



**KENYA INSTITUTE OF CURRICULUM DEVELOPMENT**

*A skilled and Ethical Society*

**UPPER PRIMARY SCHOOL**

**SCIENCE & TECHNOLOGY CURRICULUM DESIGN**

**GRADE 5**

First Published 2017

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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
<b>Total</b>		<b>35</b>

## 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.

## **LEVEL 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 non-living universe. Science is a discipline that deals with explanations and predictions about nature and the universe while Technology is the application of science to create devices that can solve problems and do tasks.

The achievement of Vision 2030 greatly depends on Science, Technology and Innovation. Sessional Paper No.1 of 2005 highlights the fact that for a breakthrough towards industrialisation, achievement of the desired economic growth targets and social development, a high priority needs to be placed on the development of human capital through education and training by promoting the teaching of sciences and information technology. This is also highlighted in the Sessional Paper 14, 2012 which stresses the need for sustainable basic and higher education, with an emphasis on Science, Technology and Innovation (ST&I). This makes it necessary for Science and Technology to be taught in Upper Primary Education level.

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



## **SUBJECT GENERAL LEARNING OUTCOMES**

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

- a) Interact with the environment for learning and sustainable development.
- b) Apply digital literacy skills appropriately for communication, learning and enjoyment.
- c) Appreciate the contribution of science and technology in the provision of innovative solutions.
- d) Use scientific knowledge to observe and explain the natural world.
- e) Make functional discoveries that impact individuals and the wider society.
- f) Use innovative approaches as well as critical thinking and problem solving skills to stimulate scientific inquiry, at the local, national and global levels for lifelong learning.

## STRAND 1.0: LIVING THINGS AND THEIR ENVIRONMENT

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question
<b>1.0 Living things and their Environment</b>	<b>1.1 Classification of plants (14 lessons)</b> <ul style="list-style-type: none"> <li>• Classification of plants (<i>flowering and non-flowering plants</i>)</li> <li>• Parts and function of flowers</li> </ul>	By the end of the sub strand, the learner should be able to: <ol style="list-style-type: none"> <li>a) classify plants into flowering and non-flowering,</li> <li>b) describe functions of parts of a flower,</li> <li>c) outline the importance of flowers in nature,</li> <li>d) appreciate the importance of flowers in nature.</li> </ol>	The learner is guided to: <ul style="list-style-type: none"> <li>• collaboratively use print and non-print materials to search for images of flowering and non-flowering plants and share,</li> <li>• take a walk in their locality to observe, identify and categorise plants into flowering and non-flowering,</li> <li>• draw a flower and label parts,</li> <li>• collaboratively discuss functions of parts of a flower and share with peers,</li> <li>• discuss the importance of flowers in nature with peers,</li> </ul>	How are plants classified?

			<ul style="list-style-type: none"> <li>● use digital applications to draw, paint and label flowers.</li> </ul> <p><i>Note: Learners are guided on precautions to take when handling plants as they study flowering and non-flowering plants.</i></p>	
<p><b>Core competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>● <b>Self-efficacy:</b> The learner effectively discusses functions of parts of a flower with peers.</li> <li>● <b>Digital literacy:</b> The learner uses digital applications to draw, paint and label flowers.</li> </ul>				
<p><b>Values:</b></p> <ul style="list-style-type: none"> <li>● <b>Unity:</b> The learner appreciates the effort of others while observing, identifying and classifying plants into flowering and non-flowering.</li> </ul>				
<p><b>PCIs:</b></p> <ul style="list-style-type: none"> <li>● <b>Environmental Conservation:</b> The learner conserves the environment when observing, identifying and categorising plants into flowering and non-flowering in their natural habitat.</li> </ul>				
<p><b>Links to other learning areas:</b></p> <ul style="list-style-type: none"> <li>● <b>Creative Arts:</b> The use of digital applications to draw, paint and label flowers is linked to drawing and painting in Creative Arts.</li> </ul>				

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question
<b>1.0 Living things and their Environment</b>	<b>1.2 Vertebrates (16 lessons)</b> <ul style="list-style-type: none"> <li>• General characteristics of vertebrates</li> <li>• Groups of vertebrates: (mammals, birds, reptiles, fish and amphibians; <i>structural features only</i>)</li> </ul>	By the end of the sub strand the learner should be able to: <ol style="list-style-type: none"> <li>a) describe general characteristics of vertebrates,</li> <li>b) classify vertebrates into their main groups,</li> <li>c) appreciate the importance of vertebrates in the environment.</li> </ol>	Learners is guided to: <ul style="list-style-type: none"> <li>• search for information from print and non-print material on the general characteristics of vertebrates and share with peers,</li> <li>• explore the school compound and adjacent environment to observe and identify characteristics of vertebrates,</li> <li>• use print and non-print material to search for information on characteristics of different groups of vertebrates, study their main characteristics, discuss and share,</li> </ul> <p><b>Note:</b> <i>The learners are guided to observe safety precautions when handling different animals.</i></p>	What are the key features of vertebrates?

