SENIOR SCHOOL CURRICULUM DESIGN

GRADE 10

GENERAL SCIENCE

KENYA INSTITUTE OF CURRICULUM DEVELOPMENT
2024

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Nurturing Every Learner's Potential

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NATIONAL GOALS OF EDUCATION

Education in Kenya should:

1. **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.

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 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.

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.

LEARNING OUTCOMES FOR SENIOR SCHOOL

By the end of senior school, the learner should be able to:

1. Communicate effectively and utilise information and communication technology across varied contexts.
2. Apply mathematical, logical and critical thinking skills for problem solving.
3. Apply basic research and scientific skills to manipulate the environment and solve problems.
4. Exploit individual talents for leisure, self-fulfilment, career growth, further education and training.
5. Uphold national, moral and religious values and apply them in day to day life.
6. Apply and promote health care strategies in day to day life.
7. Protect, preserve and improve the environment for sustainability.
8. Demonstrate active local and global citizenship for harmonious co-existence.
9. Demonstrate appreciation of diversity in people and cultures.
10. Manage pertinent and contemporary issues responsibly.

THE SENIOR SCHOOL IN THE COMPETENCY BASED CURRICULUM (CBC)

Senior School is the forth level of Basic Education in the Competency Based Curriculum (CBC) that learners shall come to after the Pre-Primary, Primary and Junior School (JS). The essence of Senior School is to offer learners a Pre- University/ Pre- career experience where the learners have an opportunity to choose pathways where they have demonstrated interest and/or potential at the earlier levels. Senior school comprises three years of education for learners in the age bracket of **15 to 18 years** and lays the foundation for further education and training at the tertiary level and the world of work. In the CBC vision, learners exiting this level are expected to be ***engaged, empowered and ethical citizens*** ready to participate in the socio-economic development of the nation.

At this level, learners shall take **SEVEN (07) learning areas (LAs)** as recommended by the *Presidential Working Party on Educational Reforms* (PWPER). These shall comprise **Four Compulsory** learning areas, and Three learning areas opted for by the learner according to their choses Pathway. While English and Kiswahili are indicated as Compulsory, the learners who opt for these learning areas as their subjects of specialization shall go through a *differentiated curriculum* in terms of scope, experiences and assessment. Such learners shall; therefore, take *Advanced English* or *Kiswahili Kipevu* with additional two lessons. It is recommended that AT LEAST TWO learning areas should be from chosen Pathway. In exceptional cases, some learners may opt for ONE learning area from the chosen Pathway and a maximum of TWO learning areas from any of the three pathways; depending on the learner's career projections and with guidance by the principals at Senior School.

PROPOSED LIST OF SUBJECTS AT SENIOR SCHOOL

Compulsory Subjects	Science, Technology, Engineering & Mathematics (STEM)	Social Sciences	Arts & Sports Science
1. English 2. Kiswahili/KSL 3. Community Service Learning 4. Physical Education ***NB: ICT skills will be offered to all students to facilitate learning and enjoyment***	5. Mathematics/Advanced Mathematics 6. Biology 7. Chemistry 8. Physics 9. General Science 10. Agriculture 11. Computer Studies 12. Home Science 13. Drawing and Design 14. Aviation Technology 15. Building and Construction 16. Electrical Technology 17. Metal Technology 18. Power Mechanics 19. Wood Technology 20. Media Technology* **21.** Marine and Fisheries Technology*	22. Advanced English 23. Literature in English 24. Indigenous Language 25. Kiswahili Kipevu/Kenya Sign Language 26. Fasihi ya Kiswahili 27. Sign Language 28. Arabic 29. French 30. German 31. Mandarin Chinese 32. History and Citizenship 33. Geography 34. Christian Religious Education/ Islamic Religious Education/Hindu Religious Education 35. Business Studies	36. Sports and Recreation 37. *Physical Education (C)* 38. Music and Dance 39. Theatre and Film 40. Fine Arts

LESSON DISTRIBUTION AT SENIOR SCHOOL

The number of lessons in each of the compulsory learning areas shall be 4; while the optional areas shall be 6 lessons each. A lesson shall be 40 minutes. The "free" lessons shall be used for development of ICT skills, Pastoral Instruction Programme (PPI), projects, collaborative study and further reading.

