KENYA INSTITUTE OF CURRICULUM DEVELOPMENT

*A Skilled and Ethical Society*

# JUNIOR SCHOOL CURRICULUM DESIGN

# INTEGRATED SCIENCE

# GRADE 8

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## NATIONAL GOALS OF EDUCATION

Education in Kenya should:

**i) Foster nationalism and patriotism and promote national unity.**

Kenya's people belong to different communities, races and religions, but these differences need not divide them. They must be able to live and interact as Kenyans. It is a paramount duty of education to help young people acquire this sense of nationhood by removing conflicts and promoting positive attitudes of mutual respect which enable them to live together in harmony and foster patriotism in order to make a positive contribution to the life of the nation.

**ii) Promote the social, economic, technological and industrial needs for national development.**

Education should prepare the youth of the country to play an effective and productive role in the life of the nation.

a) **Social Needs**

Education in Kenya must prepare children for changes in attitudes and relationships which are necessary for the smooth progress of a rapidly developing modern economy. There is bound to be a silent social revolution following the wake of rapid modernisation. Education should assist our youth to adapt to this change.

b) **Economic Needs**

Education in Kenya should produce citizens with the skills, knowledge, expertise and personal qualities that are required to support a growing economy. Kenya is building up a modern and independent economy which is in need of an adequate and relevant domestic workforce.

c) **Technological and Industrial Needs**

Education in Kenya should provide learners with the necessary skills and attitudes for industrial development. Kenya recognises the rapid industrial and technological changes taking place, especially in the developed world. We can only be part of this development if our education system is deliberately focused on the knowledge, skills and attitudes that will prepare our young people for these changing global trends.

**iii) Promote individual development and self-fulfilment**

Education should provide opportunities for the fullest development of individual talents and personality. It should help children to develop their potential interests and abilities. A vital aspect of individual development is the building of character.

**iv) Promote sound moral and religious values.**

Education should provide for the development of knowledge, skills and attitudes that will enhance the acquisition of sound moral values and help children to grow up into self-disciplined, self-reliant and integrated citizens.

**v) Promote social equality and responsibility.**

Education should promote social equality and foster a sense of social responsibility within an education system which provides equal educational

opportunities for all. It should give all children varied and challenging opportunities for collective activities and corporate social service irrespective of gender, ability or geographical environment.

vi) **Promote respect for and development of Kenya's rich and varied cultures.**
Education should instil in the youth of Kenya an understanding of past and present cultures and their valid place in contemporary society. Children should be able to blend the best of traditional values with the changing requirements that must follow rapid development in order to build a stable and modern society.

vii) **Promote international consciousness and foster positive attitudes towards other nations.**
Kenya is part of the international community. It is part of the complicated and interdependent network of peoples and nations. Education should therefore lead the youth of the country to accept membership of this international community with all the obligations and responsibilities, rights and benefits that this membership entails.

viii. **Promote positive attitudes towards good health and environmental protection.**
Education should inculcate in young people the value of good health in order for them to avoid indulging in activities that will lead to physical or mental ill health. It should foster positive attitudes towards environmental development and conservation. It should lead the youth of Kenya to appreciate the need for a healthy environment.

**LESSON ALLOCATION AT JUNIOR SCHOOL**

| S/No | Learning Area | Number of Lessons |
|---|---|---|
| 1. | English | 5 |
| 2. | Kiswahili / Kenya Sign Language | 4 |
| 3. | Mathematics | 5 |
| 4. | Religious Education | 4 |
| 5. | Social Studies | 4 |
| 6. | Integrated Science | 5 |
| 7. | Pre-Technical Studies | 4 |
| 8. | Agriculture and Nutrition | 4 |
| 9. | Creative Arts and Sports | 5 |
| | Pastoral /Religious Instructional Program | 1 |
| **Total** | | **40 + 1** |

## LEARNING OUTCOMES FOR JUNIOR SCHOOL

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

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

## ESSENCE STATEMENT

Integrated Science is a new learning area that enable learners to apply distinctive ways of logical valuing, thinking and working to understand natural phenomena in the biological, physical and technological world. The learning area is expected to create a scientific culture that inculcates scientific literacy to enable learners to make informed choices in their personal lives and approach life challenges in a systematic and logical manner. The inclusion of Integrated Science is therefore a deliberate effort to enhance the level of scientific literacy of all learners and equip them with the relevant basic integrated scientific knowledge, skills, values and attitudes needed for their own survival and/or career development. Concepts in Integrated Science are presented as units within which there are specific strands that build on the competencies acquired in Science and Technology at Primary level. The emphasis of science education at lower secondary levels is to enhance learners' scientific thinking through learning activities that involve the basic science process skills.

