



REPUBLIC OF KENYA
MINISTRY OF EDUCATION

JUNIOR SECONDARY SCHOOL CURRICULUM DESIGN

INTEGRATED SCIENCE
FOR LEARNERS WITH VISUAL IMPAIRMENT

GRADE 7



KENYA INSTITUTE OF CURRICULUM DEVELOPMENT

First Published in 2022

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FOREWORD

Curriculum is a tool, which a country employs to empower its citizens. The Kenya Institute of Curriculum Development in meeting its core mandate ‘*to develop curriculum and curriculum support materials*’ has spearheaded curriculum reforms in the education sector. The reforms are based on rigorous research, monitoring and evaluation activities conducted on the 8-4-4 system of education to inform the Competency-Based Curriculum through a phase-in phase-out model. The reforms were informed by the Summative Evaluation Survey (2009), Needs Assessment Study (2016) and the Task Force Report on Re-alignment of Education Sector (2012), 21st century learning and approaches, the East Africa Protocol on harmonisation of education, among many others.

The curriculum reforms aim at meeting the needs of the Kenyan society by aligning the curriculum to the Constitution of Kenya 2010, the Kenya Vision 2030 and the East African Protocol, among other policy requirements as documented by the Sessional Paper No. 1 of 2019 on ‘Reforming Education and Training in Kenya for Sustainable Development’. The reforms adopted the Competency-Based Curriculum (CBC) to achieve development of requisite knowledge, skills, values and attitudes that will drive the country’s future generations as documented by the Basic Education Curriculum Framework (BECF). Towards achieving the mission of the Basic Education, the Ministry of Education has successfully and progressively rolled out curriculum implementation for Early Years Education and Foundation level, Grades 4, 5 and Intermediate Level. The roll out for Grade 6, Junior Secondary (Grade 7-9), and Prevocational Level will subsequently follow.

It is my hope that the curriculum designs for learners with visual impairment in Grade 7 will guide the teachers, among other educational stakeholders, for progressive achievement of the curriculum vision, which seeks to have engaged, empowered and ethical citizens.

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PREFACE

The Government of Kenya embarked on the national implementation of the Competency Based Curriculum in January, 2019 for Early Years Education (Pre-Primary 1 and 2, and Lower Primary Grade 1, 2 and 3) and Foundation Level. The implementation progressed to Upper Primary (Grade 4, 5 and 6) and Intermediate Level based on the reorganization of the Basic Education structure. Grade 7 curriculum furthers implementation of the Competency-Based Curriculum to Junior Secondary education level. This level marks the zenith of Middle School education whose main feature is to offer a broad opportunity for the learner to explore talents, interests and abilities before selection of pathways and tracks in Senior Secondary education level. This is similar to the Pre-vocational and Vocational Level.

The Grade 7 curriculum designs for learners with Visual Impairment in the respective learning areas will enable the development of 21st Century competencies. Ultimately, this will lead to the realization of the vision and mission of the Competency-Based Curriculum as documented in the Basic Education Curriculum Framework (KICD, 2017).

It is my hope that all Government agencies among other stakeholders in education will use the designs to guide effective and efficient implementation of the learning activities as well as provide relevant feedback on various aspects of the curriculum. Successful implementation of the Grade 7 curriculum for learners with Visual Impairment will be a significant milestone towards realization of the curriculum mission ‘Nurturing Every Learner’s Potential

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ACKNOWLEDGEMENTS

The Kenya Institute of Curriculum Development (KICD) Act Number 4 of 2013 (Revised 2019) mandates the Institute to develop curricula and curriculum support materials for basic and tertiary education and training, below the university. The curriculum development process for any level involves thorough research, international benchmarking, and robust stakeholder engagement. Through this systematic and consultative process, KICD conceptualised the Competency Based Curriculum (CBC) as captured in the Basic Education Curriculum Framework (BECF). The CBC responds to the demands of the 21st Century and the aspirations captured in the Constitution of Kenya 2010, Kenya Vision 2030, East African Commission Protocol and the United Nations Sustainable Development Goals.

The Kenya Institute of Curriculum Development has developed and adapted the Grade 7 curriculum designs for learners with Visual Impairment taking cognizance of the tenets of the CBC, key among them being the need to ensure that learners are provided with learning experiences that call for higher order thinking, thereby ensuring they become engaged, empowered and ethical citizens as articulated in the BECF Vision. The Grade 7 designs for learners with Visual Impairment also provide opportunities for learners to develop the core competencies as well as engage in Community Service Learning. The designs present an assessment rubric linked to sub strands in the individual subjects. Teachers are encouraged to use varied assessment tools when assessing learners.

KICD obtains its funding from the Government of Kenya to enable the achievement of its mandate and implementation of the Government and Sector (Ministry of Education (MoE) plans. The Institute also receives support from development partners targeting specific programmes. The Grade 7 curriculum designs have been developed and adapted with the support of the World Bank through the Kenya Secondary Education Quality Improvement Program (SEQIP) commissioned by the MoE. The Institute is grateful for the support accorded to the process by the Government of Kenya, through the MoE and the development partners for the policy, resource, and logistical support.

I acknowledge the KICD curriculum developers and other staff, teachers and all the educators who participated, as panelists, in the development and adaptation of the designs. I also appreciate the contribution of the Semi-Autonomous Government Agencies (SAGAs) and representatives of various stakeholders for their various roles in the development and adaptation of the Grade 7 curriculum designs.

My special thanks to the Cabinet Secretary, Ministry of Education; the Principal Secretary State Department of Early Learning and Basic Education; the Secretary, Teachers' Service Commission (TSC) and the Chief Executive Officer, Kenya National Examinations Council (KNEC) for their support in the process. Finally, I am grateful to the KICD Governing Council for their consistent guidance during the development and adaptation of the curriculum designs. The Institute assures all curriculum implementers, parents, and other stakeholders that the designs will ensure effective implementation of the CBC at Grade 7.

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TIME ALLOCATION

S/No.	Subject	Number of Lessons Per Week (40 minutes per lesson)
1.	English	5
2.	Kiswahili/KSL	4
3.	Mathematics	5
4.	Integrated Science	4
5.	Health Education	2
6.	Pre technical Studies	4
7.	Social Studies	3
8.	Religious Education (CRE/IRE/HRE)	3
9.	Business Studies	3
10.	Agriculture	3
11.	Life Skills Education	1
12.	Physical Education and Sports	2
13.	Optional Subject including Braille skills	3
14.	Optional Subject	3
	Total	45

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 in the wake of rapid modernization. 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 recognizes 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-fulfillment**
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 instill 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.

LEARNING OUTCOMES FOR MIDDLE SCHOOL

By the end of Middle 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. Practice 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 coexistence;
8. Manage pertinent and contemporary issues in society effectively;
9. Apply digital literacy skills for communication and learning.

ESSENCE STATEMENT

Science is a dynamic, collaborative human endeavor that enables use of distinctive ways of logistical valuing, thinking and working to understand natural phenomena in the biological, physical and technological world. The emphasis of science education for learners with visual impairment at lower secondary level is to enhance their scientific thinking through suitable learning activities that involve planning, designing, measuring, manipulating, observing, evaluating procedures, examining evidence, and analyzing data. This is envisaged in The Kenya Vision 2030, which states in part that, “The achievement of the vision greatly depends on Science, Technology and Innovation.” Equally, Sessional Paper No.1 of 2005 highlights the fact that “for a breakthrough towards industrialization, 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.” The same is further underscored in both Sessional Paper No. 14 of 2012 and Sessional Paper 1 of 2019 which equally stresses the need for sustainable basic and higher education, with an emphasis on Science, Technology and Innovation.