ESSENCE STATEMENT

General Science investigates biological, physical and chemical phenomena. The science equips the learner with foundational skills and principles necessary for application in real life and industry. This learning area also deals with society's need to understand how the physical environment works in order to benefit from it and responsibly care for it. The learning area utilises scientific and technological knowledge which builds on the foundational concepts acquired from Integrated Science at Junior School. Teaching General Science at Senior School continues with the process of developing scientific knowledge and understanding of ideas developed in Integrated Science at Junior School.

The purpose of General Science is to develop competencies in the learner to solve societal and technological problems while taking care of the environment. The learning area seeks to equip learners with functional investigating skills relating to life science. Some of the skills relevant for the study of General Science include; classifying, communicating, measuring, designing an investigation, drawing and evaluating conclusions. The learner will need to formulate models, observe, hypothesise, identify and control variables, interpret data and make inferences based on scientific evidence. This aims at developing problem-solving and reflective skills. General Science promotes construction and application of scientific and technological knowledge; an understanding of the nature of science to make it applicable in real life situations. This will increase understanding of basic life principles and concepts, prepare student for post Senior School learning especially for the learner who will not require pure sciences.

These abilities can support students in navigating day to day life issues and are crucial for success in any field of study, employment or world of work. Consequently, studying General Science provides a platform for the learner who may develop

interest in specialist learning such as sports science, applied science courses, talent based areas and vocational career paths. Knowledge, skills and attitude in General Science enables the learner to develop a sense of citizenship as well as environmental management and socio-economic development skills. General Science plays an increasingly important role in the lives of all learners owing to the influence on scientific and technological development, which are necessary for the country's economic growth and the social wellbeing of its people.

GENERAL LEARNING OUTCOMES

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

a) Relate General Science to technology and society to enhance the learners' appreciation of the environment.
b) Select and use appropriate instruments to carry out basic science process skills to discover and explain the order of the environment.
c) Apply basic research and scientific skills to manipulate the environment and solve human problems.
d) Develop capacity for critical thinking through basic scientific skills and research in addressing pertinent & contemporary issues affecting the society.
e) Apply scientific skills for enhancement of innovations and entrepreneurial skills for development.
f) Use relevant skills and values to promote local and global citizenship for harmonious coexistence and appreciation of biodiversity.
g) Acquire adequate knowledge, skills and attitudes to enhance exploitation of individual talents for leisure, self -fulfilment, career growth and for further education and training.
h) Apply acquired knowledge, skills and attitudes for effective communication and utilisation of information in scientific advancement.

SUMMARY OF STRANDS AND SUB STRANDS

Strand	Sub Strand	Suggested Number of Lessons
1.0 Introduction to General Science	1.1 Introduction to General Science	6
2.0 Living Things and Environment	2.1 Properties of Waves	10
	2.1 The Cell	6
	2.2 Nutrition in Animals	8
	2.3 Transport in plants	8
	2.4 Respiration	6
	2.5 Plant growth and development	10
	2.6 Microorganisms	10
3.0 Matter and Chemical Reactions	3.1 The periodic table	8
	3.2 Chemical Families	8
	3.3 Chemical bonding	10
	3.4 Acids, Bases and Salts	8
	3.5 Rates of Reactions	12
4.0 General Physics	4.1 Turning effect of force	11
	4.2 Linear motion with constant acceleration	9
	4.3 Waves	10
	4.4 Magnetism and electromagnetic induction	10
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: INTRODUCTION TO GENERAL SCIENCE

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
1.0 Introduction to General Science	**Introduction to General Science** (4 lessons) - *Studying General Science,* - *The principle of inference as used in science education (include methods of collecting evidence for drawing conclusions)*	By the end of the Sub Strand, the learner should be able to: a) explain the meaning of General Science as a learning area, b) discuss the branches of General Science, c) outline the importance of General Science in life, environment and technology, d) identify career opportunities related to General Science,	The learner is guided to: ● find out the meaning of general science from a resource person or the internet, ● brainstorm on the main branches of General Science and share with peers, ● use available digital and/or print media to search for information on main branches of General Science *(Biology, Chemistry and Physics),* ● consult teachers or parents on the importance of General Science in relation to human life, environment, technology, ● use available digital and print media to search for information	How is General Science useful in daily life?

		e) analyse the principle of inference in science education, f) appreciate the importance of General Science in day to day living.	on career opportunities related to General Science, ● draw a chart on careers related to General Science and identify with a particular career path of own interest, ● explore the process of collecting evidence for drawing inferences in science education *(methods of collecting and analysing data).*	

Core competencies to be developed:

- Self-efficacy: as the learner designs and presents charts on career opportunities related to General Science and identifies a particular career path of own interest.
- Digital literacy: as the learner uses digital media to search for relevant information on the importance of General Science using digital devices.
- Citizenship: as the learner seeks for information concerning local and international career opportunities related to General Science that help improve lives of members of the community.