Integrated Science provides the learner with the basic requisite skills, knowledge, values and attitudes necessary for specialization in STEM pathway at senior school level. The rationale for inclusion of Integrated Science is anchored on the Kenya Vision 2030, Sessional Papers No. 14 of 2012, and No. 1 of 2019, which all underscore the importance of science, technology and innovation in education and training.

Integrated Science is taught through inquiry-based learning approaches with emphasis on the 5Es: engagement, exploration, explanation, elaboration and evaluation

**SUBJECT GENERAL LEARNING OUTCOMES**

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

1. Acquire scientific knowledge, skills, values and attitudes to make informed choices on career pathways at Senior School.
2. Select, improvise and safely use basic scientific tools, apparatus, materials and chemicals effectively in everyday life.
3. Explore, manipulate, manage and conserve the environment for learning and sustainable development.
4. Practise relevant hygiene, sanitation and nutrition skills to promote good health.
5. Apply the understanding of body systems with a view to promote and maintain good health.
6. Develop capacity for scientific inquiry and problem solving in different situations.
7. Appreciate the use of scientific knowledge, skills, principles and practices in everyday life.
8. Apply acquired scientific knowledge, skills, principles and practices in everyday life.

**STRAND 1.0: MIXTURES, ELEMENTS AND COMPOUNDS**

| Strand | Sub Strand | Specific Learning Outcomes | Suggested Learning Experiences | Suggested Key Inquiry Questions |
|---|---|---|---|---|
| **1.0 Mixtures, Elements and Compounds** | **1.1 Elements and Compounds (18 lessons)**<br>● Atoms, elements, molecules and compounds<br>● Symbols of common elements *(oxygen, carbon, hydrogen, nitrogen, iron, aluminium, copper, silver, gold, chlorine, sodium, mercury, lead)*<br>● Word equations for reactions of elements to form compounds *(sodium chloride, water, carbon dioxide, copper oxide, aluminium oxide)*<br>● Uses of some common elements in | By the end of the sub strand, the learner should be able to:<br>a) explain the relationship between an atom, an element, a molecule and a compound,<br>b) assign symbols to elements<br>c) use word equations to represent reactions of elements to form compounds,<br>d) outline the applications of common elements in the society,<br>e) appreciate the information on packaging labels of commonly consumed substances. | **The learner is guided to:**<br>● discuss the meaning of atoms, elements, molecules and compounds,<br>● sample labelled containers of different substances, identify and record the elements or compounds on the containers,<br>● represent selected elements using symbols collaboratively,<br>● write word equations to represent reactions of selected elements to form compounds,<br>● identify elements in selected compounds with peers (*compounds with only two elements),*<br>● explore the importance of common elements and compounds in society and present them in plenary,<br>● Where possible use digital devices to observe simulations of atoms, elements, molecules and compounds. | Why is it important to use symbols for representing elements in day to day life? |

| | | | | |
|---|---|---|---|---|
| | the society *(jewellery, construction, electricity, food nutrients, minerals elements, medals* | | | |

**Core competencies to be developed**

- **Learning to learn**: The learner reflects on their own experiences as they identify elements and compounds on labels of containers.
- **Communication and collaboration:** The learner writes clearly and correctly the symbols of elements, compounds and word equations.

**Pertinent and Contemporary Issues (PCIs)**

- **Financial literacy**: The learner explores the importance of common elements and compounds in society.

**Values**

- **Unity** The learner cooperates with others to identify elements and compounds from sample labelled containers of different substances.