Learners with visual impairment, particularly those with blindness have not been learning certain concepts in science especially those related to chemistry and physics. In view of this, integrated science has been adapted to create a scientific culture among these learners that inculcates scientific literacy to enable them make informed choices in their personal lives and approach their life challenges in a systematic and logical manner. This learning area intends to enable learners to practically explore and discover knowledge within their environment and in the laboratory to allow them to understand themselves and relate with their environment through application of scientific principles and ideas. Suitable apparatus, equipment, materials and experiences have been suggested to make learning in this subject accommodative and interesting to learners with visual impairment. Learners with low vision need enhancement in terms of materials and learning environment to address the limitations of sight when learning integrated science. The integrated science learning area 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, attitudes and values 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 upper primary school level. This provides the learner with the basic requisite skills, knowledge, values and attitudes necessary for specialization in pure sciences (Physics, Chemistry, and Biology), applied sciences, Careers and Technology Studies (CTS) and Technical and Engineering subjects offered in the STEM pathway at senior school. Integrated science is taught through inquiry-based learning approaches with an emphasis on the 5Es: engagement, exploration, explanation, elaboration and evaluation.

SUBJECT GENERAL LEARNING OUTCOMES

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

- a) Acquire sufficient scientific knowledge, skills, values and attitudes to make informed choices on career pathways at senior school and for everyday use, further education and training;
- b) Select, improvise and safely use adapted basic scientific apparatus, materials and chemicals effectively in everyday life;
- c) Explore, manipulate, manage and conserve the environment for learning and sustainable development;
- d) Practice relevant hygiene, sanitation and nutrition skills to promote good health;
- e) Apply the understanding of body systems with a view to promote and maintain good health;
- f) Develop capacity for scientific inquiry and problem solving in different situations;
- g) Appreciate and use scientific principles and knowledge in everyday life;
- h) Apply acquired scientific skills and knowledge to construct appropriate scientific devices from available resources.

STRAND 1.0: SCIENTIFIC INVESTIGATION

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
1.0 Scientific Investigation	1.1 Introduction to Integrated Science 4 Lessons	By the end of the sub-strand the learner should be able to: a) identify the components of Integrated Science as a field of study; b) relate knowledge and skills gained in Integrated Science to career opportunities; c) appreciate the importance of Integrated Science in daily life.	<ul style="list-style-type: none"> ● In groups, learners discuss the meaning and components of Integrated Science. ● In pairs, learners discuss career opportunities related to knowledge and skills gained in Integrated Science. ● Learners are guided to identify pathways related to Integrated Science at Senior school. ● Learners to search for information on the importance of Integrated Science from sources like the internet using digital devices with assistive technology and materials in braille or print. ● In groups, learners discuss the importance of scientific knowledge in daily life. 	How is the knowledge acquired in Integrated Science useful in daily life?
Core competencies to be developed: <ul style="list-style-type: none"> ● Communication and collaboration as learners share information while discussing the importance of scientific knowledge in daily life. ● Citizenship as learners search for local and international career opportunities related to Integrated Science. ● Digital literacy as learners use digital devices with assistive technology to search for information on the importance of Integrated Science. ● Self-efficacy as learners discuss confidently the pathways and career opportunities associated with Integrated Science. 				
Pertinent and Contemporary Issues (PCIs) <ul style="list-style-type: none"> ● Poverty eradication is enhanced as learners discuss how scientific knowledge is applied in solving problems within their environment and generating income. ● Safety and security skills are enhanced as learners search for information on the internet using the digital devices with assistive technology while observing cyber security regulations. 				
Links to other subjects: <ul style="list-style-type: none"> ● Computer studies as learners search for information from the internet using digital devices with assistive technology. 				

<ul style="list-style-type: none"> ● Values: ● Respect is promoted as learners respect opinions of others during the discussions.
<p>Suggested Non-Formal Activities</p> <ul style="list-style-type: none"> ● Learners to watch and listen to video tapes on components of Integrated Science during clubs and societies.
<p>Suggested Assessment Methods</p> <ul style="list-style-type: none"> ● Observation, ● Practical Work, ● Written assignments in print or braille, ● Oral Questions, ● Self and peer assessment.
<p>Suggested Learning Resources</p> <ul style="list-style-type: none"> ● Course book in print and braille ● Digital devices with assistive technology

Assessment Rubric				
Criteria	Exceeds expectation	Meets expectation	Approaches expectation	Below expectation
Identifying the components of Integrated Science.	Identifies components of Integrated Science and states their relationship.	Identifies three components of Integrated Science.	Identifies two components of Integrated Science.	Identifies one component of Integrated Science.
Relating knowledge and skills gained in Integrated Science to career opportunities.	Relates knowledge and skills gained in Integrated Science to a variety of career opportunities.	Relates knowledge and skills gained in Integrated Science to career opportunities.	Relates knowledge and skills gained in Integrated Science to career opportunities in one field.	Mentions career opportunities related to Integrated Science.

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
1.0 Scientific Investigation	1.2 Laboratory Safety 8 Lessons	By the end of the sub-strand the learner should be able to: a) identify common hazards and their symbols in the laboratory; analyse causes of common accidents in the laboratory; b) demonstrate first aid safety measures for common laboratory accidents; c) appreciate the importance of safety in the laboratory and access to a healthy working environment.	<ul style="list-style-type: none"> ● Learners identify common hazards and accidents in the laboratory. ● Learners with low vision are guided to interpret common hazard symbols in appropriate print and colour contrast including but not limited to flammable, corrosive, toxic, carcinogenic, radioactive substances among others. ● Learners with blindness are guided to identify the names of common hazard symbols in braille. ● In groups, learners discuss causes of common laboratory accidents and related first aid measures such as burns and scalds, cuts, and ingestion of harmful substances. ● In groups, learners practice first aid procedures for common accidents in the laboratory. ● Learners observe safety measures in the laboratory and the general school learning environment. <p><i>Hint: Label hazardous chemicals in the laboratory using sandpaper for identification by learners with blindness.</i></p> <ul style="list-style-type: none"> ● In groups, learners discuss the importance of safety measures in the laboratory. ● Learners to search for laboratory safety procedures from other sources such as the internet, e-libraries using digital devices with assistive technology among others. 	<ol style="list-style-type: none"> 1. How do accidents happen in the laboratory? 2. Why should safety measures be considered while constructing a laboratory?
<p>Core competencies to be developed:</p> <ul style="list-style-type: none"> ● Communication and collaboration as learners share information while working in groups during discussions and practice laboratory safety measures. ● Imagination and Creativity as learners practice first aid procedures for common accidents in the laboratory. 				

<ul style="list-style-type: none"> ● Digital literacy as learners use digital devices with assistive technology to access and study content on First Aid procedures. ● Citizenship as learners adhere to laboratory safety measures for self and others.
<p>Pertinent and Contemporary Issues (PCIs)</p> <ul style="list-style-type: none"> ● Disaster Risk Reduction is enhanced as learners practice safety precautions in the laboratory. ● Citizenship is enhanced as learners use knowledge and skills gained in safety measures and first aid procedures to assist peers and community. ● Safety Issues are enhanced as learners adhere to laboratory safety measures for self and others.
<p>Values:</p> <ul style="list-style-type: none"> ● Respect is enhanced as learners become considerate of the opinion of others while working in groups. ● Responsibility is enhanced as learners observe their own safety and mind safety of others when working in the laboratory, prudent usage of laboratory materials and proper disposal of waste.
<p>Links to other subjects:</p> <ul style="list-style-type: none"> ● Health Education as learners practice safety measures and first aid procedures. ● Home Science as learners' practice first aid procedures to demonstrate safety.
<p>Suggested non-formal activities</p> <ul style="list-style-type: none"> ● Learners watch and listen to video tapes on components of Integrated Science as a field of study during science clubs.
<p>Suggested Assessment Methods</p> <ul style="list-style-type: none"> ● Observation, ● Practical Work, ● Assessment Rubrics, ● Written assignments in print and braille, ● Oral Questions.
<p>Suggested Learning Resources</p> <p>Digital devices with assistive technology, charts with common hazard symbols, first aid kit, sand paper</p>