			<b>Project:</b> making a portfolio of different categories of vertebrates in their locality.	
<b>Core competencies to be developed:</b>				
<ul style="list-style-type: none"> <li>• <b>Communication and collaboration:</b> The learner contributes to discussions on main characteristics of vertebrates.</li> <li>• <b>Creativity and Imagination:</b> The learner skilfully designs and develops a portfolio on vertebrates.</li> </ul>				
<b>Values:</b>				
<ul style="list-style-type: none"> <li>• <b>Responsibility:</b> The learner observes safety precautions when handling different animals.</li> </ul>				
<b>PCIs:</b>				
<ul style="list-style-type: none"> <li>• <b>Safety and security:</b> The learner takes necessary precautions while handling animals.</li> <li>• <b>Animal welfare:</b> The learner takes care of animals as they study.</li> </ul>				
<b>Links to other learning areas:</b>				
<ul style="list-style-type: none"> <li>• <b>Agriculture and Nutrition:</b> The information on characteristics of animals as living things is linked to the study of livestock in Agriculture and Nutrition.</li> <li>• <b>Creative Arts:</b> Making of a portfolio of different categories of vertebrates is linked designing in Creative Arts</li> </ul>				

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question
<b>1.0 Living things and their Environment</b>	<b>1.3 The Human Breathing system (18 lessons)</b> <ul style="list-style-type: none"> <li>● Parts of the breathing system and their functions (<i>nose, trachea, lungs, diaphragm</i>)</li> <li>● Symptoms and prevention of common conditions and diseases of the breathing system (<i>common colds, coughs, COVID-19, allergy and</i></li> </ul>	By the end of the sub strand the learner should be able to: <ol style="list-style-type: none"> <li>a) identify the main parts of the human breathing system,</li> <li>b) describe the functions of main parts of the human breathing system,</li> <li>c) outline the symptoms and prevention measures for common conditions and diseases of the breathing system,</li> <li>d) appreciate the need for</li> </ol>	Learners is guided to; <ul style="list-style-type: none"> <li>● use print and non-print material to identify the human breathing system,</li> <li>● draw the human breathing system and label the main parts,</li> <li>● search for information on the functions of main parts of the human breathing system and share with peers,</li> <li>● collaboratively discuss symptoms and prevention of common conditions and diseases that affect the human breathing system and share,</li> <li>● use simulation software, online interactive</li> </ul>	<ol style="list-style-type: none"> <li>1. What makes up the human breathing system?</li> <li>2. What measures enhance a healthy breathing system?</li> </ol>

	<i>Asthma)</i>	maintaining a healthy breathing system.	platforms or digital images to illustrate major parts of the human breathing system. <b>Project:</b> Learners are guided to collaboratively make models of the human breathing system using locally available materials.	
<p><b>Core competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>• <b>Creativity and Imagination:</b> The learner designs different ways of modelling the human breathing system using locally available material.</li> <li>• <b>Digital literacy:</b> The learner uses simulation software, online interactive platforms or digital images to illustrate major parts of the human breathing system.</li> </ul>				
<p><b>Values:</b></p> <ul style="list-style-type: none"> <li>• <b>Love:</b> The learner portrays a caring attitude while taking care of the breathing system.</li> <li>• <b>Responsibility:</b> The learner shows accountability in protecting self and others as they study prevention of common conditions and diseases that affect the human breathing system.</li> </ul>				
<p><b>PCIs:</b></p> <ul style="list-style-type: none"> <li>• <b>Preventive health and communicable diseases:</b> The learner discusses symptoms and prevention of common conditions and diseases that affect the human breathing system.</li> </ul>				
<p><b>Links to other Learning areas:</b></p> <ul style="list-style-type: none"> <li>• <b>Agriculture and Nutrition:</b> The information on symptoms and prevention of common conditions and diseases that affect the human breathing system is linked to personal hygiene in Agriculture and Nutrition.</li> </ul>				