**Links to other subjects**

- **Agriculture and Nutrition**: The learner uses ingredients and items made from the common elements and compounds.

| Strand | Sub Strand | Specific Learning Outcomes | Suggested Learning Experiences | Suggested Key Inquiry Questions |
|---|---|---|---|---|
| **1.0. Mixtures, Elements and Compounds** | **1.2 Physical and chemical changes**<br>**(22 lessons)**<br>● Kinetic theory of matter<br>● Heating curve<br>● Effects of impurities on boiling point and melting point.<br>● Physical and chemical changes *(both temporary and permanent changes)*<br>● Applications of physical and chemical changes in day to day life | By the end of the sub strand, the learner should be able to:<br>a) describe the characteristics of particles in the three states of matter,<br>b) explain the effects of impurities on boiling point and melting point of a substance,<br>c) distinguish between physical and chemical changes in substances,<br>d) outline applications of change of state of matter in day-to-day life,<br>e) appreciate the applications of change of state of matter in day-to-day life. | **The learner is guided to:**<br>● discuss the characteristics of particles in the three states of matter (kinetic theory of matter),<br>● perform experiments to demonstrate diffusion in liquids and gases, for example water and ink to illustrate kinetic theory of matter,<br>● carry out simple experiments to determine the boiling and melting points of pure and impure substances with peers,<br>● draw the heating curve and discuss the trends,<br>● discuss the effects of impurities on boiling point and melting point,<br>● carry out simple experiments to demonstrate physical changes and chemical changes,<br>● discuss the applications of physical and chemical changes in day-to-day life.<br>● where applicable use digital devices to play and observe videos and animations showing movement of particles in the different states of matter. | How does the movement of particles in matter affect its properties? |

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| **Core competencies to be developed**<br>● **Critical thinking and problem solving**: The learner uses logical reasoning while discussing the characteristics of particles in the three states of matter.<br>● **Digital literacy:** The learner uses digital devices to play and observe videos and animations showing movement of particles in the different states of matter. | | | | |
| **Pertinent and Contemporary Issues (PCIs)**<br>● **Safety and security:** The learner observes safety while carrying out simple experiments to determine the boiling and melting points of pure and impure substances with peers. | | | | |
| **Values:**<br>● **Unity** The learner cooperates with peers as they carry out simple experiments to determine the boiling and melting points of pure and impure substances. | | | | |
| **Link to other Learning areas:**<br>● **Agriculture and Nutrition:** The learner preserves food by applying the knowledge of change of state of matter. | | | | |

| Strand | Sub Strand | Specific Learning Outcomes | Suggested Learning Experiences | Suggested Key Inquiry Questions |
|---|---|---|---|---|
| **1.0 Mixtures, Elements and Compounds** | **1.3 Classes of fire (20 Lessons)**<br>● Causes of fire *(classes of fire)*<br>● Fire triangle and Fire control *(breaking the fire triangle and use of fire extinguishers)*<br>● Dangers of fires | By the end of the sub strand, the learner should be able to:<br>a) identify causes of fire in nature,<br>b) explain the role of fire triangle in spread of fire,<br>c) describe ways of controlling fires in nature,<br>d) acknowledge the dangers of fires in nature. | **The learner is guided to:**<br>● discuss the possible causes of fire in nature,<br>● discuss the role of the fire triangle in the spread of fire,<br>● brainstorm on the different classes of fire,<br>● discuss the dangers of fires in the environment,<br>● practice fire control measures with peers,<br>● discuss rights to safety and access to information on flammable substances,<br>● Where possible, use digital devices or print media to search for fire control measures.<br>**project:**<br>Learner is guided to prepare posters on classes of fires and their control measures and hang either at school, home or neighbouring markets | What are the dangers of fire in nature? |
| **Core competencies to be developed:**<br>● **Citizenship:** The learner enhances active community life skills by making posters on classes of fires and their control measures and hanging them at school, home and neighbouring markets. | | | | |

**Pertinent and Contemporary Issues (PCIs):**

- **Safety and security**: as the learner discusses the dangers of fires in the environment.

**Values:**

- **Respect:** The learner observes rules of engagement while working with peers in groups to classify fire according to the cause and suggest control measures.
- **Responsibility**: The learner observes safety precautions when dealing with fires and flammable materials.

**Link to other Learning areas:**

- **Social studies:** The learner practises safety measures to prevent fire accidents in nature.