Assessment Rubric				
Indicator	Exceeds expectation	Meets expectation	Approaches expectation	Below expectation
Identifying common hazards and their symbols in the laboratory.	Identifies hazards and accidents in the laboratory and states how they can be avoided.	Identifies hazards and accidents in the laboratory.	States hazards and accidents in the laboratory.	Names hazards and accidents in the laboratory.
Analyzing causes of common accidents in the laboratory.	Analyses causes of common accidents in the laboratory and states how to prevent them.	Analyses causes of common accidents in the laboratory.	Describes causes of common accidents in the laboratory.	Names causes of common accidents in the laboratory.
Demonstrating procedures of first aid safety measures for common laboratory accidents in the laboratory.	Demonstrates a variety of procedures of first aid safety measures for common laboratory accidents in the laboratory.	Demonstrates procedures of first aid safety measures for common laboratory accidents in the laboratory.	Identifies procedures of first aid safety measures for common laboratory accidents in the laboratory.	Names first aid safety measures for common laboratory accidents in the laboratory.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
1.0 Scientific Investigation	1.3. Basic Science skills 10 Lessons	By the end of the sub strand the learner should be able to: a) identify basic skills in science; b) use the International System of Units (SI) for basic and derived quantities in science; b) appreciate the application of Basic skills in science.	<ul style="list-style-type: none"> ● In groups, learners with visual impairment identify basic skills in science such as manipulation, observation, measurement, classification, prediction, communication and conclusion skills. ● Learners with low vision read labels on products using optical assistive devices. ● Learners with blindness read tactile packing labels on products. ● Learners to brainstorm on the importance of reading packing labels on quantities and products. ● In groups, learners apply the International System of Units (SI) to determine temperature, length, mass, time, electric current, area, volume and density. ● Learners to search for information on science skills from the internet using digital devices with assistive technology. 	<ol style="list-style-type: none"> 1. Why are basic skills in science important in daily life? 2. How is science information communicate?

Assessment Rubric				
Criteria	Exceeds expectation	Meets expectation	Approaches expectation	Below expectation
Identifying basic skills in science.	Identifies basic Science skills and applies them.	Identifies basic science skills.	States basic Science skills.	Names basic Science skills.
Using the SI units for basic and derived quantities in science.	Uses the SI units for basic and derived quantities and interconverts them.	Uses the SI units for basic and derived quantities.	Uses SI units for basic quantities.	Names the SI units for basic quantities.

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Question(s)
1.0 Scientific Investigation	1.4 Laboratory apparatus and instruments 11 Lessons	By the end of the sub-strand the learner should be able to: a) identify apparatus and instruments used in the laboratory; b) handle and care for the apparatus and instruments in the laboratory; c) appreciate the importance of consumer protection when handling different apparatus and chemicals in the laboratory.	<ul style="list-style-type: none"> ● In groups, learners with low vision explore the apparatus and instruments in the laboratory calibrated in appropriate print and colour contrast to identify different features of the apparatus. ● Learners with blindness manipulate the apparatus and instruments calibrated and labeled in tactile and the ones with voice output such as talking thermometers, digital stopwatches and weighing scales to identify different features of the apparatus. ● <i>Hint: include parts and functions of a microscope and Bunsen burner.</i> In pairs, learners with low vision handle and use adapted apparatus and instruments in the laboratory. ● Learners with blindness are given one on one demonstration on proper positioning of the apparatus and instruments for accurate measurement of different quantities. The learners are supported by sighted peers to measure accurate volume of liquids. ● Learners to search for information on safety precautions to observe when handling apparatus and instruments in the laboratory. ● Learners to observe safety precautions when handling chemicals, adapted apparatus and instruments in the laboratory. 	<ol style="list-style-type: none"> 1. How are different laboratory apparatus and instruments used? 2. Why should we consider basic measures when storing different laboratory apparatus?
<p>Core competencies to be developed:</p> <ul style="list-style-type: none"> ● Communication and Collaboration as learners share ideas using appropriate language as they work in groups when carrying out laboratory experiments and activities. 				

<ul style="list-style-type: none"> ● Citizenship as learners observe their own safety and of others when handling adapted apparatus and instruments. ● Digital literacy as learners use digital devices with assistive technology to search for safety precautions to observe when handling apparatus and instruments.
<p>Pertinent and Contemporary Issues (PCIs):</p> <ul style="list-style-type: none"> ● Environmental Education is enhanced as learners appropriately dispose of the consumables and any broken equipment in the laboratory. ● Disaster Risk Reduction is enhanced as learners observe safety precautions when handling adapted apparatus and instruments in the laboratory. ● Safety issues are enhanced as learners take care of laboratory apparatus to avoid breakages and injuries to them and others.
<p>Values:</p> <ul style="list-style-type: none"> ● Respect is promoted as learners respect others' opinions while working in groups. ● Responsibility is promoted as learners care for apparatus, chemicals and specimens, as they handle adapted laboratory equipment and apparatus during experiments. ● Social justice is promoted as learners share laboratory adapted apparatus and equipment to undertake experiments.
<p>Links to other subjects:</p> <ul style="list-style-type: none"> ● Home Science as learners carry out measurements of ingredients when preparing meals. ● Mathematics as learners carry out measurements of various quantities of substances.
<p>Suggested Non-Formal Activities:</p> <ul style="list-style-type: none"> ● Learners to make posters and charts in appropriate print or braille on how to safely handle and use apparatus and instruments in the laboratory.
<p>Suggested Assessment Methods:</p> <ul style="list-style-type: none"> ● Practical Work ● Observation ● Self and peer assessment ● Written assignments in print or braille ● Oral questions
<p>Suggested Learning Resources Heating: Bunsen burner, digital ,water bath, gas and kerosene stove, Measuring mass: digital talking electronic balance, Temperature: talking digital thermometer and alcohol thermometer, Length: meter rule calibrated in tactile and appropriate color contrast, font type, Volume: measuring cylinders, beakers, volumetric flasks, pipette, burette calibrated in braille and appropriate print and color contrast, Weight: electronic spring balance, Magnification: microscope and hand lens ,Time: digital talking stopwatch, talking colour detector and liquid level indicator.</p>

Assessment Rubric				
Criteria	Exceeds expectation	Meets expectation	Approaches expectation	Below expectation
Identifying apparatus and instruments used in the laboratory.	Identifies apparatus and instruments used in the laboratory and group them according to their use.	Identifies apparatus and instruments used in the laboratory.	Identifies either apparatus or instruments used in the laboratory.	Names either apparatus or instruments used in the laboratory.
Handling apparatus and instruments laboratory.	Handles laboratory apparatus and instruments and stores them appropriately.	Handles apparatus and instruments appropriately.	Handles either apparatus or instruments appropriately.	Identifies apparatus and instruments.

STRAND 2.0: MIXTURES

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
2.0 Mixtures, Elements and Compounds	2.1 Mixtures 14 Lessons	By the end of the sub strand the learner should be able to: a) classify different types of mixtures as homogeneous or heterogeneous; b) distinguish between pure and impure substances using melting and boiling points; c) separate mixtures using different methods; d) appreciate the use of different methods of separating mixtures in day-to-day life.	<ul style="list-style-type: none"> ● Learners are guided to identify different mixtures through one on one demonstration to feel the texture and size of the solid particles in solid-solid mixtures such as maize and beans and solid-liquid mixtures such as sand and water. <i>Learners with low vision observe liquid-liquid mixtures to identify their properties. Learners with blindness are given verbal descriptions on the properties of liquid-liquid and gas-gas mixtures.</i> ● In groups, learners categorize different mixtures as homogeneous and heterogeneous such as in solid-solid, solid- liquid, liquid-liquid and gas- gas mixtures. ● In pairs, learners with low vision carry out simple experiments to determine the boiling and melting points of pure and impure substances such as ice, candle wax, water, and salty water. ● Learners with blindness manipulate pure and impure substances such as ice, candle wax and water before heating. Learners are guided to experience the substances after heating. Learners are supported by sighted peers to read the temperature taken using a digital talking thermometer at different time intervals during heating and cooling of substances. ● Learners search, watch and listen to videos and animations on how to determine melting and boiling points of substances. ● In groups, learners with visual impairment to separate different types of mixtures using various methods of separating mixtures as follows: 	<ol style="list-style-type: none"> 1. How can you classify mixtures? 2. Why are mixtures separated?