Values:

- Respect: as the learner appreciates others' opinions as they discuss the importance of general science in day to day life.
- Responsibility: as the learner uses digital devices appropriately to search for information on the career opportunities related to General Science.

Pertinent and Contemporary Issues (PCIs):

- Socio-Economic and Environmental issues: as the learner discusses with peers the importance of General Science to the environment and technology.
- Learner Support Programmes; Career guidance: as the learner designs and displays charts on the possible career opportunities related to General Science.

Assessment Rubric

Level / Indicator	Exceeds expectations	Meets expectations	Approaches expectations	Below expectations
Ability to explain the meaning of General science as a learning area.	Comprehensively explains the meaning of General science giving all the branches of General Science.	Explains the meaning of General science giving the branches of General Science.	Explains the meaning of General science but misses some key points or identifies one branch of General Science.	With prompts, explains the meaning of General science.
Ability to outline the importance of General science in human life, environment and technology.	Correctly outlines the importance of General science in human life, environment and technology, giving some examples from the locality.	Correctly outlines the importance of General science in human life, environment and technology.	Correctly outlines some of the importance of General science in human life, environment and technology.	With prompt, to outline some of the importance of General science in human life, environment and technology.

Ability to relate General science to career opportunities beyond senior school.	Correctly relates General science to career opportunities beyond senior school, giving examples to such career opportunities.	Correctly relates General science to career opportunities beyond senior school.	Correctly relates General science to some career opportunities beyond senior school.	With prompts, related General science to some career opportunities beyond senior school.

STRAND 2.0: LIVING THINGS AND ENVIRONMENT

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Living Things and Environment	**2.1 The Cell** (6 lessons) • *Types of microscopes* • *and differences between light and electron microscopes.* • *Cell structure and functions* • *Levels of cell organisation*	By the end of the Sub Strand, the learner should be able to: a) explain the differences between light and electron microscopes. b) describe the plant and animal cell under an electron microscope, c) compare plant and animal cell structures under light and electron microscope, d) explain the functions of the components of	The learner is guided to: ● discuss with peers the differences between light and electron microscopes. ● Use print or non-print media to search for the structures of plant and animal cells under electron microscope, ● observe photomicrographs of plant and animal cells under electron microscope to identify the components of the cells, ● discuss with peers the functions of components of the animal and plant cells ● draw and label the structures of animal and plant cells	What makes up an organism?

		plant and animal cells e) construct a concept map of the levels of cell organisation, f) appreciate the function of the cell as a basic unit of life.	under the electron microscope, ● make a chart showing levels of cell organisation *(organelles, cells, tissues, organs, organ systems and organisms).* **Project** Use locally available materials to make a model of a plant and/or an animal cell.	

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Living Things and Environment	**2.2 Nutrition in Animals** (10 lessons) • *Digestion of different types of foods in each region of the digestive system,* • *Adaptations of parts of the human digestive system,* • *Experiments on food tests*	By the end of the Sub Strand, the learner should be able to: a) describe digestion of different types of food in each region of the digestive system, b) explain the adaptations of parts of the human digestive system, c) Perform experiments to determine presence of different nutrients in food. d) appreciate the role of different parts of the digestive system	The learner is guided to: ● search for information on digestion of different types of food in each region of the digestive system, ● Watch animation or simulation of digestion of food along the alimentary canal, ● discuss the adaptations of parts of the human digestive system to their functions, ● Search for information from print and non-print materials on the enzymes used to breakdown each type of food at different regions of the digestive system and share with peers, ● carry out experiments on food tests in groups and share in the plenary.	What is the importance of breaking down food?

			Project Make a model of the human digestive system using locally available materials.	