**Assessment Rubric**

| Indicator | Exceeds expectation | Meets expectation | Approaches expectation | Below expectation |
|---|---|---|---|---|
| Assigning symbol to elements | Assigns symbol to all elements provided correctly | Assigns symbol to most elements provided correctly | Assigns symbol to some elements provided correctly | Assigns symbol to some elements provided correctly with prompt |
| Writing word equation for reactions of elements to form compounds | Writes word equation for any given reactions correctly | Writes word equation for most of the given reactions correctly | Writes word equation for some given reactions correctly | Writes word equation for some given reactions correctly with prompt |
| Describing the characteristics of particles in the three states of matter | Describes the characteristics of particles in the three states of matter correctly | Describes the characteristics of particles in any two states of matter correctly | Describes the characteristics of particles in one state of matter correctly | Describes the characteristics of particles in one state of matter partially |
| Distinguishing between physical and chemical changes | Distinguishes between physical and chemical changes elaborately | Distinguishes between physical and chemical changes clearly | Distinguishes between physical and chemical changes partially | Distinguish between physical and chemical changes superficially |
| Outlining applications of physical and chemical changes | Outlines most applications of physical and chemical changes in details correctly | Outlines most applications of physical and chemical changes correctly | Outlines some applications of physical and chemical changes correctly | Outlines some applications of physical and chemical changes Correctly with prompt |
| Identifying classes of fires in nature | Identifies all classes of fires in nature correctly | Identifies four to five classes of fire in nature | Identifies two to three classes of fire in nature | Identifies one class of fire in nature |

| | | | | |
|---|---|---|---|---|
| | | correctly | correctly | correctly |
| Describing ways of controlling fires in nature | Describes ways of controlling all classes of fires in nature correctly | Describes ways of controlling four to five classes of fires in nature correctly | Describes ways of controlling two to three classes of fires in nature correctly | Describes ways of controlling one class of fires in nature correctly |

**STRAND 2.0: LIVING THINGS AND THEIR ENVIRONMENT**

| Strand | Sub Strand | Specific Learning Outcomes | Suggested Learning Experiences | Suggested Key Inquiry Questions |
|---|---|---|---|---|
| **2.0 Living Things and their Environment** | **2.1 The Cell (20 lessons)**<br>● Definition of the cell<br>● Cell structure as seen under a light microscope (plant and animal cells)<br>● Preparation of temporary slides of plant cells<br>● magnification of cells seen under the light microscope | By the end of the sub strand the learner should be able to:<br>a) outline the structure of plant and animal cells as observed under a light microscope,<br>b) describe the functions of components of cells as seen under the light microscope,<br>c) compare plant and animal cells as observed under a light microscope,<br>d) determine the magnification of cells seen under the light microscope,<br>e) appreciate that all living things are made of microscopic units. | The learner is guided to:<br>● collaboratively prepare, mount, observe and draw plant cells as seen under a light microscope, (*include a reminder on how to use and care for a light microscope)*<br>● collaboratively observe, draw and label animal cells on permanent slides as seen under the light microscope,<br>● use print and non-print material to search for information on functions of components of plant and animal cells as seen under the light microscope,<br>● discuss the similarities and differences between plant and animal cells as seen under a light microscope,<br>● calculate magnification of specimens at various objective lenses of the light microscope. | What makes up plant and animal cells? |

**Core competencies to be developed:**

- **Learning to learn:** The learner prepares, mounts, observes and draws plant cells as seen under a light microscope.
- **Self-efficacy**: The learner successfully prepares and observes specimens under the light microscope.

**Pertinent and Contemporary Issues (PCIs)**

- **Environmental conservation:** The learner safely disposes off waste materials generated from experiments on study of cells.

**Values**

- **Unity:** The learner displays team spirit as they prepare, mount, observe and draw plant cells as seen under a light microscope.
- **Responsibility:** The learner performs assigned roles as they observe, draw and label animal cells on permanent slides as seen under the light microscope.