			<p><i>Simple distillation:</i> Learners identify apparatus used during simple distillation such as boiling tube, cork, delivery tube, test tube and beaker. Learners with blindness are supported by sighted peers in setting up the experiment. Learners to feel the residue in boiling tube and distillate in the test tube.</p> <p><i>Filtration:</i> Learners are guided to fold a filter paper to fit well in a filter funnel. Learners to swirl solid- liquid mixture and then pour it carefully on the filter funnel. Learners with low vision identify residue on the filter paper and filtrate in the beaker or conical flask. Learners with blindness to manipulate the filtrate and residue.</p> <p><i>Decantation:</i> Learners are guided to feel solid-liquid mixture such as sand and water. Learners carefully pour out the liquid into another clean beaker. Learners feel the liquid and solid after separation.</p> <p><i>Use of a magnet:</i> Learners are guided to feel solid-solid mixture such as Sulphur and iron filings. Learners hold a magnet slightly above the mixture to attract magnetic substance to separate the mixture. Learners with blindness are guided to feel magnetic materials attracted by the magnet and the substance that was not attracted.</p> <p><i>Sublimation:</i> Learners are guided to feel solid-solid mixture such as sodium chloride and iodine. Learners are guided to set up the experiment. Learners are guided to feel the sublimate on the lower part of the watch glass and residue in the beaker. Learners with blindness are given verbal description on the colour of the mixture, vapour and sublimate.</p> <p><i>Paper chromatography:</i> Learners identify apparatus and materials for setting up the experiment such as boiling tube, beaker, filter paper strip, organic solvent and black</p>	
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			<p>ink. Learners with low vision to observe the process of separation on the filter paper strip. Learners with blindness are given verbal description on location of baseline, solvent front and components of ink and the properties that make them possible to separate through paper chromatography.</p> <p><i>Solvent extraction:</i> Learners are guided to identify apparatus and materials for setting up the experiment such as pestle and mortar, nuts, organic solvent and filter paper. Learners to crush nuts while adding the solvents such as propanone and put the mixture into the evaporating dish. Learners to feel the oil that remains in the evaporating dish.</p> <p><i>Crystallization:</i> Learners identify apparatus and materials such beakers, wire gauze, tripod stand, source of heat and copper (II) sulphate powder. Learners feel copper (II) sulphate powder and set up the experiment. Learners are guided to feel the crystals of hydrated copper (II) sulphate at the end of the experiment.</p> <ul style="list-style-type: none"> ● In groups, learners discuss the applications of separating mixtures in day to day life such as crude oil refining, fractional distillation of liquefied air, extraction of oil from nuts. 	
<p>Core competencies to be developed:</p> <ul style="list-style-type: none"> ● Creativity and imagination as learners separate different mixtures using various methods. ● Digital literacy as learners use digital devices with assistive technology to search, watch and listen to videos and animations on determining melting and boiling points of substances. ● Learning to learn as learners search for other methods of separating mixtures and apply them on separating mixtures. 				
<p>Pertinent and Contemporary Issues (PCIs):</p> <ul style="list-style-type: none"> ● Social cohesion is enhanced as learners work in groups to separate mixtures. ● Safety issues are enhanced as learners observe safety precautions while carrying out experiments on mixtures. ● Citizenship is enhanced as learners appreciate local industries that apply different methods of separating mixtures. 				

Values:

- Unity is enhanced as learners work harmoniously in groups while carrying out simple experiments on mixtures.
- Integrity is enhanced as learners separate mixtures and report findings honestly.
- Responsibility is enhanced as learners take care of instruments and apparatus while carrying out experiments.

Links to other subjects:

- Home Science as learners use different ingredients to prepare meals following various recipes.
- Agriculture as learners apply the knowledge on separating mixtures in agricultural processes like straining milk, winnowing grains and straining honey among others.
- History as learners relate traditional methods of separating mixtures to modern methods.

Suggested Non-Formal Activities:

- Learners purify contaminated water for domestic uses using various methods of separation.

Suggested Assessment Methods:

- Written assignments in print or braille
- Oral Questions
- Observation
- Peer and self-assessment

Suggested Learning Resources:

- Course book in braille and appropriate print.
- Beakers and conical flask calibrated in braille or appropriate print and colour contrast.
- Ice, candle wax, water/salty water.
- Sieve, magnet, magnetic material such as iron fillings, nails, mortar and pestle, corks, filter funnel, filter paper, watch glass and Bunsen burner.
- Boiling tubes, delivery tubes, copper (II) sulphate, nuts, sulphur, Sodium chloride, iodine, black ink, organic solvent such as propanone and ethanol.

Assessment Rubric				
Criteria	Exceeds expectation	Meets expectation	Approaches expectation	Below expectation
Classifying different types of mixtures as homogeneous and heterogeneous.	Classifies and categorizes different types of mixtures as homogeneous and heterogeneous.	Classifies different types of mixtures as homogeneous and heterogeneous.	Classifies homogeneous mixtures only.	States examples of mixtures.
Distinguishing between pure and impure substances using melting and boiling points.	Distinguishes between pure and impure substances using melting and boiling points and explains the meaning of melting point and boiling point.	Distinguishes between pure and impure substances using melting and boiling points.	Distinguishes between pure and impure substances using either melting or boiling point.	Identifies pure and impure substances.
Separating mixtures using different methods.	Separates mixtures using different methods and cites application in real life.	Separates mixtures using seven different methods.	Separates mixtures using at least four different methods.	Separates mixtures using three or less different methods.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
2.0 Mixtures, Elements and Compounds	2.2 Acids, bases and indicators 16 Lessons	By the end of the sub strand the learner should be able to: a) use plant extracts as acid-base indicator; b) categorize different household solutions as either acidic or basic using indicators; c) determine the strength of acids and bases using universal indicator ;	<ul style="list-style-type: none"> • In pairs, learners crush parts of a plant such as petals of a flower to prepare plant extract indicators using locally available materials. Learners with blindness are given verbal description on the colour of the plant extract indicator. • Learners with low vision identify the colour change of the indicator after adding a few drops of the indicator to the solutions. Learners with blindness use talking colour detectors to identify the colour of the indicator in different solutions. • In groups, learners use plant extract indicators to classify common household solutions such as soap solution, wood ash solution, toothpaste, lemon 	<ol style="list-style-type: none"> 1. How can you identify a substance as acidic or basic? 2. Why are acids and bases significant?

		<p>d) outline applications of acids, bases and indicators in real life;</p> <p>e) appreciate the applications of acids and bases in real life.</p>	<p>juice, sour milk, tap water as either acidic, neutral or basic.</p> <ul style="list-style-type: none"> ● In groups, learners with low vision classify different house-hold solutions as either acidic neutral or basic using commercial indicators such as methyl orange, litmus paper or phenolphthalein. Learners with blindness use a talking colour detector to classify different house-hold solutions. ● Learners search for information on different colours of acid- base indicators in different solutions. ● Learners to listen and watch audio-visual animation on different colours of acid- base indicators in different solutions. ● Learners are given one on one demonstration on how to use universal indicators solution, pH scale and pH chart to determine strength of acids and bases. ● In pairs, learners classify acidic or basic solutions as either strong or weak. Learners with blindness use a digital pH meter to determine the pH value. <p><i>Hint: use universal indicator solution, pH scale and pH chart.</i></p> <ul style="list-style-type: none"> ● Learners explore applications of acids and bases. <p><i>Hint: include antacid tablets, common fruits in the locality, fertilizers, liming of soil, detergents.</i></p>	
<p>Core competencies to be developed:</p> <ul style="list-style-type: none"> ● Critical thinking and problem solving as learners explore applications of acids and bases in day-to-day life. ● Creativity and imagination as learners work in groups to classify acidic or basic solutions as either strong or weak. ● Learning to learn as learners classify different household solutions as either acidic or basic. 				
<p>Pertinent and Contemporary Issues (PCIs):</p> <ul style="list-style-type: none"> ● Citizenship enhanced as learners test for the acidity or alkalinity of soil samples for food security. 				

- Life skills enhanced as learners acquire knowledge on applications of acids and bases in day-to-day life.
- Safety issues are enhanced as learners carefully handle acids and bases in the laboratory.
- Environmental conservation is enhanced as learners pick plant materials that are only needed for making plant extract indicators and dispose of the waste appropriately.

Values:

- Peace is promoted as learners cooperate with others while working in groups to classify household solutions as either acidic or basic.
- Responsibility is promoted as learners carefully pick flowers from the environment.
- Respect is promoted as learners appreciate each other's opinion while working in groups to classify acidic or basic solutions as either strong or weak.