Core competencies to be developed:

- Digital literacy: the learner searches for information from the internet on the enzymes used to breakdown each type of food at different regions of the digestive system.
- Creativity and Imagination: as the learner uses locally available materials to make a model of the human digestive system.

Values:

- Respect: Learner is considerate of others' opinion while discussing the adaptations of the human digestive system.
- Peace and Unity is promoted as the learner works harmoniously as they carry out experiments on food tests.

Pertinent and Contemporary Issues (PCIs)

- Learner support programmes: Peer education and mentorship; Learner develops leadership skills as they work in groups.
- Safety and security: Learner observes safety precautions as they carry out experiments on food tests.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Living Things and Environment	**2.3 Transport in plants** **(12 lessons)** • *Transport systems in plants* • *Absorption of Water and Mineral Salts* • *Translocation* • *Importance of transpiration* • *Factors affecting transpiration*	By the end of the Sub Strand, the learner should be able to: a) describe transport in plants, b) investigate factors affecting transpiration, c) describe the significance of transpiration in sustainability of plant life, d) appreciate the role of transport in plants.	The learner is guided to: ● use digital devices or print media to search for information on transport in plants *(translocation, absorption of water and mineral salts),* ● observe plant specimen to identify tissues responsible for transport in plants, ● discuss with peers how absorption of water and mineral salts in plants take place, ● carry out experiments in groups to investigate factors affecting transpiration in plants *(structural aspect of the plant and environmental factors),* ● carry out experiment(s) to investigate translocation in plants, ● discuss with peers the necessity of transport in plants,	1. Why is transport important in plants? 2. How do plants absorb water?

			• sensitise the community on the importance of transport in plants to sustain plant growth.	

Core competencies to be developed:

- Communication and collaboration: as the learner shares information gathered on transport in plants with others.
- Learning to learn: as the learner reflects on experiments on factors affecting transpiration in plants.

Values:

- Respect: is enhanced as the learner discusses with peers in harmony how absorption of water and mineral salts in plants take place.
- Patriotism: is enhanced as the learner utilises the knowledge on transport in plants to sustain plant growth in the locality.
- Responsibility: as the learner engages in assigned roles while working with others in the process of learning such as investigation of factors affecting transpiration.
- Peace and Unity: as the learner works harmoniously with others as they carry out tasks and practical activities.

Pertinent and Contemporary Issues (PCIs)

Safety and security: Learner observes safety precautions as they carry out experiments in groups to investigate factors affecting transpiration in plants.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Living Things and Environment	**2.4 Respiration** (6 lessons) • *Meaning of respiration* • *Aerobic and anaerobic respiration (explain effects of anaerobic respiration - oxygen debt)* • *Respiratory substrates and respiratory quotient*	By the end of the Sub Strand, the learner should be able to: a) explain the meaning respiration in living things, b) describe aerobic and anaerobic respiration in living things, c) relate the respiratory quotient to the type of substrate and respiration in living things, d) explain factors affecting respiration in living things, e) describe economic importance of anaerobic respiration,	The learner is guided to: ● discuss with peers the meaning of respiration ● discuss with peers the difference between aerobic and anaerobic respiration in living things and present in plenary, ● use print or non-print media to search for information on effects of anaerobic respiration, ● carry out activities to investigate anaerobic respiration in living organisms *(fermentation using yeast cells),* ● calculate the Respiratory Quotient to determine the type of substrate and type of respiration in living things, ● discuss with peers factors affecting respiration in living things,	How is aerobic and anaerobic respiration important in a society's economy?

	• *Factors affecting respiration* • *Economic importance of anaerobic respiration in industry and at home*	f) acknowledge the significance of respiration in living things.	• discuss in groups, the economic importance of anaerobic respiration in living things and share in plenary. **Project** Carry out a project that utilises the concept of anaerobic respiration *(exclude brewing).*	

Core competencies to be developed:

- Communication and collaboration: as the learner discusses with peers in a group factors affecting energy requirements in human beings.
- Learning to learn: as the learner carries out activities to investigate anaerobic respiration in living organisms.

Values:

- Respect: as the learner considers others' opinion while working on practical activities in groups such as fermentation.
- Responsibility: as the learner carries out activities to investigate anaerobic respiration in living organisms.