**Link to other learning areas:**

- The information on calculating magnification is linked to basic arithmetic in Mathematics.

| Strand | Sub Strand | Specific Learning Outcomes | Suggested Learning Experiences | Key Inquiry Questions |
|---|---|---|---|---|
| **2.0 Living Things and their Environment** | **2.2 Movement of materials in and out of the cell**<br><br>**(16 lessons)**<br><br>● Diffusion and Osmosis<br>● Demonstration of diffusion and osmosis<br>● Role of diffusion and osmosis in living things *(Absorption of water, nutrients in the intestines, gases in the lungs)* | By the end of the sub strand the learner should be able to;<br>a) outline the process of diffusion and osmosis in cells,<br>b) demonstrate diffusion and osmosis in living things,<br>c) explain the role of diffusion and osmosis in living things,<br>d) appreciate the importance of diffusion and osmosis in living things. | The learner is guided to:<br>● use print and non-print material to search for information on the processes involved in movement of materials in and out of a cell, discuss with peers *(cover diffusion and osmosis),*<br>● set-up experiments to demonstrate diffusion of materials in plant materials and share their findings with peers,<br>● set-up experiments to demonstrate osmosis using visking tubing and plant materials and share their findings with peers,<br>● search for information from print and non-print media on the roles of diffusion and osmosis in living things and discuss with peers. | How do materials move in and out of a cell? |
| **Core competencies to be developed:**<br>● **Communication and collaboration**: The learner writes clearly and correctly while recording findings from experiments to demonstrate diffusion and osmosis.<br>● **Self-efficacy:** The learner executes assigned tasks successfully while carrying out experiments to demonstrate diffusion and osmosis. | | | | |
| **Values:**<br>● **Respect –** The learner appreciates the opinions of peers when discussing the roles of diffusion and osmosis in living things.<br>● **Responsibility-** The learner executes assigned roles while carrying out experiments to demonstrate diffusion and osmosis. | | | | |

**Pertinent and Contemporary Issues (PCIs)**

- **Waste management:** The learner appropriately disposes off waste materials from experiments to demonstrate diffusion and osmosis.

**Link to other learning areas:**

- The information on diffusion and osmosis is linked to absorption of water and mineral salts from the soil by crops in Agriculture and Nutrition.

| Strand | Sub Strand | Specific Learning Outcomes | Suggested Learning Experiences | Suggested Key Inquiry Question(s) |
|---|---|---|---|---|
| **3.0 Living things and their Environment** | **2.3 Reproduction in human beings (18 lessons)**<br>● The menstrual cycle in human beings (omit details of hormonal control)<br>● Challenges related to the menstrual cycle (include *irregular periods, irregular bleeding, and pain)*<br>● Process of fertilisation and implantation (cover *fusion of sperm with the egg and implantation of blastocyst in the uterus)*<br>***Note:*** *-details on formation of blastocyst not necessary*<br>● Symptoms and prevention of common STIs *(HIV& Aids, Gonorrhea, Syphilis, Herpes - Avoid details of causative agent*) | By the end of the sub strand the learner should be able to:<br>a) outline the menstrual cycle and its related challenges in human beings,<br>b) develop a plan to manage challenges related to menstrual cycle in human beings,<br>c) describe fertilisation and implantation in human beings,<br>d) outline symptoms and prevention of common STIs in human beings,<br>e) appreciate the need for a healthy reproductive system. | The learner is guided to:<br>● search for information from print or non-print media on the menstrual cycle and discuss with peers,<br>● search for information from print or non-print media on challenges related to the menstrual cycle and discuss with peers,<br>● discuss management of challenges related to the menstrual cycle and share experiences with peers,<br>● study illustrations/charts on fertilisation and implantation,<br>● search for information from print and non-print materials on symptoms of common STIs and their prevention, discuss. | How best can challenges related to the menstrual cycle be managed? |
| **Core competencies to be developed:**<br>● **Learning to learn:** The learner organises own learning while searching for information from print and non-print materials on symptoms of common STIs and their prevention.<br>● **Self-efficacy:** The learner appreciates and successfully manages challenges related to the menstrual cycle. | | | | |
| **Values:**<br>● **Love:** The learner shows empathy and embraces those with menstrual challenges.<br>● **Respect**: The learner shows open mindedness while discussing symptoms of common STIs and their prevention. | | | | |
| **Pertinent and Contemporary Issues (PCIs):**<br>● **Health promotion issues** The learner discusses challenges related to the menstrual cycle and prevention of common STIs. | | | | |
| **Link to other learning areas:** | | | | |