Links to other subjects:

- Agriculture as learners use lime and fertilizers to improve soil fertility in day-to-day life and learn how to test for the level of acidity in the soil.
- Health Education as learners acquire knowledge on the use of antacid to relieve stomach upsets.

Suggested Non-Formal Activities:

Learners grow plants in their school compound that can be used to make plant extracts to be used as acid-base indicators.

Suggested Assessment Methods:

- Oral Questions,
- Written assignments in print or braille,
- Self and peer assessment,
- Observation.

Suggested Learning Resources:

- Course book in braille and appropriate print.
- Digital talking colour detector, digital pH meter, mortar and pestle, droppers.
- Soap solution, wood ash solution, toothpaste, lemon juice, sour milk, tap water.
- Universal indicator, pH scale and pH chart, antacid tablets, common flowers and fruits in the locality, fertilizers.

Assessment Rubric				
Criteria	Exceeds expectation	Meets expectation	Approaches expectation	Below expectation
Using plant extracts as acid-base indicators.	Uses a variety of plant extracts as acid-base indicators.	Uses plant extracts as acid-base indicators.	Prepares plant extracts as acid-base indicators.	Collects flowers for making plant extracts to be used as acid-base indicators.
Categorizing different household solutions as either acidic or basic.	Determines the strength of acids and bases and further cites relevant examples.	Determines the strength of acids and bases.	Determines strong and weak acids.	Recognizes different household solutions to be categorized as either acidic or basic.
Determining the strength of acids and bases.	Determines the strength of acids and bases and cites relevant examples..	Determines the strength of acids and bases.	Determines strong and weak acids.	Names the universal indicator to be used to determine the strength of acids and bases.
Outlining the applications of acids and bases.	Demonstrates the applications of acids and bases.	Outlines the applications of acids and bases.	Outlines applications of either acids or bases.	Mentions applications of either acids or bases.

STRAND 3.0: LIVING THINGS AND THEIR ENVIRONMENT

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Question(s)
<p>3.0 Living Things and their Environment</p>	<p>3.1 Reproduction in human beings (16 Lessons)</p>	<p>By the end of the sub strand the learner should be able to:</p> <ul style="list-style-type: none"> a) describe the menstrual cycle in human beings; b) describe challenges related to the menstrual cycle; c) analyze the process of fertilization and implantation in human beings; d) appreciate the existence of sex-related challenges in human beings. 	<ul style="list-style-type: none"> ● In groups, learners discuss the human menstrual cycle. <i>Hint: Details of hormonal control not required; only mention.</i> ● In pairs, learners discuss various challenges related to the menstrual cycle such as irregular periods, irregular bleeding, pains, among other common challenges. ● Learners with low vision use illustrations and charts in appropriate print and colour contrast showing the process of fertilization and implantation. ● Learners with blindness manipulate tactile illustrations and charts showing the process of fertilization. ● Learners watch and listen to audio-visual animations on fertilization and implantation such as movement of the sperm, fusion with the egg, formation of zygote and its implantation on uterus. 	<ol style="list-style-type: none"> 1. How does reproduction occur in human beings? 2. Why do human beings experience challenges during menstruation? 3. How can we manage issues related to the menstrual cycle?

Core competencies to be developed:

- Creativity and imagination as learners make sanitary towels using locally available materials and sensitize the community on sex-related disorders.
- Citizenship as learners appreciate the significance of protecting life from inception to birth.
- Digital literacy as learners use digital devices with assistive technology to watch and listen to audio-visual animations on fertilization.
- Critical thinking and problem solving as learners make improvised sanitary towels using locally available materials.
- Self-efficacy as learners share experiences and discuss the management of challenges related to intersex condition and menstruation.
- Learning to learn as learners work in groups to search for information and develop capacity to continue learning while doing projects.

Pertinent and Contemporary Issues (PCIs):

- Social cohesion is enhanced as the learners collaborate during project work in their groups.
- Life skills/Human sexuality are enhanced as learners develop self-awareness and skills to guard against early pregnancies.
- Health education is enhanced as learners maintain proper hygiene during menstruation.
- Environmental issues in education are enhanced as learners dispose of used sanitary towels appropriately and as learners use locally available materials to make sanitary towels.

Values:

- Respect is enhanced as learners embrace those with menstrual disorders and sex-related disorders. They also learn to appreciate others' opinions during discussions.
- Responsibility is enhanced as learners take up various tasks assigned and share the same fairly.
- Social justice is enhanced as learners practise equity, equality and gender consideration in distribution of learning resources as well as assigning responsibilities during the learning process and as they appreciate sex-related challenges.
- Patriotism is enhanced as learners promote the use of sanitary towels made using locally available materials.

Links to other subjects:

- Health education as learners learn about healthy living during pregnancy.
- Home Science as learners learn about proper nutrition for healthy expectant mothers and babies.

Suggested Non-Formal Activities:

- Learners hold debates on reproduction in human beings during clubs and societies meetings.

Suggested Assessment Methods:

- Observation,
- Practical Work,
- Written assignment in print or braille,
- Oral Questions,
- Peer and self-assessment.

Suggested Learning Resources:

- Charts in tactile and appropriate print and colour contrast,
- Digital devices with assistive technology,
- Course books in appropriate print and braille,
- Pieces of cloth, scissors, cotton wool, sanitary towels, needles, thread.

Assessment Rubric				
Criteria	Exceeds expectation	Meets expectation	Approaches expectation	Below expectation
Describing the menstrual cycle in human beings.	Describes and illustrates using a flow chart the menstrual cycle in human beings.	Describes four phases of the menstrual cycle in human beings.	Describes at least two phases of the menstrual cycle in human beings.	Mention one phase of the menstrual cycle in human beings.
Describing challenges related to the menstrual cycle.	Describes challenges related to the menstrual cycle and states how to cope up with the challenges.	Describes challenges related to the menstrual cycle.	State challenges related to the menstrual cycle.	Recognizes challenges related to the menstrual cycle.
Describing the process of fertilization and implantation.	Analyzes the process of fertilization and implantation and identifies anomalies that can occur during the process.	Analyzes the process of fertilization and implantation.	Analyzes either the process of fertilization or implantation.	Define the term fertilization and implantation.

Strand	Sub- Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
3.0 Living Things and their Environment	3.2 Human Excretory System-Skin and Urinary System 12 Lessons	By the end of the sub-strand the learner should be able to: a) identify parts of the human skin and their functions for healthy living; b) identify parts of the urinary system and their functions in human beings; c) describe causes of kidney disorders in human beings; d) adopt a healthy lifestyle to promote kidney and skin health; e) appreciate the importance of proper use of cosmetics for a healthy living.	<ul style="list-style-type: none"> ● In groups, learners with blindness use models or tactile charts that have distinct features of human skin to brainstorm on parts and functions of human skin such as hair, sweat glands and epidermis. ● Learners with low vision use models and charts in appropriate print and colour contrast on parts and functions of human skin to identify their feature. ● <i>Hint: avoid homeostatic functions of the skin..</i> ● Learners with low vision are guided to observe and manipulate models or realia of kidney, ureter, bladder, urethra to identify their features such as shape while learners with blindness manipulate the models. ● Learners with low vision draw parts of the urinary system while learners with blindness manipulate and make tactile diagrams of the urinary system. ● In groups, learners discuss parts of the urinary system. <i>Hint: External appearance of the kidney and vessels serving kidney, ureter, bladder, urethra.</i> ● In pairs, learners discuss the waste products excreted through the skin such as salts and water and kidneys such as urine. ● In groups, learners with low vision use hand lenses to observe the external parts of the skin such as hair and sweat pores. Learners with blindness feel hair on their 	<ol style="list-style-type: none"> 1. Why is the skin important in humans? 2. Why is excretion important to the human body? 3. Why is proper use of cosmetics important?