Pertinent and Contemporary Issues (PCIs)

- Financial literacy: as the learner undertakes the project on economic importance of anaerobic respiration.
- Life skills and human sexuality is enhanced as the learner becomes aware of varying energy requirements in human beings.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Living Things and Environment	**2.5 Plant growth and development** **(10 lessons)** • *Concept of growth and development* • *Seed dormancy- (causes and how to break it)* • *Conditions necessary for germination* • *Types of germination* • *Primary and secondary growth*	By the end of the Sub Strand, the learner should be able to: a) explain the meaning of growth and development in plants, b) describe the causes of seed dormancy, c) determine the conditions necessary for germination, d) differentiate between epigeal and hypogeal germination e) distinguish between primary and secondary growth, f) describe the role of growth hormones,	The learner is guided to: ● use digital or print media to search for differences between growth and development in plants, ● discuss in groups causes of seed dormancy and ● search for information on how to break seed dormancy and share with peers, ● carry out experiments with peers to investigate conditions necessary for germination, ● carry out experiments to investigate epigeal and hypogeal germination, ● Discuss with peers the differences between primary and secondary growth,	What brings about growth in plants?

	• *Role of growth hormones*	g) appreciate the concept of growth and development in plants.	• use print and non-print media to search for information on the role of growth hormones in plants.	

Core competencies to be developed:

- Communication and collaboration: the learner shares information gathered on differences between growth and development.
- Self-efficacy: the learner demonstrates confidence as they share information on seed dormancy.
- Learning to learn: the learner reflects on the experiments on conditions necessary for germination.

Values:

- Respect: Learner is considerate of others' opinion while working on practical activities to investigate epigeal and hypogeal germination.
- Responsibility: Learner engages in assigned roles while working with others in the process of learning such as investigating conditions necessary for germination.

Pertinent and Contemporary Issues (PCIs)

- Learner support programmes: Peer education and mentorship; Learner develops leadership skills as they work in groups.
- Cyber security: as the learner observes online security as they search for information on growth and development.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Living Things and Environment	**2.6 Microorganisms** **(14 lessons)** ***Fungi*** • *types of microorganisms (fungal, bacteria and viruses)* • *mode of transmission and infections of different microorganisms* • *prevention and control of microorganisms*	By the end of the Sub Strand, the learner should be able to: a) identify microorganisms that affect human beings, b) explain modes of transmission of microorganisms in human beings, c) identify types of infections caused by microorganisms in human beings, d) Describe methods of control and prevention of infections caused by microorganism, e) Explain the economic importance of microorganisms f) Appreciate the effect of microorganisms in day to day life	The learner is guided to: ● discuss types of microorganisms that affect human beings ● Use digital or print media to search for information on the modes transmission of microorganisms in human beings ● use digital or print media to search for information on infections caused by microorganisms in human beings ● relate the methods of control and prevention of microorganisms to their mode of transmission ● In groups, discuss economic importance of	How are micro-organisms important in day to day life?

			microorganisms and share in plenary	

Core competencies to be developed:

- Digital literacy: The learner uses digital devices to search for information on microorganism infections, control and prevention.
- Communication and collaboration: Learner shares information gathered on types of microorganism infections, control and prevention.

Values:

Respect is promoted as the learner becomes considerate of others' opinion while discussing methods of controlling and preventing microorganism infections.

Pertinent and Contemporary Issues (PCIs)

- Life skills and human sexuality: Problem solving skills; Learner uses knowledge gained to solve problems as they discuss control and prevention of infections caused by microorganisms.
- Learner support programmes: Peer education and mentorship; Learner develops leadership skills as they work in groups.

Suggested Assessment Rubric

Level / Indicator	Exceeds expectations	Meets expectations	Approaches expectations	Below expectations
Ability to describe the plant and animal cell under an electron microscope	Comprehensively and accurately describes the plant and animal cell under an electron microscope	Accurately describes the plant and animal cell under an electron microscope	Partially describes the plant and animal cell under an electron microscope,	Describes the plant and animal cell under an electron microscope, with assistance
Ability to relate the respiratory quotient to the type of substrate and respiration in living things	Comprehensively and accurately relate the respiratory quotient to the type of substrate and respiration in living things	Accurately relates the respiratory quotient to the type of substrate and respiration in living things	Partially relates the respiratory quotient to the type of substrate and respiration in living things	Relates the respiratory quotient to the type of substrate and respiration in living things with hints
Ability to investigate factors affecting transpiration	Distinctly and clearly investigate all factors affecting transpiration	Clearly investigate all factors affecting transpiration	Investigate some factors affecting transpiration	Investigate factors affecting transpiration with prompts
Ability to determine the conditions	Comprehensively and accurately determine the conditions	Accurately determine the conditions	Partially determine the conditions necessary for germination	Determine the conditions necessary for