- The information on common STIs is linked to communicable diseases in Agriculture and Nutrition.

| **Suggested Assessment Rubric** | | | | |
|---|---|---|---|---|
| **Levels**<br>**Indicator** | **Exceeds expectation** | **Meets expectation** | **Approaches expectation** | **Below expectation** |
| Comparing plant and animal cells as observed under a light microscope | Compares plant and animal cells as observed under a light microscope comprehensively | Compares plant and animal cells as observed under a light microscope | Compares plant and animal cells as observed under a light microscope partially | Compares plant and animal cells as observed under a light microscope partially with prompts |
| Explaining the role of diffusion and osmosis in living things | Explains the role of diffusion and osmosis in living things in-depth | Explains the role of diffusion and osmosis in living things | Explains the role of diffusion and osmosis in living things partially | Explains the role of diffusion and osmosis in living things partially with prompts |
| Demonstrating diffusion and osmosis in living things | Demonstrates diffusion and osmosis in living things skillfully | Demonstrates diffusion and osmosis in living things | Demonstrates diffusion and osmosis in living things simplistically | Demonstrates diffusion and osmosis in living things haphazardly |
| Outlining the menstrual cycle and its related challenges in human beings | Outlines the menstrual cycle and its related challenges in human beings exhaustively | Outlines the menstrual cycle and its related challenges in human beings | Outlines the menstrual cycle and its related challenges in human beings superficially | Outlines the menstrual cycle and its related challenges in human beings superficially with prompts |
| Developing a plan to manage challenges related to menstrual cycle in human beings | Develops an innovative plan to manage challenges related to menstrual cycle in human beings | Develops a plan to manage challenges related to menstrual cycle in human beings | Develops a simple plan to manage challenges related to menstrual cycle in human beings | Develops a simple plan to manage challenges related to menstrual cycle in human with prompts |

**STRAND 3.0: FORCE AND ENERGY**

| Strand | Sub Strand | Specific Learning Outcomes | Suggested Learning Experiences | Key Inquiry Question(s) |
|---|---|---|---|---|
| **3.0 Force and energy** | **3.1 Transformation of energy**<br><br>**(20 lessons)**<br><br>● Forms of energy in nature<br>● Renewable and non-renewable energy sources<br>● Energy transformations in nature<br>● Safety measures associated with energy transformation<br>● Applications of energy transformation in day-to- day life. | By the end of the sub strand, the learner should be able to:<br>a) identify forms of energy in nature,<br>b) classify energy sources into either renewable or non-renewable,<br>c) demonstrate simple energy transformations in nature,<br>d) describe safety measures associated with energy transformation,<br>e) appreciate the applications of energy transformation in day-to- day life. | The learner is guided to:<br>● discuss with peers and identify forms of energy found in nature *(light, heat, potential, kinetic, gravitational, electrical energy, sound energy, chemical energy, nuclear or atomic energy),*<br>● discuss and classify energy sources in nature *(renewable and non-renewable sources),*<br>● use digital or print media to search for more information on classification of energy sources in nature*,*<br>● carry out activities to show energy transformation in day-to-day life (*electrical to heat, chemical to electrical, mechanical to electrical, electrical to light, electrical to sound and potential to kinetic)*,<br>● discuss and identify applications of energy transformations in day to day life (*use of a falling object, rubbing both hands, burning of wood, electric bulbs, Light Emitting Diodes (LED), electric heater, steam engine, piezoelectricity, microphone, windmills, electric generator/dynamo, hydroelectric dams, thermocouple, geothermal power plant, solar panel, electric motor*),<br>● use digital or print media to search for more information on the applications of energy transformations in day to day life,<br>● discuss safety measures associated with energy transformation and strategies of mitigating them (*relate to road accidents*; *K.E to P.E; action and reaction, accidents caused by fire, electricity, health* | 1. What are the sources of energy in the environment?<br>2. How is energy transformation applied in day-to-day life? |

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| | | | *hazard from bright light, loud sound*),<br>● use digital or print media to search for more information on safety measures associated with energy transformation and strategies of mitigating them. | |

**Core competencies to be developed:**

- **Critical thinking and problem solving:** The learner explores problems and creates different solutions as they discuss examples and applications of energy transformation processes in day to day life.
- **Creativity and imagination**: The learner experiments with ideas to test workability of energy transformation in day-to-day life.

