REPUBLIC OF KENYA

MINISTRY OF EDUCATION

JUNIOR SCHOOL CURRICULUM DESIGN

INTEGRAT ED SCIENCE

GRADE 7

FOR LEARNERS WITH VISUAL IMPAIRMENT

KENYA INSTITUTE OF CURRICULUM DEVELOPMENT

A Skilled and Ethical Society

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FOREWORD

The Government of Kenya is committed to ensuring that policy objectives for Education, Training and Research meet the aspirations of the Constitution of Kenya 2010, the Kenya Vision 2030, National Curriculum Policy 2019, the United Nations Sustainable Development Goals (SDGs) and the Regional and Global conventions to which Kenya is a signatory. Towards achieving the mission of Basic Education, the Ministry of Education (MoE) has successfully and progressively rolled out the implementation of the Competency Based Curriculum (CBC) at Pre-Primary, Primary and Junior School levels.

The implementation of Competency Based Curriculum involves monitoring and evaluation to determine its success. After the five-year implementation cycle, a summative evaluation of the primary education cycle was undertaken to establish the achievement of learning outcomes as envisaged in the Basic Education Curriculum Framework. The Government of Kenya constituted a Presidential working Party on Education Reforms (PWPER) in 2022 to address salient issues affecting the education sector. PWPER made far reaching recommendations for basic education that necessitated curriculum review. The recommendations of the PWPER, monitoring reports, summative evaluation, feedback from curriculum implementers and other stakeholders led to rationalisation and review of the basic education curriculum.

The reviewed Grade seven curriculum designs for learners with Visual impairment build on competencies attained by learners at Primary school level. Emphasis at this grade is the development of skills for exploration and making informed decision on pathways based on careers.

The curriculum designs present National Goals of Education, essence statements, general and specific expected learning outcomes for the subjects as well as strands and sub strands. The designs also outline suggested learning experiences, key inquiry questions, core competencies, Pertinent and Contemporary Issues (PCIs), values, and assessment rubric.

It is my hope that all Government agencies and other stakeholders in Education will use the designs to plan for effective and efficient implementation of the CBC.

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PREFACE

The Ministry of Education (MoE) nationally implemented Competency Based Curriculum (CBC) in 2019. Grade seven is the first grade of Junior school while Grade 9 is the final grade of the level in the reformed education structure.

The reviewed Grade seven curriculum furthers implementation of the CBC from Primary Education level. The curriculum provides opportunities for learners to focus in a field of their choice to form a foundation for further education and training and/or gain employable skills. This is very critical in the realisation of the Vision and Mission of the on-going curriculum reforms as enshrined in the Sessional Paper No. I of 2019 whose title is: *Towards Realizing Quality, Relevant and Inclusive Education and Training for Sustainable Development* in Kenya. The Sessional Paper explains the shift from a content-focused curriculum to a focus on **nurturing every learner's potential.**

Therefore, the Grade seven curriculum designs for learners with Visual impairment are intended to enhance the learners' development in the CBC core competencies, namely: Communication and Collaboration, Critical Thinking and Problem Solving, Creativity and Imagination, Citizenship, Digital Literacy, learning to Learn and Self-efficacy.

The curriculum designs provide suggestions for interactive and differentiated learning experiences linked to the various sub strands and the other aspects of the CBC. They also offer several suggested learning resources and a variety of assessment techniques. It is expected that the designs will guide teachers to effectively facilitate learners to attain the expected learning outcomes for Grade seven and prepare them for smooth transition to Grade eight. Furthermore, it is my hope that teachers will use the adapted designs to make learning interesting, exciting and enjoyable.

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ACKNOWLEDGEMENT

The Kenya Institute of Curriculum Development (KICD) Act Number 4 of 2013 (Revised 2019) mandates the Institute to develop and review curricula and curriculum support materials for basic and tertiary education and training. The curriculum development process for any level of education involves thorough research, international benchmarking and robust stakeholder engagement. Through a systematic and consultative process, the KICD conceptualised the Competency Based Curriculum (CBC) as captured in the Basic Education Curriculum Framework (BECF)2017, that responds to the demands of the 21st Century and the aspirations captured in the Constitution of Kenya 2010, the Kenya Vision 2030, East African Community Protocol, International Bureau of Education Guidelines and the United Nations Sustainable Development Goals (SDGs).

KICD receives its funding from the Government of Kenya to facilitate successful achievement of the stipulated 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 revised Grade seven curriculum designs for learners with Visual impairment were developed and adapted with the support of the World Bank through the Kenya Primary Education Equity in Learning Programme (KPEELP); a project coordinated by MoE. Therefore, the Institute is very grateful for the support of the Government of Kenya, through the MoE and the development partners for policy, resource and logistical support. Specifically, special thanks to the Cabinet Secretary-MoE and the Principal Secretary – State Department of Basic Education.

I also wish to acknowledge the KICD curriculum developers and other staff, all teachers, educators who took part as panelists; the Semi-Autonomous Government Agencies (SAGAs) and representatives of various stakeholders for their roles in the development and adaptation of the Grade seven curriculum designs for learners with Visual impairment. In relation to this, I acknowledge the support of the Chief Executive Officers of the Teachers Service Commission (TSC) and the Kenya National Examinations Council (KNEC) for their support in the process of developing and adapting these designs. Finally, I am very grateful to the KICD Council Chairperson and other members of the Council for very consistent guidance in the process.