<b>Assessment Rubric</b>				
<b>Levels</b> \ <b>Indicators</b>	<b>Exceeds expectation</b>	<b>Meets expectation</b>	<b>Approaches expectation</b>	<b>Below expectation</b>
Describing functions of parts of a flower	Describes functions of parts of a flower exhaustively	Describes functions of parts of a flower	Describes functions of parts of a flower partially	Describes functions of parts of a flower superficially
Classifying vertebrates into their main groups	Classifies vertebrates into their main groups precisely	Classifies vertebrates into their main groups	Classifies vertebrates into their main groups partially	Classifies vertebrates into their main groups inaccurately
Describing the functions of main parts of the human breathing system	Describes the functions of main parts of the human breathing system comprehensively	Describes the functions of main parts of the human breathing system	Describes the functions of main parts of the human breathing system partially	Describes the functions of main parts of the human breathing system superficially
outlining the symptoms and prevention measures for common conditions and diseases of the breathing system measures for common conditions and diseases of the breathing system	Outlines the symptoms and prevention measures for common conditions and diseases of the breathing system exhaustively	Outlines the symptoms and prevention measures for common conditions and diseases of the breathing system	Outlines the symptoms and prevention measures for common conditions and diseases of the breathing system partially	Outlines the symptoms and prevention measures for common conditions and diseases of the breathing system incompletely



## STRAND 2.0: MIXTURES

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question
2.0 Matter	<p><b>2.1 Mixtures (14 Lessons)</b></p> <ul style="list-style-type: none"> <li>● Meaning of mixtures</li> <li>● Types of mixtures (<i>heterogeneous and homogeneous</i>) examples of (<i>solid-solid, solid-liquid and liquid-liquid</i>)</li> <li>● Separating heterogeneous mixtures (<i>Winnowing, picking, sieving, using magnet, Filtering, decanting, separating funnel</i>)</li> </ul>	<p>By the end of the sub-strand the learner should be able to:</p> <ol style="list-style-type: none"> <li>a) classify mixtures as homogeneous or heterogeneous,</li> <li>b) apply appropriate methods to separate heterogeneous mixtures,</li> <li>c) outline the applications of separating mixtures in day to day life,</li> <li>d) appreciate different methods of separating mixtures in day to day life.</li> </ol>	<p><b>The Learner is guided to:</b></p> <ul style="list-style-type: none"> <li>● brainstorm the meaning of a mixture, give examples at home and school,</li> <li>● categorise mixtures as homogeneous (uniform) and heterogeneous (non-uniform),</li> <li>● carry out activities to separate heterogeneous mixtures in groups, (<i>Winnowing, picking, sieving, using magnet, Filtering, decanting, separating funnel</i>)</li> <li>● discuss the applications of separating mixtures in day to day life. (<i>Winnowing, picking, sieving, using magnet, Filtering, decanting, separating funnel</i>)</li> </ul>	<ol style="list-style-type: none"> <li>1. What should be considered when separating various mixtures?</li> </ol>

**Core competencies to be developed:**

- **Communication and collaboration:** The learner contributes to group decision making as they separate mixtures using appropriate methods.
- **Learning to learn:** The learner reflects on their own experiences as they carry out activities with peers to separate different types of mixtures.

**Values:**

- **Social justice:** The learner accord others equal opportunities in sharing responsibilities as they work in groups when separating mixtures.

**Pertinent and Contemporary Issues (PCIs)**

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

**Links to other subjects:**

- **Agriculture and Nutrition:** The learner applies the knowledge on separating mixtures in agricultural processes like straining milk, winnowing grains and straining honey.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question
2.0 Matter	<b>2.2 Water Pollution (18 lessons)</b> <ul style="list-style-type: none"> <li>• Meaning of the term water pollution</li> <li>• Common water pollutants</li> <li>• Effects of polluted water on living things</li> <li>• Methods of reducing water pollution</li> <li>• Basic methods of water treatment (<i>boiling, filtration, chemical treatment, solar treatment</i>)</li> </ul>	By the end of the sub strand the learner should be able to: <ol style="list-style-type: none"> <li>a) identify water pollutants in the water sources,</li> <li>b) outline the effects of water pollution in day-to-day life,</li> <li>c) Identify methods of reducing water pollution in the water sources,</li> <li>d) apply appropriate methods of water treatment,</li> <li>e) advocate for safe water sources.</li> </ol>	<b>The learner is guided to:</b> <ul style="list-style-type: none"> <li>• discuss the meaning of water pollution,</li> <li>• brainstorm on water pollutants in water sources,</li> <li>• discuss the effects of water pollution in day to day life, (<i>eg water borne diseases etc</i>),</li> <li>• discuss different methods of reducing water pollution,</li> <li>• observe safety measures when working in a water polluted environment (<i>Example: practice use of gumboots and gloves</i>),</li> <li>• carry out activities to demonstrate basic methods of water treatment (<i>filtering, boiling, chemical treatment, solar treatment</i>),</li> <li>• where possible use visual aids or digital devices to identify water pollutants and their effects in day to day life.</li> </ul>	1. What are the dangers of water pollution?