			<p>skin and are given verbal descriptions of the appearance of external parts of the skin under hand lens.</p> <ul style="list-style-type: none"> ● In pairs, learners search for information and brainstorm on examples of cosmetics and their health effects on the human body such as skin lightening creams and lotions. ● In groups, learners brainstorm on the external parts and functions of the human kidney. <p><i>Hint: Avoid details of the nephron and osmoregulation.</i></p> <ul style="list-style-type: none"> ● Learners search for information on the causes and prevention of kidney disorders. ● In groups learners discuss healthy lifestyles that promote kidney and skin health, for instance, adequate hydration. <p>Project Model parts of the urinary system. Learners with blindness are supported on aspects of the project activities that require use of sight such as cutting the cartons and use of glue to join the materials.</p>	
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Core competencies to be developed:

- Citizenship as learners sensitize the community on proper use of cosmetics and promote use of locally made cosmetics.
- Digital literacy as learners use various digital devices with assistive technology to search for videos on the structure of the skin and kidney as excretory organs.
- Imagination and Creativity as learners develop and carry out projects on cosmetics from locally available materials.
- Critical thinking and problem solving as learners use locally available materials to make cosmetics, which are not harmful to the skin.
- Self-efficacy as learners associate with others and work on activities that assist them discover their areas of strength and weaknesses thus enhancing scientific skills development. Learners understand and appreciate their unique skin characteristics.

<ul style="list-style-type: none"> ● Learning to learn as learners develop self-awareness on healthy living to keep their skins and kidneys healthy and promote the same amongst peers and community.
<p>Pertinent and Contemporary Issues (PCIs) :</p> <ul style="list-style-type: none"> ● Life skills are enhanced as learners develop self-awareness while learning the effects of cosmetics on the skin. ● Environmental education is enhanced as learners discuss the effects of cosmetics on the environment. ● Financial literacy is enhanced as learners improvise teaching and learning resources using locally available materials, economical use of locally available resources such as making cosmetics and planning of projects.
<p>Values:</p> <ul style="list-style-type: none"> ● Respect is promoted as learners work with others in groups on projects and activities. They also learn to appreciate others' opinions. ● Responsibility is promoted as learners practise taking care of equipment and apparatus, taking care of their skin and the environment and observing a correct diet. ● Peace and Unity are promoted by assigning specific tasks to individuals for the benefit of the whole group while carrying out project work and activities. ● Integrity is promoted as learners report true findings from activities and projects.
<p>Links to other subjects:</p> <ul style="list-style-type: none"> ● Health education as learners learn about lifestyle diseases, taking care of the skin. ● Home Science as learners learn about nutrition for healthy skin and kidney.
<p>Suggested Non-Formal Activities:</p> <ul style="list-style-type: none"> ● Learners to conduct document analysis on Human Excretory System-Skin and Kidneys. ● Learners to hold discussions on causes of kidney disorders during science club meetings.
<p>Suggested Assessment Methods:</p> <ul style="list-style-type: none"> ● Practical Work, ● Observation, ● Oral Questions, ● Written assignments in print or braille. ● Self and peer assessment.
<p>Suggested Learning Resources:</p> <ul style="list-style-type: none"> ● Charts in tactile and appropriate print and colour contrast showing distinct features of the human skin and the kidney, ● Models of human skin and parts of the urinary system, ● Realia of parts of the urinary system, ● Gloves,

- Course book in braille and appropriate print.

Assessment Rubric				
Criteria	Exceeds expectation	Meets expectation	Approaches expectation	Below expectation
Identifying parts of the human skin and stating their functions.	Identifies the parts of the human skin and states their functions and describes how the parts are structurally adapted to their functions.	Identifies all parts of the human skin and states their functions.	Identifies all parts of the human skin and states the function of utmost five parts.	Identifies parts of the human skin.
Identifying parts of the urinary system and their functions.	Identify parts of the urinary system and their functions and describe how the parts are structurally adapted to their functions.	Identifies the four parts of the urinary system and their functions.	Identifies two parts of the urinary system and their functions.	Identifies one part of the urinary system and their functions.
Describing causes of kidney disorders	Describes causes of kidney disorders and states their prevention measures..	Describes causes of kidney disorders.	Identifies causes of kidney disorders.	Name kidney disorders.

STRAND 4.0: FORCE AND ENERGY

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
4.0 Force and Energy	4.1 Static Electricity 12 Lessons	By the end of the sub strand the learner should be able to: a) demonstrate the existence of static charges in objects; b) charge objects using different methods; c) demonstrate the effects of force between charged objects; d) appreciate the use of static charges in daily life.	<ul style="list-style-type: none"> ● In groups, learners rub different objects such as plastic ruler or pen against their hair and bring it close to small pieces of paper to show presences of static charges. Learners with blindness to feel the attracted pieces of paper on the ruler. ● In groups, learners use two spherical balls mounted on an insulator and in contact with each other to demonstrate induction. Learners are guided to bring a charged body close to one spherical ball where charges will move by attraction or repulsion. Learners be given verbal description on the movement of charges. ● Learners search for videos on types of charges using digital devices with assistive technology. ● In pairs, learners show attraction and repulsion between charged objects. Learners show attraction using inflated balloons by rubbing them with a cotton wool to gain a negative charge, then move the finger towards the charged parts where cracking sound is produced to show there is an attraction. Learners with blindness feel charged parts of the balloon. ● Learners demonstrate repulsion using recharged balloons by rubbing them with cotton wool and bringing the charged parts near each other to feel some resistance to show there is repulsion. Learners with blindness to bring 	<ol style="list-style-type: none"> 1. How do materials get charged? 2. Why are static charges dangerous?

			<p>the charged parts of the balloons near each other.</p> <ul style="list-style-type: none"> ● In groups, learners discuss safety measures when dealing with static charges such as lightning. 	
<p>Core competencies to be developed:</p> <ul style="list-style-type: none"> ● Digital literacy as the learners use digital devices with assistive technology to search for videos on types of charges. ● Learning to learn as learners learn how to deal with static electricity in day-to-day life. ● Communication and collaboration as learners share information while working in groups to show attraction and repulsion in charged bodies. 				
<p>Pertinent and Contemporary Issues (PCIs):</p> <ul style="list-style-type: none"> ● Disaster Risk Reduction is enhanced as learners learn about safety measures during lightning. ● Safety and security are enhanced as learners avoid dangers associated with static electricity. 				
<p>Values:</p> <ul style="list-style-type: none"> ● Responsibility is enhanced as learners perform their different roles during the practical work. ● Unity is enhanced as learners perform the activities in groups. ● Integrity is enhanced as learners present their honest findings from experiments. 				
<p>Suggested Non-Formal Activities:</p> <ul style="list-style-type: none"> ● Learners participate in cleaning windows panes using suitable materials such as microfiber materials that do not charge the glass during school general cleaning. 				
<p>Suggested Assessment Methods:</p> <ul style="list-style-type: none"> ● Written assignments in print or braille, ● Practical Work, ● Observation, ● Self and peer and assessment, ● Oral questions. 				
<p>Suggested Learning Resources:</p> <ul style="list-style-type: none"> ● Plastic ruler, pieces of paper, cotton wool, spherical balls, insulators, balloons. ● Course book in braille and appropriate print. 				
<p>Links to other subjects:</p> <ul style="list-style-type: none"> ● Pre-technical studies as learners learn about lightning arrestors installed in buildings. 				

Assessment Rubric				
Criteria	Exceeds expectation	Meets expectation	Approaches expectation	Below expectation
Demonstrating the existence of static charges in objects.	Justifies the existence of static charges in objects.	Demonstrates the existence of static charges in objects.	Explains the existence of static charges in an object.	Identifies the existence of static charges in an object.
Charging objects using different methods.	Charges objects using different methods and identifies the type of charge each body gains.	Charges objects using two different methods.	Charges objects using one method only.	Identifies objects that can be charged.
Demonstrating the effects of force between charged objects.	Demonstrates the effects of force between charged objects and cites relevant examples in real life situations.	Demonstrates two effects of force between charged objects.	Demonstrate one effect of force between charged objects.	Identifies one effect of force between charged objects.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
4.0 Force and Energy	4.2 Electrical Energy 12 Lessons	By the end of the sub strand the learner should be able to: a) identify various sources of electricity in the environment; b) identify components of a simple electrical circuit in the laboratory; c) identify symbols of simple electrical components in print or tactile; d) set up simple electrical circuits in series and parallel using dry cells, bulbs; ammeters and voltmeters,	<ul style="list-style-type: none"> • In groups, learners discuss sources of electricity such as hydroelectric power, geothermal, solar and wind power. • In groups, learners search for videos on sources of electricity using digital devices with assistive technology. Learners with low vision could also search for photographs showing sources of electricity. • In groups, learners are guided to manipulate the various components of a simple circuit such as: <i>Dry cells: to identify the terminals and the size of the battery.</i> 	<ol style="list-style-type: none"> 1. Why do we observe safety measures when handling electrical appliances? 2. How do we differentiate between conductors and non-conductors of electricity?