I assure all teachers, parents and other stakeholders that this curriculum design will effectively guide the implementation of the CBC at Grade seven and preparation of learners with Visual impairment for transition to Grade eight.

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NATIONAL GOALS OF EDUCATION

Education in Kenya should:

1. **Foster nationalism, 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.

2. **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 in 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 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.

3 **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.

4 **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.

5 **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.

6 **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.

7 **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.

8 **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 FOR JUNIOR SCHOOL

S/ No.	Learning Area	Lesson
1.	English for Learners with Visual Impairment	5
2.	Kiswahili for Learners with Visual Impairment	4
3.	Mathematics for Learners with Visual Impairment	5
4.	Religious Education	4
5.	Integrated Science for Learners with Visual Impairment	5
6.	Agriculture & Nutrition for Learners with Visual Impairment	4
7.	Social Studies for Learners with Visual Impairment	4
8.	Creative Arts and sports for Learners with Visual Impairment	5
9	Pre- technical Studies for learners with Visual Impairment	4
10.	Pastoral/ Religious Instruction Programme	1
	Total	**41**

NOTE: Braille skills for learners with Blindness to be implemented as Non formal (Co-Curricular) Programmes

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 enables 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 with visual impairment 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 learners with visual impairment and equip them with the relevant basic integrated scientific knowledge, skills, values and attitudes needed for career development, employment and independent living. 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 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.

Learners with visual impairment, particularly those with blindness have not been learning certain concepts in science especially those related to chemistry and physics due to lack of science educational resources and instructional methods that have been appropriately adapted to make science accessible to these categories of learners. In view of this, integrated science in Junior school has been adapted to provide multisensory experimental approaches that are crucial in helping learners with blindness to gain more purposeful, independent, and hands-on laboratory experience. Appropriate apparatus, equipment, materials, assistive technology as well as suitable 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 that may hinder effective learning of integrated science.

Integrated Science provides the learner with the basic requisite skills, knowledge, values and attitudes necessary for specialization in the 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.

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.

SUMMARY OF STRANDS AND SUB STRANDS

Strands	**Sub Strands**	**Suggested Number of Lessons**
1.0 Scientific Investigation	**1.1** Introduction to Integrated Science	12
	1.2 Laboratory Safety	14
	1.3 Laboratory apparatus and instruments	16
2.0 Mixtures, Elements and Compounds	2.1 Mixtures	18
	2.2 Acids, bases and indicators	22
3.0 Living things and the Environment	3.1 Human reproductive system	16
	3.2 Human Excretory System	18
4.0 Force and Energy	4.1 Electrical Energy	18
	4.2 Magnetism	16
Total Number of Lessons		**150**
Note The suggested number of lessons per sub strand may be less or more depending on the context.		

STRAND 1.0: SCIENTIFIC INVESTIGATION

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
1.0 Scientific Investigation	**1.1 Introduction to Integrated Science** **(12 Lessons)** ● *Components of Integrated Science as a field of study* ● *Importance of science in daily life (health, agriculture, industry, transport, food and textile and career opportunities).*	By the end of the sub strand, the learner should be able to: a) outline the components of Integrated Science as a field of study, b) explain the importance of science in daily life, c) show interest in learning Integrated Science at junior school.	● Learners are guided to brainstorm on the meaning and components of Integrated Science. ● Learners use digital devices with assistive technology, print or braille media to search for information on components of integrated science and share with peers. ● In groups, learners discuss the importance of science in daily life. ● Learners are guided to search for information from digital devices with assistive technology, print or braille media on pathways related to Integrated Science at Senior School. **Project** Learners with low vision construct a career chart in appropriate font and colour contrast while learners with blindness are	How is the knowledge acquired in Integrated Science useful in daily life?

			guided to assemble materials for making a tactile career chart using threads, glue, braille papers and manilla papers. Learners display their work.	

Core competencies to be developed:

- Communication and collaboration: The learner develops speaking skills while making class presentations and participating in group discussion.
- Self-efficacy: The learner develops effective communication skills as they discuss the pathways and career opportunities associated with Integrated Science and present their findings.

Values:

- Respect: The learner works harmoniously in groups as they discuss the importance of scientific knowledge in daily life.
- Unity: The learner cooperates with others while working in groups to discuss the meaning and components of integrated science.

Pertinent and Contemporary Issues (PCIs):

- Socio-Economic and Environmental Issues: The learner acquires **s**afety and security skills as they search for information on the internet using the digital devices in observing cyber security regulations.

Links to other subjects:

- Pre-technical Studies: The learner is able to link the importance of science to career pathways.

Suggested learning resources:

Digital devices with assistive technology such as adapted keyboard, screen readers and screen magnifiers, print and braille materials, threads, glue, manilla papers.