			<b>Project:</b> Learners to make functional water filters using locally available materials.	
<b>Core competencies to be developed:</b> <ul style="list-style-type: none"> <li>• <b>Creativity and imagination:</b> The learner comes up with new ideas in making functional water filters using locally available materials.</li> </ul>				
<b>Values:</b> <ul style="list-style-type: none"> <li>• <b>Responsibility:</b> The learner observes safety precautions when working in a water polluted environment</li> <li>• <b>Peace:</b> The learner shows care by not hurting others while practising methods of water treatment</li> </ul>				
<b>Pertinent and Contemporary Issues:</b> <ul style="list-style-type: none"> <li>• <b>Health Issues(preventive health):</b> The learner carry out activities to demonstrate basic methods of water treatment</li> </ul>				
<b>Links to other Learning areas:</b> <ul style="list-style-type: none"> <li>• <b>Agriculture and Nutrition::</b> Use of water filters to obtain clean water for domestic use.</li> </ul>				

<b>Assessment Rubric</b>				
<b>Indicators</b>	<b>Exceeds expectation</b>	<b>Meets expectation</b>	<b>Approaches expectation</b>	<b>Below expectation</b>
Carrying out appropriate methods of separating heterogeneous mixtures	Carries out all the appropriate methods of separating heterogeneous mixtures	Carries out 4-5 appropriate methods of separating heterogeneous mixtures	Carries out 2-3 appropriate methods to separate heterogeneous mixtures	Carries out at most one appropriate method of separating heterogeneous mixtures
Outlining methods of reducing water pollution in the water sources.	Outlines 4 methods of reducing water pollution in the water sources correctly.	Outlines 3 methods of reducing water pollution in the water sources correctly.	Outlines 2 methods of reducing water pollution in the water sources correctly.	Outlines 1 method of reducing water pollution in the water sources correctly.

### STRAND 3.0: FORCE AND ENERGY

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question
<b>3.0 Force and Energy</b>	<b>3.1 Floating and Sinking (14 lessons)</b> <ul style="list-style-type: none"> <li>• Floating and sinking <i>(factors that affect floating and sinking of objects in water and applications of floating and sinking)</i></li> </ul>	By the end of the sub strand the learner should be able to: <ol style="list-style-type: none"> <li>a) demonstrate floating and sinking of objects using different materials,</li> <li>b) identify factors that affect floating and sinking of objects in water,</li> <li>c) explain applications of floating and sinking in day to day life,</li> <li>d) appreciate the use of floaters as life</li> </ol>	The learner is guided to: <ul style="list-style-type: none"> <li>• use different objects to demonstrate floating and sinking in water (<i>use dry wood, stone, metals, plastic, cork, buoy &amp; feathers</i>),</li> <li>• carry out activities to classify objects in the environment into those that float and those that sink in water,</li> <li>• carry out activities to verify how shape, weight and size affect floating and sinking of objects in water (<i>normal bottle tops, crushed bottle tops, same quantity of plasticine in different shapes, containers of same size and weight; one filled with sand and the other one feathers or cotton wool</i>,</li> <li>• discuss the applications of floating and sinking in day to day life (<i>swimming, diving, use of lifesavers,</i></li> </ul>	<ol style="list-style-type: none"> <li>1. Why do some materials float and others sink?</li> <li>2. How are floaters useful in day to day life?</li> </ol>

		savers.	<p><i>water transport, floods, drowning, surfing),</i></p> <ul style="list-style-type: none"> <li>● use digital or print media to search for: <ul style="list-style-type: none"> <li>○ effects of flooding and mitigation measures,</li> <li>○ the use of floaters as life savers.</li> </ul> </li> </ul> <p><b>Project:</b> In groups learners make lifesavers from floaters made of locally available materials such as rubber tubes, wood or plastics.</p>	
<p><b>Core competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>● <b>Communication and Collaboration:</b> The learner exercises teamwork while carrying out activities to observe and classify objects in the environment into those that float and those that sink in water.</li> <li>● <b>Critical thinking and problem solving:</b> The learner explores a variety of locally available materials that can be used to make lifesavers.</li> </ul>				
<p><b>Values:</b></p> <ul style="list-style-type: none"> <li>● <b>Integrity:</b> The learner gives honest observations and records real results while carrying out activities to classify objects in the environment into those that float or sink in water.</li> <li>● <b>Responsibility:</b> The learner shows resilience in accomplishing tasks in making lifesavers made from locally available materials such as rubber tubes, wood or plastics.</li> </ul>				