		<p>e) classify materials as conductors and non-conductors of electricity;</p> <p>f) identify electrical appliances in their locality;</p> <p>g) observe safety measures when handling electrical appliances;</p> <p>h) appreciate the use of electricity in their daily life.</p>	<p>Single and double cell holders: to identify the position of fitting the positive and negative terminals of the cells and practice fitting the cells in single and double cell holders.</p> <p>Bulb: to identify the glass bulb and the electrical foot contact.</p> <p>Bulb holder: to identify terminals and the position where the electrical foot of the bulb is fitted and practice fitting the bulb into the bulb holder. Learners with blindness to be supported by sighted peers to fit the bulb into the bulb holder.</p> <p>Switch: to identify the terminals and practice on how to open and close the switch using a stopper.</p> <p>Crocodile clips: to identify the connection points and practice how to connect it with a wire and attach it to a cell holder. Learners with blindness to be supported by sighted peers to connect the wires to the clips.</p> <p>Connecting wires: learners with low vision identify red wires that connect to the positive terminal of the cell and black wires that connect negative terminals of the cell. Learners with blindness are supported by sighted peers to identify red and black wires. Learners practice how to remove the insulator at the ends of the wires for purposes of connection to various terminals.</p> <ul style="list-style-type: none"> ● In pairs, learners with low vision use charts in appropriate print and colour contrast to identify symbols that represent components of 	
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			<p>a simple circuit while learners with blindness use tactile charts to identify the symbols.</p> <ul style="list-style-type: none"> ● In pairs, learners with low vision interpret series and parallel circuit diagrams. ● Learners with blindness are given one on one demonstration on how to interpret tactile series and parallel circuit diagrams so as to recognize the arrangement of components in a circuit. ● In groups, learners set up simple electrical circuits for series and parallel arrangements of cells and bulbs. ● Learners are given one on one demonstration on how to set up a simple electrical circuit for parallel and series arrangement of cells. Learners with blindness to be supported by sighted peers on the arrangement of the components and on aspects that require use of sight such as noting when the bulb lights. ● In groups, learners search for videos and animations on how to set-up simple electrical circuits using digital devices with assistive technology. ● In pairs, learners carry out experiments to classify materials as conductors and non-conductors of electricity using the different materials such as plastic, metal, rubber, wood in a simple circuit. Learners with low vision use digital ammeters and voltmeters while learners with blindness use digital ammeters and voltmeters with voice output. Learners with blindness are supported on aspects that 	
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			<p>require use of sight such as noting when the bulb lights.</p> <ul style="list-style-type: none"> ● In groups, learners discuss and identify various electrical appliances in their locality. ● Learners observe safety measures when using electrical appliances. ● Learners to explore uses of electricity in their environment. 	
<p>Core competencies to be developed:</p> <ul style="list-style-type: none"> ● Learning to learn as learners apply the knowledge on electricity to safely use electrical appliances. ● Communication and collaboration as learners share information while discussing and identifying different sources of electricity during group activities. ● Digital Literacy as learners use digital devices with assistive technology to search for videos and photographs on sources of electricity. ● Self-efficacy as learners present findings from experiments of classifying materials as conductors and non-conductor. 				
<p>Pertinent and Contemporary Issues (PCIs):</p> <ul style="list-style-type: none"> ● Disaster Risk Reduction is enhanced as learners observe safety measures when using electrical appliances. 				
<p>Values:</p> <ul style="list-style-type: none"> ● Responsibility is enhanced as learners take care of the apparatus as they perform their different roles when setting up simple electrical circuits. ● Integrity is enhanced as learners present their honest research findings from experiment when classifying materials as conductors and non-conductor. 				
<p>Links to other subjects:</p> <ul style="list-style-type: none"> ● Pre-technical studies as learners learn to set up simple electrical circuits. ● English as learners communicate effectively during discussions and presentations. 				
<p>Suggested Non-Formal Activities:</p> <ul style="list-style-type: none"> ● Learners set up simple electrical circuits in series and parallel using dry cells, bulbs, ammeters and voltmeters for demonstrations during science club. 				
<p>Suggested Assessment Methods</p> <ul style="list-style-type: none"> ● Written assignment in print or braille, ● Observation, ● Oral questions, 				

<ul style="list-style-type: none"> ● Self and peer assessment, ● Practical Work.
<p>Suggested Learning Resources</p> <ul style="list-style-type: none"> ● Dry cells, cell holders, red and black connecting wires, bulbs, bulb holders, crocodile clips, digital voltmeters and ammeters with audio output, charts of circuit symbols in appropriate print and colour contrast or in braille, tactile circuit diagrams, circuit diagrams in appropriate print and colour contrast, thread, pieces of wood, plastic, rubber, metal ribbon. ● Course book in braille and appropriate print.

Assessment Rubric				
Criteria	Exceeds expectation	Meets expectation	Approaches expectation	Below expectation
Identifying various sources of electricity.	Identifies and describes various sources of electricity.	Identifies four sources of electricity.	Identifies at least two sources of electricity.	Identifies one source of electricity.
Identifying components of a simple electrical circuit in the laboratory.	Identifies seven components of a simple electrical circuit in the laboratory and explains their functions.	Identifies seven components of a simple electrical circuit in the laboratory.	Identifies at least four components of a simple electrical circuit in the laboratory.	Identifies three or less components of a simple electrical circuit in the laboratory.
Identifying symbols of simple electrical components in print or tactile.	Identifies symbols of simple electrical components in print or tactile and matches them with their components.	Identifies seven symbols of simple electrical components in print or tactile.	Identifies at least four symbols of simple electrical components in print or tactile.	Identifies three or less symbols of simple electrical components in print or tactile.
Setting up simple electrical circuits.	Sets up simple electrical circuits and describes their differences.	Sets up simple electrical circuits.	Sets up an incomplete simple electrical circuit.	Identifies materials for setting simple electrical circuits.
Classifying materials as conductors and non-conductors of electricity.	Illustrates materials as conductors and nonconductors of electricity.	Classifies materials as conductors and nonconductors of electricity.	Classified materials as either conductors or non-conductors of electricity.	Gives an example of conductors of electricity.
Identifying electrical appliances in the locality.	Identifies electrical appliances in the locality and explains their uses.	Identifies electrical appliances in the locality.	Identifies household electrical appliances.	Gives an example of an electrical appliance in the locality.

Identifying safety measures when handling electrical appliances.	Demonstrate safety measures to be observed when handling electrical appliances.	Identifies all safety measures when handling electrical appliances.	Identifies two safety measures when handling electrical appliances.	Identifies one safety measure when handling electrical appliances.
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Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
4.0 Force and Energy	4.3 Magnetism 10 Lessons	By the end of the sub strand the learners should be able to; a) classify materials in the environment as magnetic or non-magnetic; b) investigate the force between like and unlike poles of magnets; c) identify the uses of magnets in day-to-day life; d) appreciate the applications of magnets in day-to-day life.	<ul style="list-style-type: none"> ● In groups, learners identify and collect materials within their environment, sort and group them as magnetic and non-magnetic materials. ● Learners sort out magnetic and non-magnetic material by holding the magnet slightly above the materials. Learners with blindness to feel materials attracted to the magnet and the ones that are not attracted. ● In pairs, learners manipulate different types of magnets such as bars and horseshoes to identify the North Pole and South Pole. Learners with blindness use magnets whose poles are labeled in braille. ● In groups, learners with low vision carry out activities to show attraction between two unlike poles and repulsion between two like poles of magnets. ● Learners with blindness hold bar magnets in both hands, then bring the unlike poles close to each other to experience attraction and bring like poles close to each other to experience repulsion. ● In groups, learners discuss the uses of magnets. 	<ol style="list-style-type: none"> 1. How do we identify magnetic materials in our environment? 2. How are magnets used in day-to-day life?