Strand	**Sub Strand**	**Specific Learning Outcomes**	**Suggested Learning Experiences**	**Suggested Key Inquiry Question(s)**
1.0 Scientific Investigation	1.2 **Laboratory Safety (14 Lessons)** ● *Common hazards and their symbols in the laboratory (flammable, corrosive, toxic, carcinogenic, and radioactive substances),* ● *Common accidents in the*	By the end of the sub strand, the learner should be able to: a) identify common hazards and their symbols in the laboratory, b) explain causes of common accidents in the laboratory, c) describe First Aid measures for common laboratory accidents, d) appreciate the importance of safety in the laboratory and access to a healthy working environment.	● Learners are guided to brainstorm on common hazards and their symbols. Learners with low vision are guided to interpret common hazard symbols in appropriate font and colour contrast while learners with blindness are given verbal descriptions of common hazard symbols in the laboratory. ● In groups, learners discuss causes of common laboratory accidents such as burns and scalds, cuts, and ingestion of harmful substances and related first aid measures. ● Learners are guided to role-play some First Aid procedures for common accidents in the laboratory. Learners with blindness are guided to manipulate items in the first Aid kit	1. How do accidents happen in the laboratory? 2. Why do we observe safety measures while working in the laboratory?

	laboratory, (cover Causes and First Aid: burns and scalds, cuts, and ingestion of harmful substances), ● *Safety measures in the laboratory.*		and are given one on one demonstration on how to use the items. ● Learners are guided to practise safety measures in the laboratory and the general school learning environment. Learners with blindness to be paired by sighted peers and be given orientation and mobility in the laboratory and general school environment. ● In groups, learners discuss the importance of safety measures in the laboratory. ● Learners are guided to use digital devices with assistive technology, print or braille media to search for information on laboratory safety procedures.	

Core competencies to be developed:

- Learning to learn: The learner develops relationships while sharing learned knowledge on First Aid procedures for common accidents in the laboratory.
- Critical thinking and problem solving: The learner reflects while role-playing some First Aid procedures for common accidents in the laboratory and practises safety measures in the laboratory and the general school learning environment.

Values:

Responsibility: The learner exercises accountability as they practise safety measures in the laboratory and the general school learning environment.

Pertinent and Contemporary Issues (PCIs):

- Safety and security: The learner learns some safety measures to take as they practice safety measures in the laboratory and the general school learning environment.

Links to other subjects:

- Pre Technical studies: The learner is able to relate safety and importance of safety measures in the laboratory to safety measures at work place.

Suggested learning resources:

- Digital devices with assistive technology such as adapted keyboard, screen readers and screen magnifiers,
- Print media in appropriate font and colour contrast,
- Braille books,
- First Aid kit,
- Internet
- Containers of different chemicals,
- Science kit,
- Basic laboratory apparatus,
- Equipment and selected specimens,
- SEPU Kit.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
1.0 Scientific Investigation	**1.3 Laboratory apparatus and instruments** **(16 Lessons)** ● *Basic skills in science (manipulative, observation, measurement, classification, prediction, communication and conclusion skills),* ● *Laboratory instruments and apparatus* ● *International System of Units (SI) for basic and derived*	By the end of the sub strand, the learner should be able to: a) describe the basic skills in science, b) use and care apparatus and instruments in the laboratory, c) write braille symbols of SI units for basic and derived quantities in science *(Learners with blindness),* d) use the SI units for basic and derived	● In groups, learners discuss the meaning and use of basic skills in science such as manipulation, observation, measurement, classification, prediction, communication and conclusion skills. ● Learners with low vision are guided to manipulate different apparatus and instruments used for heating, measuring mass, temperature, length, volume, weight, magnification and time; include parts of a microscope and Bunsen burner. Learners with blindness are given one on one demonstration to identify the features of different apparatus and instruments. ● In groups, learners discuss apparatus and instruments used for heating, measuring mass, temperature, length, volume, weight, magnification and time including parts and functions of a microscope and Bunsen burner. Learners with blindness are given one on one demonstration on how to handle and use apparatus and instruments in the laboratory.	1. Why are basic skills in science important? 2. How are quantities in science expressed?

	quantities in science.	quantities in science, e) appreciate consumer protection when handling different apparatus, instruments and other materials in day-to-day life.	● Learners with blindness are guided to use braille cards to identify the braille symbols of SI units for basic and derived quantities. The basic quantities include length (m), mass (kg), time (s), electric current (A), temperature (K) amount of substance (mol), light intensity (Cd) and derived quantities such as area (m^2), volume (m^3), speed (m/s) and density (kg/m^3). ● Learners with blindness are guided to write the braille symbols of SI units for basic and derived quantities. ● Learners with low vision are guided to use apparatus with appropriate font and colour contrast to carry out the same activities. Learners with blindness are guided to use appropriate apparatus to carry out activities on measurements of basic quantities and express them in the International System of Units (SI). ● Learners are given one on one demonstration to carry out activities to determine derived quantities from basic units such as area, volume, speed, density. ● In groups, learners collect packaging featuring labels of quantities and discuss the importance of the information on labels.	

Core competencies to be developed:

- Learning to learn: The learner practices use and care for apparatus and instruments in the laboratory.
- Communication and collaboration: The learner collaboratively carry out activities on measurements of basic quantities and express them in the International System of Units

Values:

- Respect: The learner work harmoniously with peers when carrying out activities to determine derived units from basic units working.
- Responsibility: The learner learns how care for apparatus and instruments as they practise how to care and use them in the laboratory.

Pertinent and Contemporary Issues (PCIs):

- Socio economic issues: The learner links the quantity of goods parked to their prices as they collects packaging with labels of quantities and discuss the importance of the information on labels

Links to other subjects:

- Agriculture and Nutrition: The learner is able to link the packaging of goods and labels of quantities form inputs and product labels learnt.
- Mathematics: The learner uses manipulation skills in recording and working measurements.

Suggested learning resources:

Tactile rulers, digital electronic weighing balance, light microscope, braille cards, Bunsen burner, ammeters and digital stopwatch.