Level / Indicator	Exceeds expectations	Meets expectations	Approaches expectations	Below expectations
necessary for germination	necessary for germination	necessary for germination		germination, with hints
Ability to perform experiment on test for reducing sugars as per the following procedure: 1. Put about 2 cm3 of test solution in a test tube 2. Add an equal amount of benedict's solution and mix 3. Place the test tube with the mixture in a hot water bath for a few minutes 4. Observe and record all the colour changes	Systematically and accurately follow all the steps in the procedure	Accurately follows the procedure	Partially follow the procedure	Follow the procedure with assistance

Level / Indicator	Exceeds expectations	Meets expectations	Approaches expectations	Below expectations
Ability to explain modes of transmission of microorganisms in human beings	Comprehensively and accurately explains modes of transmission of microorganisms in human beings	Accurately explains modes of transmission of microorganisms in human beings	Partially explains modes of transmission of microorganisms in human beings	Explain modes of transmission of microorganisms in human beings with assistance

STRAND 3.0: MATTER AND CHEMICAL REACTIONS

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Matter and Chemical Reactions	**3.1 The periodic table** (12 lessons) *Classification of the first twenty elements of the periodic table* ***Ion formation*** • *Valency and oxidation number* • *Names and formulae of* • *common radicals*	By the end of the Sub Strand, the learner should be able to: a) examine electron arrangement of an atom of an element to identify the period and group the element belongs, b) classify elements into groups and periods of the periodic table, c) explain the stability and electron affinity of atoms of elements, d) describe ion formation for the first 20 elements of the periodic table,	The learner is guided to: ● carry out activities to review the concepts of the structure of an atom, atomic number, mass number and the electron arrangement of atoms of selected elements, ● arrange the first 20 elements using similarities in their electron arrangements, ● discuss with peers the order adopted in developing the periodic table *(the periodic law),* ● discuss with peers in a group how atoms of elements acquire stability *(losing or gaining electrons)* relating to the atom's ability to attain the	1. Why is electron arrangement significant? 2. How are elements arranged in the periodic table?

	• *chemical formulae of some common compounds* • *Writing chemical equations*	e) formulate chemical formula of compounds using valencies of elements and radicals, f) appreciate the importance of the structure of the atom in the development of the periodic table.	positive or negative charge *(cations and anions)*, • draw dot (.) and cross (x) diagrams to illustrate ion formation for the first 20 elements of the periodic table, • discuss with peers on how to determine the valency and oxidation numbers of elements and radicals (*ammonium ion, sulphate, nitrate, hydroxide, carbonate, phosphate, hydrogen carbonate, sulphite and nitrite*), • watch animations and simulations on ion formation and atomicity of gases using digital devices. **Project** Model the periodic table for the first 20 elements using locally available materials.	

Core competencies to be developed:

- Communication and Collaboration: as the learner discusses with peers in a group how to determine valency and oxidation numbers of elements and radicals.
- Critical Thinking and Problem Solving: as the learner sorts and arranges the first twenty elements of the periodic table according to their similarities.
- Creativity and Imagination: as the learner models the periodic table for the first twenty elements using locally available materials.

Values:

- Respect: as the learner recognises and respects the input of every group member as they discuss how to determine the valency and oxidation numbers of elements and radicals.
- Unity: as the learner takes turns in playing roles when drawing dot (.) and cross (x) diagrams to illustrate ion formation for atoms of elements of the periodic table.
- Responsibility: as the learner uses digital devices appropriately to watch simulations and animations onion formation.