**Pertinent and Contemporary Issues (PCIs):**

- **Citizenship education:** The learner exercises civic responsibility as they use digital or print media to search for more information on safety measures associated with energy transformation and strategies of mitigating them.

**Values:**

- **Social justice:** The learner cooperates with peers as they discuss and classify energy sources in nature.
- **Love:** The learner cares for others as they demonstrate the processes of energy transformation in day-to-day life.

**Link to other Learning Areas:**

**Agriculture and Nutrition:** The learner relates the concept of energy transformation to cooking processes in day-to-day life.

| Strand | Sub Strand | Specific Learning Outcomes | Suggested Learning Experiences | Key Inquiry Questions |
|---|---|---|---|---|
| **3.0 Force and Energy** | **3.2 Pressure (16 lessons)**<br>● Pressure in solids and liquids<br>● Applications of pressure in solids and liquids | By the end of the sub strand, the learner should be able to:<br>a) describe pressure in solids and liquids,<br>b) demonstrate pressure in solids and liquids,<br>c) identify applications of pressure in solids | The learner is guided to:<br>● brainstorm on the meaning of pressure as used in science,<br>● carry out activities to demonstrate pressure exerted by solids *(sharp and blunt cutting surfaces, stiletto and fl*at *soled shoes, bricks on different surfaces, construction of water dams),*<br>● carry out activities to demonstrate pressure in liquids *(tin with vertical holes at different heights filled with* | What are the applications of pressure in solids and liquids? |

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| | | and liquids,<br>d) appreciate the applications of pressure in solids and liquids. | *water, water finding its own level in a container, the syringe, drinking straw),*<br>● discuss the relationship among pressure, area of contact and weight of solids and relationship between pressure and height of liquid based on observations made on materials with different surface areas and liquid columns *(qualitative treatment only),*<br>● discuss the applications of pressure in solids and liquids *(axle load capacity, syringe, high heeled shoes, cutting tools, car brakes, siphons, bicycle pumps, drinking straw).*<br>● use digital or print media to search for more information on the applications of pressure in solids and liquids. | |

**Core competencies to be developed:**

- **Digital literacy:** The learner interacts with technology while using digital media to search for more information on the applications of pressure in solids and liquids.
- **Learning to Learn**: The learner realizes new findings on the relationship among pressure, area of contact and weight of solids, and relationship between pressure and height of liquid.

**Pertinent and Contemporary Issues (PCIs):**

**Citizenship education**: The learner exercises human rights as they use digital or print media to search for more information on the applications of pressure in solids and liquids.

**Values:**

- **Unity:** The learner cooperates while carrying out activities to demonstrate pressure exerted by solids and pressure in liquids.
- **Integrity:** The learner follows laid down procedures in using appropriate materials in groups to demonstrate pressure in liquids give fair results.

**Link to other Learning Areas:**

- Pre-technical and Business Studies: The learner relates concepts of pressure in construction.

| **Assessment Rubric** | | | | |
|---|---|---|---|---|
| **Indicator** | **Exceeds expectation** | **Meets expectation** | **Approaches expectation** | **Below expectation** |
| Ability to classify energy sources into either renewable or nonrenewable | Classifies energy sources into either renewable or nonrenewable extensively | Classifies energy sources into either renewable or nonrenewable sufficiently | Classifies a few energy sources into either renewable or nonrenewable | Classifies energy sources into either renewable or nonrenewable with prompt |
| Ability to demonstrate simple energy transformations in nature. | Demonstrates simple energy transformations in nature correctly and consistently | Demonstrates simple energy transformations in nature correctly | Demonstrates simple energy transformations in nature partially | Demonstrates simple energy transformations in nature with hints |
| Ability to describe safety measures associated with energy transformation. | Describes safety measures associated with energy transformation extensively | Describes safety measures associated with energy transformation sufficiently | Describes some safety measures associated with energy transformation correctly | Describes some safety measures associated with energy transformation with prompt |
| Ability to demonstrate pressure in solids, and liquids. | Demonstrates pressure in solids and liquids correctly an consistently | Demonstrates pressure in solids and liquids correctly | Demonstrates pressure in solids and liquids partially | Demonstrates pressure in solids and liquids with hints |
| Ability to identify applications of pressure in solids and liquids. | Identifies applications of pressure in solids and liquids extensively | Identifies applications of pressure in solids and liquids sufficiently | Identifies some applications of pressure in solids and liquids correctly | Identifies some applications of pressure in solids and liquids with prompt |