Level / Indicator	Exceeds expectations	Meets expectations	Approaches expectations	Below expectations
Ability to outline the components of integrated Science	Outlines four components of integrated science.	Outlines three components of integrated science.	Outlines two components of integrated science.	Outlines one or none components of integrated science.
Ability to identify common hazards and their symbols in the laboratory	Identifies four commons hazards and their symbols in the laboratory.	Identifies three commons hazards and their symbols in the laboratory.	Identifies two commons hazards and their symbols in the laboratory.	Identifies one or none commons hazards and their symbols in the laboratory.
Ability to describe First Aid measures for common laboratory accidents	Describes four First Aid measures for common laboratory accidents.	Describes three First Aid measures for common laboratory accidents.	Describes two First Aid measures for common laboratory accidents.	Describes one or none First Aid measures for common laboratory accidents.
Ability to: ● Use and care apparatus and instruments in the laboratory ● Uses the SI units for basic and derived quantities in science.	The learner to demonstrate five skills.	The learner to demonstrate four skills.	The learner to demonstrate 2-3 skills.	The learner to demonstrate one skill or none.

STRAND 2.0: Mixtures, Elements and Compounds

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Mixtures, Elements and Compounds	**2.1 Mixtures** **(18 Lessons)** ● *Homogeneous mixtures (solid-solid, solid-liquid, liquid-liquid and gas-gas)* ● *Separation of homogeneous mixtures (evaporation, crystallisation, Simple distillation, fractional distillation, sublimation, solvent extraction and chromatography)*	By the end of the sub-strand, the learner should be able to: a) separate homogeneous mixtures using appropriate method, b) outline applications of separating homogeneous mixtures in day-to-day life, c) appreciate the use of different methods of separating mixtures in day-to-day life.	● Learners are guided to categorise the identified mixtures as homogeneous or heterogeneous which include solid-solid, solid-liquid, liquid-liquid and gas-gas mixtures. ● Learners are guided to brainstorm on the meaning of the terms solvent, solute and solution. ● In groups, learners share tasks as they carry out activities to separate homogeneous mixtures such as: ○ *Simple distillation:* Learners are guided to manipulate and identify apparatus used during simple distillation. Learners are supported in setting up and carrying out the experiment. Learners to feel the residue in the boiling tube and distillate in the test tube.	How is the separation of mixtures important in day-to-day life?

	● *Applications of methods of separating mixtures in real life*		○ *Filtration:* Learners are guided to manipulate the residue on the filter paper and filtrate in the beaker. ○ *Decantation:* Learners are guided to feel solid-liquid mixture such as sand and water. Learners with blindness are supported to carefully pour out the liquid into another clean beaker. Learners feel liquid and solid after separation. ○ *Use of a magnet:* Learners are guided to feel solid-solid mixture such as Sulphur and iron filings. Learners with blindness are guided to feel magnetic materials attracted by the magnet and the substance that was not attracted. ○ *Sublimation*: Learners are guided to feel solid-solid mixture such as sodium chloride and iodine. Learners with blindness are supported	

			to set up the experiment and are given verbal descriptions on colour of the mixture, vapour and sublimate. Learners are guided to feel the sublimate on the lower part of the watch glass and residue in the beaker. ○ *Paper chromatography:* Learners with low vision observe the process of separation in filter paper strips. Learners with blindness are given verbal descriptions on location of baseline, solvent front and components of ink with their properties that make them possible to be separated through paper chromatography. ○ *Solvent extraction:* Learners with blindness to be supported on aspects of the experiment that require use of sight.	

			○ *Crystallisation:* Learners are supported to feel copper(II) sulphate powder before and after the experiment. ● In groups, learners discuss the applications of separating mixtures in day-to-day life which include crude oil refining, fractional distillation of liquefied air, extraction of salt from seawater, extraction of oil from nuts. ● Learners use digital devices with assistive technology, print or braille media to search for more information on fraction distillation as a method of separating a mixture.	
Core competencies to be developed: ● Communication and collaboration: The learner learns data presentation as they work collaboratively to categorise the mixtures as homogeneous or heterogeneous.				

● Learning to learn: The learner learns how to separate various mixtures as they carry out activities to separate homogeneous mixtures.
Values: ● Unity: The learner works harmoniously with peers while carrying out activities to separate homogeneous mixtures.
Pertinent and Contemporary Issues (PCIs): ● Peer education and mentorship: The leaner practices sharing of tasks as they carry out activities to separate homogeneous mixtures.
Links to other subjects: ● Agriculture and nutrition: The learner is able to relate methods of separating mixtures in cereals to heterogenous mixtures.
Suggested learning resources: Filter paper, filter funnel, sand, water, source of heat, boiling tube, Sulphur, iron fillings, Iodine, sodium chlorine, pestle and mortar, Copper (II) Sulphate, black ink, Digital devices with assistive technology such as adapted keyboard, screen readers and screen magnifiers,

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question (s)
2.0 Mixtures, Elements and Compounds	**2.2 Acids, bases and indicators** **(22 Lessons)** ● *Introduction to acids and bases,* ● *Identification of acids and bases using a litmus paper* ● *Preparation of acid-base indicators from plant extracts* ● *Classification of commonly used substances as acids and bases using acid -base indicator from plant extract* ● *physical properties of acids and bases*	By the end of the sub-strand, the learner should be able to: a) identify acids and bases using a litmus paper, b) prepare an acid-base indicator from plant extracts, c) describe the physical properties of acids and bases, d) outline applications of acids, bases and indicators in real life, e) appreciate the uses of acids and bases in real life.	● Learners are guided on how to use litmus paper to classify household solutions into acids and bases. Learners with blindness are given verbal description on colour change on the litmus paper in presence of an acid or a base. ● In pairs, learners are guided to crush parts of a plant such as petals of a flower to prepare plant extract indicators using locally available materials and dispose laboratory waste responsibly. Learners with blindness are given verbal descriptions of the colour of the plant extract indicator. ● Learners are guided to use plant extract indicators to classify common household solutions such as soap solution,	Why are acids and bases important?