**PCIs:**

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

**Links to other Learning Areas:**

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

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Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question
<b>3.0 Force and Energy</b>	<b>3.2 Sound Energy (14 lessons)</b> <ul style="list-style-type: none"> <li>• Sources of sound</li> <li>• Movement of sound in nature</li> <li>• Effects of loud sound</li> <li>• Role of sound in day to day life</li> </ul>	By the end of the sub strand, the learner should be able to: <ol style="list-style-type: none"> <li>a) identify sources of sound in nature,</li> <li>b) demonstrate the movement of sound in nature,</li> <li>c) describe effects of loud sound in day to day life,</li> <li>d) appreciate the role of sound in day to day life.</li> </ol>	The learner is guided to: <ul style="list-style-type: none"> <li>• carry out activities to identify sources of sound (<i>vibrating air, vibrating strings, vibrating drums</i>),</li> <li>• carry out an activity to demonstrate that sound travels in all directions from a source (<i>listening to a loud sound from a common speaker from different directions and around corners</i>),</li> <li>• carry out an activity to demonstrate reflection of sound (echo) (<i>use of two tubes placed alongside a wall, a cliff, a large hall, a forest, a valley, between tall buildings</i>),</li> <li>• discuss the effects of loud sound in the environment with peers,</li> <li>• use digital or print media to</li> </ul>	<ol style="list-style-type: none"> <li>1. How is sound produced?</li> <li>2. What are the effects of loud sound?</li> </ol>

			<p>search for the effects of loud sound in day to day life,</p> <ul style="list-style-type: none"> <li>● discuss the role of the government in addressing sound pollution.</li> </ul> <p>PROJECT 1: In groups, learners to make a sound producing instrument from locally available materials (<i>for example: bell, drum, guitar, wind instruments, etc.</i>).</p> <p>PROJECT 2: create a sound game using Scratch</p>	
<p><b>Core competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>● <b>Creativity and imagination:</b> The learner experiments different ways of making sound producing instruments using locally available materials.</li> <li>● <b>Digital literacy:</b> The learner uses appropriate digital technology to create and add sound effects using the "Sound" blocks in Scratch.</li> </ul>				
<p><b>Values:</b></p> <ul style="list-style-type: none"> <li>● <b>Responsibility:</b> The learner practises how to minimise the effects of loud sound in the environment.</li> </ul>				
<p><b>PCIs:</b></p> <ul style="list-style-type: none"> <li>● <b>Citizenship:</b> The learner acquires awareness on human rights and responsibilities as they discuss the role of the government in addressing sound pollution.</li> <li>● <b>Socio-Economic Issues:</b> The learner creates awareness on sound pollution as they discuss with peers the effects of loud sound in the environment.</li> </ul>				

**Links to other subjects:**

- **Creative Arts:** The learner relates the concept of sound energy to music.

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Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question
<b>3.0 Force and Energy</b>	<b>3.3 Heat transfer (12 lessons)</b> <ul style="list-style-type: none"> <li>● Modes of heat transfer in nature</li> <li>● Classification of conductors of heat into good or poor conductors</li> <li>● Uses of heat transfer in day to day life</li> <li>● Safety precautions when handling heat</li> </ul>	By the end of the sub strand the learner should be able to: <ol style="list-style-type: none"> <li>a) demonstrate the modes of heat transfer in nature,</li> <li>b) classify conductors of heat into good or poor conductors,</li> <li>c) explain the uses of heat transfer in day to day life,</li> <li>d) acknowledge safety precautions when handling heat.</li> </ol>	The learner is guided to: <ul style="list-style-type: none"> <li>● brainstorm on the meanings of the terms conduction, convection and radiation as used in heat transfer,</li> <li>● perform experiments to demonstrate the modes of heat transfer (<i>conduction, convection and radiation</i>),</li> <li>● carry out experiments to identify good and poor conductors of heat,</li> <li>● discuss applications of heat transfer in day to day life (<i>cooking, melting, freezing, maintaining body temperature, insulation</i>),</li> <li>● use digital or print media to search for applications of heat transfer in day to day life,</li> </ul>	1. How is heat transferred through materials in nature?

