulling and pushing a*	How does force affect objects?

				hand-cart, ox cart, pushing a bicycle, falling bodies),
				• discuss ways of minimising friction between moving bodies *(smoothening surfaces, greasing, oiling, use of rollers, ball bearings),*
				• discuss the applications of force of friction and force of gravity in day-to-day life.

Core competencies to be developed:
- **Learning to learn**: The learner uses digital devices 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.

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

Link to other learning area:
- **Agriculture and Nutrition:** the learner relates the concepts of force of friction in maintenance farm tools and equipment.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question (s)
3.0 Force and Energy	**3.2 Light (14 lessons)** ● Sources of light ● Ways of lighting the house (*windows, translucent roofs, artificial lighting),* ● Uses of light	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.	The learner is guided to: ● brainstorm on the meaning of light, ● carry out activities in groups to identify and where possible, illustrate the sources of light in day to day life, ● discuss ways of lighting a house (*windows, translucent roofs, artificial lighting),* ● use digital or print media to search for sources and uses of light in nature, ● discuss the applications of light in day-to-day life (*to see, safety, discourage pests, read comfortably*).	1. Why is light important in day-to-day life?
Core competencies to be developed: ● **Digital literacy:** The learner interacts with technology as they use digital devices 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.

PCIs:
- **Citizenship education**: The learner reflects on the uses of light for safety and security as they discuss the importance of light.

Links to other Learning areas:
- **Pre-technical and Business studies:** The learner seeks alternative cost-effective ways of lighting a house as they discuss ways of lighting a house.

Strand	Sub Strand	Specific learning outcomes	Suggested learning experiences	Key inquiry question(s)
3.0 Force and energy	**3.3 Heat (12 lessons)** ● Sources of heat (*sun, fire, electricity, gas*) ● Uses of heat (*Cooking, warming, ironing and drying*) ● Safety measures when handling heat ● Importance of heat in daily life	By the end of the sub strand the learner should be able to: a) identify sources of heat in nature, b) demonstrate uses of heat in day-to-day life, c) describe safety measures to observe when using heat, d) appreciate the importance of heat in day-to-day life.	The leaner is guided to: ● use available resources to search for the meaning of heat, ● discuss in groups the sources of heat (*sun, fire, electricity, gas*), ● carry out activities to demonstrate the uses of heat in day-to-day life (*keeping warm, drying, cooking, food preservation*), ● discuss safety measures when using heat (*use of kitchen gloves, avoid direct contact with open flames, use of appropriate clothing*), ● use digital or print media to search for safety measures and practices necessary when using heat, ● discuss in groups the importance of heat. **Project**: Use locally available materials to make kitchen gloves.	1. What is the importance of heat? 2. What are the safety measures observed when using heat?

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 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.	
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.	
Links to other Learning areas: ● **Agriculture and Nutrition**: The learner links heat to drying grains & clothes, hatching of chicks, pests' control, cooking processes & utensils and warming houses.	

Assessment Rubric				
Indicators	**Exceeds expectation**	**Meets expectation**	**Approaches expectation**	**Below expectation**
Demonstrating the effects of force on objects in nature	Correctly and consistently demonstrates the effects of force on objects in nature.	Correctly demonstrates the effects of force on objects in nature.	Partially demonstrates the effects of force on objects in nature.	With prompts, demonstrates the effects of force on objects in nature.
Identifying the sources of light in nature	Correctly and consistently identifies the sources of light in nature.	Correctly identifies the sources of light in nature.	Correctly identifies some sources of light in nature.	With prompts, identifies the sources of light in nature
Explaining the uses of light in day-to-day life	Comprehensively explains the uses of light in day-to-day life	Satisfactorily explains the uses of light in day-to-day life	Partially explains the uses of light in day-to-day life	With some hints, explains the uses of light in day-to-day life with flaws
Demonstrating uses of heat in day-to-day life	Correctly and consistently demonstrates uses of heat in day-to-day life	Correctly demonstrates uses of heat in day-to-day life	Partially demonstrates uses of heat in day-to-day life	With prompts, demonstrates uses of heat in day-to-day life
Describing safety measures when using heat	Comprehensively describes safety measures when using heat	Satisfactorily describes safety measures when using heat	Partially describes safety measures when using heat	With some hints, describes safety measures when using heat

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

Assessment Methods in Science	Learning Resources	Non-Formal Activities
- Reflections - Game Playing - Pre-Post Testing - Model Making - Explorations - Experiments - Investigations - Conventions, Conferences, and Debates - Applications - Teacher Observations - Project - Journals - Portfolio - Oral or Aural Questions - Learner's Profile - Written Tests - Anecdotal Records	- Laboratory Apparatus and Equipment - Textbooks - Software - Relevant reading materials - Digital Devices - Recordings	- Visit science historical sites - Use digital devices 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.

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