	● *uses of acids, bases and indicators in real life*		wood ash solution, toothpaste, lemon juice, sour milk, tap water as either acidic, neutral or basic. Learners with low vision are guided to identify the colour change of the indicator while learners with blindness are given verbal descriptions on the colour change of the indicator. Where possible learners with blindness use a talking colour detector device to note the colour change. ● Learners are guided to carry out activities to investigate physical properties of acids and bases. Learners with blindness are given verbal descriptions of the colour change during the activity. ● Learners are guided to use digital devices with assistive technology, print or braille media to explore applications of acids and bases.	

			Precaution: *Observe cyber security measures when using digital devices.*	

Core competencies to be developed:

- Communication and Collaboration: The learner acquires data recording and presentation techniques as carry out activities to investigate the physical properties of acids and bases.
- Critical thinking and problem solving: The learner develops research skills as they explore applications of acids and bases using print or digital media.
- Creativity and Imagination: The learner acquires innovative practices as they use acid-base indicator from plant extracts to classify common household solutions as either acidic or basic.

Values:

- Responsibility: The learner engages in assigned roles as they carry out activities to prepare acid-base indicators from plant extracts collaboratively.
- Respect: The learner appreciates diverse opinions of peers as they collaboratively use digital or print or braille media to explore applications of acids and bases and present findings in plenary.

Pertinent and Contemporary Issues (PCIs):

- Socio-economic and Environmental issues: The learner observes cyber security measures while using digital media to explore applications of acids and bases.

Links to other subjects:

- **Agriculture and Nutrition**: The learner is able to relate the content of acids and bases is to testing soil acidity and application of lime and fertilizers to improve soil fertility and pH.

Suggested learning resources:

- Parts of a plant such as petals of a flower, common household solutions such as soap solution, wood ash solution, toothpaste, lemon juice, sour milk, tap water, talking colour detector device, Digital devices with assistive technology such as adapted keyboard, screen readers and screen magnifiers, braille and print course book.

Suggested Assessment Rubric

Level / Indicator	Exceeds expectations	Meets expectations	Approaches expectations	Below expectations
Ability to: ● Separate homogeneous mixtures using appropriate methods. ● Identify acids and bases using a litmus paper. ● Prepare acid- base indicator from plant extract. ● Describe the physical properties of acids and bases.	The learner demonstrates four skills.	The learner demonstrates three skills.	The learner demonstrates two skills.	The learner demonstrates one skill or none.

STRAND 3.0: LIVING THINGS AND THEIR ENVIRONMENT

Strand	Sub Strand	Specific learning outcomes	Suggested learning experiences	Suggested Key inquiry question
3.0 Living things and the Environment	**3.1 Human reproductive system (16 lessons)** ● Parts of the human reproductive system and their functions (*Male; penis, testis and urethra. Female; vagina, cervix, uterus, oviduct, and ovaries)* ***Note:*** *Detailed internal structures of testis and ovaries are not required.* ● *Changes in boys and girls during adolescence and their implications* ● *How to manage developmental challenges during*	By the end of the sub strand, the learner should be able to: a) identify parts of the human male and female reproductive systems, b) describe functions of parts of the male and female reproductive system, c) describe the physical changes that take place in boys and girls during adolescence, d) develop a plan to manage developmental challenges during adolescence, e) appreciate that physical changes in boys and girls during adolescence have	● Learners are guided to use print or tactile charts and other print or braille materials to identify parts of the human male and female reproductive systems. ● In groups, learners discuss the functions of parts of the male and female reproductive systems and share with peers. ● Learners use print, braille or non-print material to search for information on physical changes that take place in boys and girls during adolescence and make presentations. ● Learners use print, braille or non-print material to search for information on developmental challenges during adolescence. In groups, learners discuss the coping mechanisms for	How are developmental changes managed during adolescence?

	adolescence (physical, social and emotional)	social and reproductive implications.	developmental challenges during adolescence. • In groups, learners discuss and develop a plan to manage developmental challenges during adolescence.	

Core competencies to be developed:

- **Self-efficacy:** The learner develops confidence as they learn how to manage developmental challenges during adolescence.
- **Communication and collaboration**: The learner acquires speaking, listening skills and self-expression as they discuss with peers the coping mechanisms for developmental challenges during adolescence.

Values:

- **Integrity** The learner shows self-discipline in coping with developmental challenges during adolescence.
- **Respect:** The learner learns how to live harmoniously with peers already experiencing different developmental challenges as they develop a plan to manage developmental challenges during adolescence.

Pertinent and Contemporary Issues (PCIs):

- **Human sexuality**: The learner develops the skill of self-awareness as they discuss the developmental challenges during adolescence and coping mechanisms.

Links to other Learning areas:

- **griculture and Nutrition:** The content of the reproductive system is linked to reproduction in animals.

Suggested learning resources:

Tactile and print chart, Digital devices with assistive technology such as adapted keyboard, screen readers and screen magnifiers, course book in print and braille, tactile diagram of human reproductive organs.