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

| Assessment Methods in Science | Learning Resources | Non-Formal Activities |
|---|---|---|
| • Reflections<br>• Game Playing<br>• Pre-Post Testing<br>• Model Making<br>• Explorations<br>• Experiments<br>• Investigations<br>• Conventions, Conferences, and Debates<br>• Applications<br>• Teacher Observations<br>• Project<br>• Journals<br>• Portfolio<br>• Oral or Aural Questions<br>• Learner's Profile<br>• Written Tests<br>• Anecdotal Records | • Laboratory Apparatus and Equipment<br>• Textbooks<br>• Software<br>• Relevant reading materials<br>• Digital Devices<br>• Recordings | • Visit the science historical sites.<br>• Use digital devices to conduct scientific research.<br>• Organizing walks to have live learning experiences.<br>• Developing simple guidelines on how to identify and solve some community problems.<br>• Conducting science document analysis.<br>• Participating in talks by resource persons on science concepts.<br>• Participating in science clubs and societies<br>• Attending and participating science and engineering fairs<br>• Organizing and participating in exchange programmes.<br>• Making oral presentations and demonstrations on science issues. |

**CSL AT GRADE 8**
**STRAND 2.0 COMMUNITY SERVICE LEARNING PROJECT**
**Introduction**
In Grade 8, learners will undertake an integrated Community Service Learning (CSL) project of choice from a single or combined subject. The CSL project will enable the learner to apply knowledge and skills from other subjects to address a problem in the community. The implementation of the integrated CSL project will take a Whole School Approach, where all members of the school community including teachers, school administration, parents/guardians/ local community and support staff. It will be a collaborative effort where the teacher of Social Studies coordinates and works with other subject teachers to design and implement the integrated CSL projects. The teachers will select a theme drawn from different Learning Areas and the broader categories of Pertinent and Contemporary Issues (PCIs) for the CSL project. It should also provide an opportunity for development of core competencies and nurturing of values. Learners will undertake **one common** integrated class CSL project following a 6-step milestone approach as follows:

| **Milestone** | **Description** |
|---|---|
| Milestone 1 | **Problem Identification**<br>Learners study their community to understand the challenges faced and their effects on community members. Some of the challenges in the community can be:<br>• Environmental degradation<br>• Lifestyle diseases, Communicable and non-communicable diseases<br>• Poverty<br>• Violence and conflicts in the community<br>• Food security issues |
| Milestone 2 | **Designing a solution**<br>Learners create an intervention to address the challenge identified. |

| | |
|---|---|
| Milestone 3 | **Planning for the Project**<br>Learners share roles, create a list of activities to be undertaken, mobilise resources needed to create their intervention and set timelines for execution |
| Milestone 4 | **Implementation**<br>The learners execute the project and keep evidence of work done. |
| Milestone 5 | Showcasing /Exhibition and Report Writing<br>Exhibitions involve showcasing learners' project items to the community and reflecting on the feedback<br>Learners write a report detailing their project activities and learnings from feedback |
| Milestone 6 | Reflection<br>Learners review all project work to learn from the challenges faced.<br>They link project work with academic concepts, noting how the concepts enabled them to do their project as well as how the project helped to deepen learning of the academic concepts. |

**NOTE:** The milestones will be staggered across the 3 terms of the academic calendar.

**Assessment of CSL integrated Project**

Assessment for the integrated CSL project will be conducted formatively. The assessment will consider both the process and end product. This entails assessing each of the milestone stages of the integrated CSL class project. It will focus on 3 components namely: skills from various learning areas

applied in carrying out the project, core competencies developed and values nurtured.