			<ul style="list-style-type: none"> <li>• discuss Safety precautions when handling heat</li> <li>• discuss various ways of responding to fire emergencies.</li> </ul> <p>Project 1: Learners to make oven gloves using locally available materials</p> <p>Project 2: Learners to make a fireless cooker</p>	
<b>Core competencies to be developed:</b>				
<ul style="list-style-type: none"> <li>• <b>Self-efficacy:</b> The learner displays self-confidence as they perform experiments to demonstrate the modes of heat transfer.</li> </ul>				
<b>Values:</b>				
<ul style="list-style-type: none"> <li>• <b>Social justice:</b> The learner shares resources equitably as they perform experiments to identify good and poor conductors of heat.</li> </ul>				
<b>PCIs:</b>				
<ul style="list-style-type: none"> <li>• <b>Social-Economic Issues:</b> The learner exercises fire emergency response measures as they discuss various ways of responding to fire emergencies.</li> </ul>				
<b>Links to other Learning areas: ;</b>				
<ul style="list-style-type: none"> <li>• <b>Agriculture and Nutrition:</b> The learner links the concept of heat transfer in knitting the oven gloves.</li> </ul>				

<b>Assessment Rubric</b>				
<b>Indicators</b>	<b>Exceeds expectation</b>	<b>Meets expectation</b>	<b>Approaches expectation</b>	<b>Below expectation</b>
Demonstrating floating and sinking of objects using different materials	Demonstrates floating and sinking of objects using different materials correctly and consistently.	Demonstrates floating and sinking of objects using different materials correctly.	Demonstrates floating and sinking of objects using different materials partially.	Demonstrates floating and sinking of objects using different materials partially with prompts.
Explaining applications of floating and sinking	Explains applications of floating and sinking comprehensively,	Explains applications of floating and sinking satisfactorily.	Explains some applications of floating and sinking.	Explains some applications of floating and sinking with prompts.
Identifying sources of sound in nature	Identifies sources of sound correctly and consistently	Identifies sources of sound Correctly	Identifies some sources of sound.	Identifies some sources of sound with prompts.
Describing effects of loud sound in day to day life	Describes effects of loud sound comprehensively	Describes effects of loud sound correctly.	Describes some effects of loud sound.	Describes some effects of loud sound with assistance.
Demonstrating the modes of heat transfer in nature	Demonstrates the modes of heat transfer correctly and consistently.	Demonstrates the modes of heat transfer correctly.	Demonstrates some modes of heat transfer correctly.	Demonstrates some modes of heat transfer with assistance
Explaining the uses of heat transfer in day to day life	Explains the uses of heat transfer correctly and comprehensively.	Explains the uses of heat transfer correctly.	Explains some of the uses of heat transfer.	Explains some uses of heat transfer with assistance.

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

Assessment Methods in Science	Learning Resources	Non-Formal Activities
<ul style="list-style-type: none"> <li>● Reflections</li> <li>● Game Playing</li> <li>● Pre-Post Testing</li> <li>● Model Making</li> <li>● Explorations</li> <li>● Experiments</li> <li>● Investigations</li> <li>● Conventions, Conferences, and Debates</li> <li>● Applications</li> <li>● Teacher Observations</li> <li>● Project</li> <li>● Journals</li> <li>● Portfolio</li> <li>● Oral or Aural Questions</li> <li>● Learner’s Profile</li> <li>● Written Tests</li> <li>● Anecdotal Records</li> </ul>	<ul style="list-style-type: none"> <li>● Laboratory Apparatus and Equipment</li> <li>● Textbooks</li> <li>● Software</li> <li>● Relevant reading materials</li> <li>● Digital Devices</li> <li>● Recordings</li> </ul>	<ul style="list-style-type: none"> <li>● Visit the science historical sites.</li> <li>● Use digital devices to conduct scientific research.</li> <li>● Organizing walks to have live learning experiences.</li> <li>● Developing simple guidelines on how to identify and solve some community problems.</li> <li>● Conducting science document analysis.</li> <li>● Participating in talks by resource persons on science concepts.</li> <li>● Participating in science clubs and societies</li> <li>● Attending and participating science and engineering fairs</li> <li>● Organizing and participating in exchange programmes.</li> <li>● Making oral presentations and demonstrations on science issues.</li> </ul>

### **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.