Strand	Sub- Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Living Things and their Environment	**3.2 Human Excretory System** **(18 Lessons)** ● Components of the excretory system ● Parts of the human skin and their functions. ● Parts of the urinary system and their functions (*external appearance of the kidney, and vessels serving kidney, ureter, bladder, urethra),*	By the end of the sub strand, the learner should be able to: a) identify parts of human skin and their functions, b) identify parts of the urinary system and their functions, c) describe causes of kidney disorders, d) develop and maintain a daily log on activities that promote skin and kidney health, e) appreciate the need for a healthy lifestyle to	• In groups, learners with low vision use hand lenses to observe the external parts of the skin such as hair and sweat pores while learners with blindness are given verbal descriptions of the appearance of external parts of the skin under hand lens such as hair and sweat pores. • In groups, learners with low vision use charts in appropriate font and colour contrast or model to brainstorm on parts and functions of human skin. Learners with blindness use tactile charts that have distinct features of human skin or models to brainstorm on parts and functions of human skin. *Hint: hair, sweat glands, sweat pore, sweat duct, epidermis and dermis –indicate position of the hair and avoid homeostatic functions of the skin.*	How can a healthy excretory system be maintained?

	Note: *avoid details of the nephron and osmoregulation* Common kidney disorders and their causes		• Learners are guided to use print, braille or non-print materials to search for information on the waste products excreted through the skin and the lungs which include salts and water in sweat, carbon dioxide. • Learners are guided to discuss parts of the urinary system which include the external appearance of the kidney and vessels serving the kidney, ureter, bladder, urethra. • Learners use locally available materials to model the urinary system. Learners with blindness are supported to assemble the materials for making the model of the urinary system. • Learners with low vision are guided to use charts, models or animations while learners with blindness use tactile charts or models to discuss the external parts and functions of the human kidney. • Learners use print, braille and non-print materials to search for information on the causes and prevention of kidney disorders.	

			• Learners use print, braille or non-print materials to search for information on healthy lifestyles that promote kidney and skin health, record and share. • Learners are guided to discuss and develop a daily log on activities that promote skin and kidney health.	

Core competencies to be developed:

- Communication and Collaboration: The learner acquires speaking and listening skills as they discuss parts of the urinary system.
- Self-efficacy: The learner develops confidence in live healthier life as they search for information on healthy lifestyles that promote kidney and skin health.

Values:

- Love: The learner appreciates and embraces their natural skin colour as they adopt a healthy lifestyle to promote kidney and skin health.
- Unity: The learner works collaboratively and harmoniously with peers as they develop a daily log on activities that promote skin and kidney health.

Pertinent and Contemporary Issues (PCIs):

- Health promotion issues: The learner searches for information on healthy lifestyles that promote kidney and skin health.

Links to other subjects:

- Agriculture and Nutrition**:** The learner is able to relate the content on healthy lifestyles that promote kidney and skin health is linked to nutrition for healthy skin and kidneys.

Suggested learning resources:
Charts in tactile and appropriate font 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, Course book in braille and print.

Suggested Assessment Rubric

Level / Indicator	**Exceeds expectation**	**Meets expectation**	**Approaches expectation**	**Below expectation**
Ability to: ● Describe functions of parts of the male and female reproductive system. ● Develop a plan to manage developmental challenges during adolescence. ● Identify parts of the excretory system and their functions. ● Develops and maintains a daily log on activities that promote skin and kidney health.	The learner demonstrates four skills.	The learner demonstrates three skills.	The learner demonstrates two skills.	The learner demonstrates one skill or none.

STRAND 4.0: FORCE AND ENERGY

Strand	Sub Strand	Specific learning outcomes	Suggested learning experiences	Suggested Key inquiry question(s)
4.0 Force and Energy	**4.1 Electrical Energy** **(18 lessons)** *Sources of electricity in the environment,* *Flow of electric current using simple electric circuits,* *Common electrical appliances used in day to day life,* Safety measures followed while	By the end of the sub-strand, the learner should be able to: a) identify sources of electricity in the environment, b) identify tactile representation of circuit symbols, *(for learners with blindness)* c) connect simple electrical circuits to demonstrate the flow of electric current, d) identify common electrical appliances	• In groups, learners discuss the sources of electricity in the environment. • Learners are guided to use digital, print or braille media to search for more information on sources of electricity in nature, *(hydro-electric power, geothermal, solar, wind power, nuclear, tidal-wave, fossil fuels, biomass, natural gas and electrical cells)* • In pairs, learners with blindness are guided to manipulate and interpret tactile representation of circuit symbols on braille work cards which includes dry cells, connecting wires, switch and bulb. • Learners are guided to interpret circuit diagrams to identify the position of each electrical component. Learners with blindness are guided to manipulate and interpret tactile circuit diagrams. • Learners with low vision are guided to interpret series and parallel circuit diagrams while learners with blindness are given one on one demonstration on how to interpret tactile	1. Why do we observe safety measures when handling electrical appliances? 2. How do we differentiate between conductors and non-conductors of electricity? 3. How is electricity useful day to day?