			<ul style="list-style-type: none"> ● In pairs, learners search for animations on force between like and unlike poles of magnets using digital devices with assistive technology. 	
Core competencies to be developed: <ul style="list-style-type: none"> ● Communication and collaboration as learners share ideas when carrying out group activities involving magnetism. ● Digital literacy as learners use digital devices with assistive technology to search for, watch and listen to animations on force between like and unlike poles ● Self-efficacy as learners present their findings from group activities to their peers. ● Critical thinking and problem solving as learners use magnets to sort out magnetic and non-magnetic material in day-to-day life. 				
Pertinent and Contemporary Issues (PCIs) <ul style="list-style-type: none"> ● Environmental Education is enhanced as learners use magnets to collect and separate magnetic materials in the environment to reduce pollution. 				
Values: <ul style="list-style-type: none"> ● Responsibility is enhanced as learners perform their different roles and take care of the magnets when carrying out activities showing the force between like and unlike poles of magnets. ● Unity is enhanced as the learners cooperate while working in groups to carry out activities showing attraction between two unlike poles and repulsion between two like poles. ● Respect is enhanced as learners appreciate others' opinions while discussing the uses of magnets. 				
Links to other subjects: <ul style="list-style-type: none"> ● Pre- Technical studies as learners use magnets to classify materials in the environment as magnetic and non-magnetic. ● Social Studies as learners determine directions using magnetic compass. 				
Suggested Non-Formal Activities <ul style="list-style-type: none"> ● Learners participate in exchange programmes to discuss the application of magnets in day-to-day life. 				
Suggested Assessment Methods <ul style="list-style-type: none"> ● Written test in print or braille, ● Observation, ● Practical Work, ● Oral questions, ● Self and peer assessment. 				
Suggested Learning Resources <ul style="list-style-type: none"> ● Strong bar magnets, horseshoe magnet, bottle tops, nails, sticks, iron fillings, plastic materials, wooden materials, glass, rubber. ● Course book in braille and print 				

Assessment Rubric				
Indicator	Exceeds expectation	Meets expectation	Approaches expectation	Below expectation
Classifying materials into magnetic and non-magnetic.	Classifies all materials into magnetic and non-magnetic and sorts strong and weak magnetic materials.	Classifies all materials into magnetic and non-magnetic.	Identify magnetic and non-magnetic materials.	Define either magnetic or non-magnetic materials.
Carrying out activities showing action between like and unlike poles of magnets.	Designs activities showing the action between like and unlike poles of magnets.	Carries out activities showing the action between like and unlike poles of magnets.	Carries out an activity showing either action between like or unlike poles of magnets.	Defines attraction and repulsion.
Identifying the uses of magnets in day-to-day life.	Describes the uses of magnets in day-to-day life.	Identifies the uses of magnets in day-to-day life.	Identifies uses of magnets in the laboratory.	Names one use of magnets.

COMMUNITY SERVICE-LEARNING CLASS ACTIVITY

Community Service Learning (CSL) is an experiential learning strategy that integrates classroom learning and community service to enable learners reflect, experience and learn from the community. The CSL project is expected to benefit the learner, the school and local community. Knowledge and skills on how to carry out a CSL project have been covered in Life Skills Education (LSE).

All learners with visual impairment in Grade 7 will be expected to participate in a CSL class activity. The activity will give learners an opportunity to practise the CSL Project skills covered under LSE. This activity will be undertaken in groups where learners with blindness will be grouped with those who have sight. Learners will be expected to apply the steps provided to carry out the CSL project.

The activity will take the form of a whole school approach, where the entire school community will be engaged in the learning process. Teachers will guide learners with visual impairment to execute a simple school based CSL class activity. This activity can be done in 4-6 weeks outside the classroom time. The duration may be adjusted accordingly to accommodate learners with blindness who may require more time to implement the CSL project.

CSL Skills to be covered

- i) **Research:** Learners will develop research skills as they investigate PCIs to address, ways and tools to use in collecting data, analysing information and presenting their findings.
- ii) **Communication:** Learners will develop effective communication skills as they engage with peers and school community members. These will include listening actively, asking questions and presentation skills using varied modes.
- iii) **Citizenship:** Learners will be able to explore opportunities for engagement as members of the school community and provide a service for the common good.
- iv) **Leadership:** Learners will develop leadership skills as they take up various roles within the CSL activity.
- v) **Financial Literacy Skills:** Learners will consider how to source and utilise resources effectively and efficiently.
- vi) **Entrepreneurship:** Learners will consider ways of generating income through innovation for the CSL class activity.

Suggested PCIs	Specific Learning Outcomes	Suggested Learning Experiences (Customise to the focus of the grade)	Key Inquiry Questions
<p>Learners will be guided to consider the various PCIs provided in the subject in Grade 7 and choose one suitable to their context and reality</p>	<p>By the end of the CSL class activity, the learner should be able to:</p> <ol style="list-style-type: none"> identify a problem in the school community through research; develop a plan to solve the identified problem in the community; design solutions to the identified problem; implement solution to the identified problem; share the findings to relevant actors; reflect on own learning and relevance of the project; appreciate the need to belong to a community. 	<ul style="list-style-type: none"> ● In groups, learners brainstorm on pertinent and contemporary issues in the community that need attention. ● In groups, learners discuss various PCIs within the school community and identify the one that requires immediate attention giving reasons for their choice. ● In groups, learners discuss possible solutions to the identified issue and propose the most appropriate solution to the problem. ● Learners brainstorm on the resources needed for the activity and source for them. Learners with blindness to be guided in selecting materials that are safe and accessible in tactile such as tactile charts, pictures and graphs. Those with low vision use reference materials with appropriate font size and contrasting colours as well as three-dimensional resources. ● In groups, learners discuss different methods and tools of collecting data and determine the ones suitable for the selected project. Learners with visual impairments to be supported in preparation and use of data collection methods and tools such as questionnaires, focus discussions and interviews. ● In groups, learners develop appropriate tools for collecting data with the guidance of the teacher. ● In groups, learners collect data and record findings. Learners with blindness to work with sighted peers when collecting data. The sighted peers would support in explaining or describing aspects that require use of sight. ● Learners with blindness use audio recorders to record the responses. ● In groups, learners discuss their findings, develop various reporting documents and use them to report on their findings. 	<ol style="list-style-type: none"> How does one determine community needs? Why is it necessary to be part of a community?

		<ul style="list-style-type: none"> ● Based on the research report, learners implement a project to get solutions to the identified problem. Learners with blindness to work with sighted peers and ensure the project site is free from hazards such as hanging trees, sharp objects and potholes to ensure safe mobility. ● Learners use feedback from peers and the school community to improve on the implementation of the project. ● In groups, learners discuss the successes, challenges faced while implementing the project activities and lessons learnt; write a report and share through various media to peers and the school community. ● Learners reflect on how the project enhanced learning while at the same time facilitating service to the school by providing solutions to the identified issue(s). 	
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Assessment Rubric				
Criteria	Exceeds Expectation	Meets Expectation	Approaches Expectation	Below Expectation
Identifying a pertinent issue in the school community to be addressed.	Gives Justification for the identified pertinent issue in the school community to be addressed.	Identifies a pertinent issue in the school community to be addressed.	States a pertinent issue in the school community to be addressed.	Recalls a pertinent issue discussed in class.
Planning to solve the identified issue.	Designs and develops a step-by-step plan of the activities to be carried out in the process of solving the problem.	Develops a plan to solve the identified problem.	Gives an outline of a plan to solve the identified problem.	States some activities to be included in the plan to solve the identified problem.
Designing and implementing solutions to the identified problem.	Designs, implements and solves the identified problem.	Designs and implements solutions to the identified problem.	Designs solutions to the identified problem.	Suggests solutions to the identified problem.
Sharing findings to relevant actors.	Incorporates feedback from relevant actors to the findings.	Shares findings to relevant actors.	Gives brief description of findings to relevant actors.	States some aspects of the findings to relevant actors.