	using electrical appliances, Appreciate the use of electricity in day to day life.	used in day-to-day life, e) identify safety measures followed when handling electrical appliances, f) appreciate the use of electricity in day-to-day life.	series and parallel circuit diagrams so as to recognize the arrangement of components in a circuit. ● Learners are guided to set up a simple electrical circuit for parallel and series arrangement of cells. Learners with blindness are given one on one demonstration and supported on aspects that require use of sight such as noting when the bulb lights. ● Learners are guided to use electrical apparatus to set up simple electrical circuits in series and parallel. Learners with blindness are guided to assemble materials for the experiment and supported on aspects that require use of sight such as noting when the bulb lights. *(use dry cells, connecting wires, switch, bulb, bulb holder)* ● Learners discuss common electrical appliances used in day-to-day life *(pressure cooker, electric cooker, electric blender, electrical lamp and torch, electric iron box, electric kettle, electric guitar, electric fan, air conditioner, electric oven, television, electric speaker, washing machine and electric refrigerator.).*	

			● In groups, learners discuss safety measures observed when using electrical appliances. ● Learners explore uses of electricity in day-to-day life. ● Learners use digital devices with assistive technology, print or braille media to search for more information on electrical appliances and safety measures observed when using them.	

Core competencies to be developed:

- Learning to learn: The learner leans how to set up a simple electric circuit as they carry out activities of series and in parallel circuits.
- Communication and collaboration: The learner collaboratively works with peers to set up simple electrical circuits in series and in parallel.

Values:

- Unity: The learner works harmoniously as they set up simple electrical circuits in series and parallel in groups.
- Patriotism: The learner exercises dedication in setting up simple electrical circuits in series and parallel in groups.

Pertinent and Contemporary Issues (PCIs):

- Social economic and environmental issues: The learner exercises safety and security in the class and school environment as they identify and discuss safety measures to follow when using electrical appliances.

Links to other subjects:

- Pre-Technical Studies: The learner is able to relate concepts in electrical circuits to electrical energy**.**

Suggested learning resources:
Dry cells, cell holders, connecting wires, bulbs, bulb holders, crocodile clips, charts of circuit symbols in appropriate font and colour contrast, tactile charts of circuit symbols, tactile circuit diagrams, circuit diagrams in appropriate font and colour contrast, Digital devices with assistive technology such as adapted keyboard, screen readers and screen magnifiers.

Strand	Sub Strand	Specific learning outcomes	Suggested learning experiences	Suggested Key inquiry question(s)
4.0 Force and Energy	**4.2 Magnetism (16 lessons)** ● *Properties of a magnet,* ● *Classification of materials as magnetic or non-magnetic,* ● *Uses of magnets.*	By the end of the sub-strand, the learner should be able to: a) demonstrate the properties of a magnet, b) classify materials as magnetic or non-magnetic, c) identify the uses of magnets in day-to-day life, d) appreciate the applications of magnets in day-to-day life.	● Learners are guided to carry out activities to demonstrate properties of magnets which include attractive and repulsive, directional, poles and magnetic strength properties. Learners with blindness are guided to bring like and unlike poles of magnets closer to each other so as to experience attraction and repulsion. ● Learners are guided to carry out activities to investigate the nature of force between different poles of magnets. Learners with blindness are guided to identify poles on magnets then bring the like and unlike poles together to experience the nature of force. ***Hint:*** *basic law of magnetism.* ● In groups, learners use a permanent magnet to test different materials, sort and classify them into magnetic and non-magnetic materials. Learners with blindness are given one on one demonstration and verbal	How are magnets used in day-to-day life?

			description on how magnetic and non-magnetic materials behave when they are brought close to a magnet. ● Learners discuss the applications of magnets in day to day life *(separation of mixtures, in radios, speakers, refrigerator door, magnetic compass and magnets used in toys to give magic effect).* ● Learners use digital devices with assistive technology, print or braille media to search for information on applications of magnets in day-to-day life.	

Core competencies to be developed:

- Communication and collaboration: The learner develops speaking skills as they carry out activities in a group to demonstrate properties of magnets.
- Self-efficacy: The learner manages assigned tasks by attentively using a permanent magnet to test different materials, sort and classify them into magnetic and non-magnetic materials.

Values:

- Responsibility: The learner diligently engages in assigned roles when carrying out activities to investigate the nature of force between different poles of magnets.
- Respect: The learner exercises patience with one another as they discuss the various applications of magnets in day to day life.

Pertinent and Contemporary Issues (PCIs):

- Social economic and Environmental issue: The learner enhances environmental education as they use print or digital media to search for and discuss applications of magnets in separation of mixtures and hence minimising soil pollution.

Links to other subjects:

- Pre-technical studies: The learner is able to link the concept leant in magnetism to the application of magnets and magnetic materials.

Suggested learning resources:

Strong bar magnets, horse shoe magnet, bottle tops, nails, sticks, iron fillings, plastic materials, wooden materials, glass, rubber, print and braille or print course book, Digital devices with assistive technology such as adapted keyboard, screen readers and screen magnifiers.

Suggested Assessment Rubrics				
Level / **Indicator**	**Exceeds expectation**	**Meets expectation**	**Approaches expectation**	**Below expectation**
Ability to: ● Identify sources of electricity in the environment. ● Connect simple electrical circuit to demonstrate the flow of electric current. ● Demonstrate the properties of magnets. ● Classify materials as magnetic or non-magnetic.	The learner demonstrates four skills.	The learner demonstrates three skills.	The learner demonstrates two skills.	The learner demonstrates one skill or none.

APPENDIX 1: GUIDELINES FOR INTEGRATING COMMUNITY SERVICE LEARNING (CSL) PROJECT

Introduction

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 activity is hosted as a strand in Social Studies. The Social Studies teacher will be expected to coordinate teachers from other learning areas to carry out the integrated CSL class activity. Learners will be expected to apply knowledge, skills, attitudes and values from the different Learning Areas to undertake the integrated CSL class activity. Learners will undertake **one common** integrated class CSL activity following a 6-step milestone approach that is:

Milestone	**Description**
Milestone 1	**Problem Identification** Learners study their community to understand the challenges faced and their effects on community members.
Milestone 2	**Designing a solution** Learners create an intervention to address the challenge identified.
Milestone 3	**Planning for the Project** 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** The learners execute the project and keep evidence of work done.

Milestone 5	Showcasing /Exhibition and Report Writing Exhibitions involve showcasing learners' project items to the community and reflecting on the feedback Learners write a report detailing their project activities and learnings from feedback
Milestone 6	**Reflection** Learners review all project work to learn from the challenges faced. 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.

Assessment of CSL integrated Activity

Assessment for the integrated CSL activity 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 activity. It will focus on 3 components namely: skills from various learning areas applied in carrying out the activity, core competencies developed and values nurtured.

APPENDIX 2: LIST OF ASSESSMENT METHODS, LEARNING RESOURCES AND NON-FORMAL ACTIVITIES

Strand	**Sub Strand**	**Suggested Assessment Methods**	**Suggested Learning Resources**	**Suggested Non-Formal Activities**
1.0 Scientific Investigation	1.1 Introduction to Integrated Science	● Observation ● Practical Work ● Assessment Rubrics ● Checklist ● Anecdotal Records ● Written Test ● Oral Questions and Answers	Course book Library	● Watching video tapes on components of Integrated Science as a field of study ● Oral Speeches on the importance of Integrated Science in daily life
	1.2 Laboratory Safety	● Practical Work ● Observation Schedule ● Checklist	● Science Kit ● Basic Laboratory Apparatus, equipment and selected specimens ● SEPU Kit ● First Aid Kit ● Internet ● Library	● Interacting actively with resource persons to understand issues to do with common hazards and their symbols in the laboratory. ● Preparing charts, posters and slogans, First Aid safety measures for common laboratory accidents

	1.3 Laboratory apparatus and instruments	• Assessment Rubric • Practical Work • Observation Schedule • Checklist	• Course book • SEPU Kit • Basic Laboratory Apparatus, equipment and selected specimens (including microscope)	• Writing articles in school magazines on units (SI) for basic and derived quantities in science. • Engaging resource persons in discussing basic science process skills • Engaging resource persons to talk about how to safely handle and use apparatus and instruments in the laboratory
2.0 Mixtures, Elements and Compounds	2.1 Mixtures	• Written Test • Assessment Rubrics • Checklist • Anecdotal Records • Oral Questions and Answers	• Course book • Basic Laboratory Apparatus, equipment and selected specimens • Ice • Candle wax • Water/salty water. • Sieve • magnet	• Organising and participating in exchange programmes / field trips to distinguish between pure and impure substances using melting and boiling points

	2.2 Acids, bases and indicators	• Assessment Rubrics • Checklist • Oral Questions and Answers • Written Test	• Course book • Basic Laboratory Apparatus, equipment and selected specimens • Universal indicator, pH scale and pH chart • Antacid tablets, common fruits in the locality, fertilisers, liming of soil, detergents	• Engaging resource persons on how to use plant extracts as acid-base indicator.
	2.3 Solid–Liquid Mixture separation	• Practical Work • Observation Schedule • Checklist	• Basic Laboratory Apparatus, equipment and selected specimens • Portfolio and file • Course book	• Inviting a resource person to talk about different methods of separating mixtures in day-to-day life • Conducting debates during club meetings on separate mixtures using different methods

3.0 Living Things and their Environment	3.1 Reproduction in human beings	• Observation • Practical Work • Assessment Rubrics • Checklist • Anecdotal Records • Written Test • Oral Questions and Answers	• Charts • Course book • Basic Laboratory Apparatus, equipment and selected specimens	• Engaging in straight talk on reproduction in human beings. • Engaging a resource person to talk about reproduction in human beings
	3.2 Human Excretory System-Skin and Kidneys	• Practical Work • Observation • Oral Questions and Answers • Assessment Rubrics • Checklist • Anecdotal Records • Written Test	• Basic Laboratory Apparatus, equipment and selected specimens • Charts • Salts and water • Course book	• Conducting document analysis on human Excretory System-Skin and Kidneys • Holding discussions on causes of kidney disorders • Inviting a resource person to talk about how to adopt a healthy lifestyle to promote kidney and skin health.
4.0 Force and Energy	4.2 Electrical Energy	• Written Test • Assessment Rubrics • Checklist • Anecdotal Records • Practical Work	• Basic Laboratory Apparatus, equipment and selected specimens • Course book	• Initiating projects on how to set up simple electrical circuits in series and parallel using dry cells, bulbs,

		● Observation Schedule		ammeters and voltmeters. ● Writing articles in school magazines on safety measures when handling electrical appliances
	4.3 Magnetism	● Portfolio ● Written Test ● Observation Schedule ● Assessment Rubrics ● Checklist ● Anecdotal Records ● Practical Work	● Basic Laboratory Apparatus, equipment and selected specimens ● Course book	● Engaging resource persons to discuss uses of magnets in day-to-day life ● Organising and participating in exchange programmes to identify force between like and unlike poles of magnets