Pertinent and Contemporary Issues (PCIs)

- Life skills; Problem solving skills: as the learner arranges the first twenty elements of the periodic table into groups and periods.
- Life skills; Financial literacy: as the learner uses locally available materials as a way of minimising the expenses when modelling the periodic table of elements.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Matter and Chemical Reactions	**3.2 Chemical Families** (8 lessons) • *Alkali metals, alkaline earth metals, halogens, noble gases and transition metals* • *Physical and chemical properties of selected elements* • *Uses of the elements and their compounds*	By the end of the Sub Strand, the learner should be able to: a) identify chemical families in the periodic table, b) classify elements of the periodic table into their chemical families, c) describe the physical and chemical properties of selected elements of the periodic table, d) explain the unreactive nature of the noble gases, e) outline the uses of elements of the periodic table, f) acknowledge the uses of the elements of the	The learner is guided to: • find out the names assigned to various categories of elements in the periodic table *(alkali, alkaline earth metals, halogens, noble gases and transition metals),* • sort and group the first twenty elements of the periodic table into their families *(include copper, iron, zinc, lead for transition elements),* • carry out activities to investigate physical properties of alkali metals, alkaline earth metals, halogens, noble gases and transition metals, • observe safety when carrying out activities to investigate	How are elements suited for their use in day to day life?

		periodic table in day to day life.	properties of elements of the periodic table, • carry out activities to investigate the reaction of sodium, magnesium and chlorine with air (*oxygen*), water and dilute acids where applicable (*write balanced chemical equations for the reactions)*, • discuss with peers the properties of elements of the periodic table in relation to their uses, • discuss with peers the unreactive nature of noble gases and how they are suited for their applications in day to day life, • use available digital and print media to search for information on transition elements and their uses	

Core competencies to be developed:

- Communication and collaboration: as the learner carries out activities to investigate the reaction of sodium, magnesium and chlorine with air.
- Digital literacy: as the learner uses available digital and print media to search for information on transition elements and their uses.

Values:

- Respect: as the learner participate with peers in harmony in contests of writing balanced chemical equations for simple reactions.
- Unity: as the learner harmoniously participates in a contest of writing the formulae of compounds from the constituent elements using valencies.

Pertinent and Contemporary Issues (PCIs)

Safety and security: as the learner observes safety precautions as they carry out activities to investigate properties of elements of the periodic table

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Matter and Chemical Reactions	**3.3 Chemical bonding** (14 lessons) • *Bond and bond types* • *Bond formation, in common compounds and metals (water, sodium chloride, hydrogen, Diamond and Graphite),* • *Bond types and their structures (ionic, covalent, Van*	By the end of the sub strand, the learner should be able to: a) identify the types of bonds formed by elements, b) illustrate chemical bonding in common compounds, c) distinguish structures of elements and compounds formed by bonding, d) describe the relationship between the bond types and the physical properties of elements and compounds, e) select appropriate materials for use based	The learner is guided to: ● discuss with peers the role of valence electrons in bond formation, ● Search for information from the Internet or other available resources on the types of bonds formed by elements, ● manipulate available digital devices to watch simulations on formation of chemical bonds, ● discuss with peers the formation of different types of chemical bonds *(ionic, covalent, dative-covalent, hydrogen and metallic),* ● use dots (.) and crosses (x) to illustrate chemical bonding for selected molecules and compounds,	How do bond types relate to physical properties of compounds?

	der Waals, and metallic), • *Uses of Diamond, Graphite and Aluminium.*	on their bond type and structure, f) reflect on the appropriateness of substances in day to day life based on their bond types and structures.	• carry out activities to demonstrate physical properties of different elements and compounds (*melting point, boiling point, solubility, electrical and thermal conductivity*), • observe safety precautions when carrying out activities to investigate properties of elements and compounds, • discuss with peers the relationship between bond types and physical properties of different structures *(giant ionic, simple molecular, giant atomic and giant metallic),* • explore with peers the uses of elements and compounds based on their bond types and structures *(diamond, graphite and Aluminium).* **Project work**	

			Model structures of molecules and compounds using locally available resources.	

Core competencies to be developed:

- Digital literacy: the learner manipulates digital devices to watch simulations on formation of chemical bonds.
- Creativity and imagination: as the learner undertakes a project of modelling ball and stick ionic and covalent structures of selected molecules using locally available resources.

Values:

- Respect: as the learner recognises and appreciates the input of every group member when discussing the relationship between bond types and physical properties of different structures.
- Responsibility: as the learner carefully uses digital devices to watch animations and simulations on formation of different bond types.

Pertinent and Contemporary Issues (PCIs)

- Safety and Security: as the learner observes safety precautions when carrying out activities to investigate properties of elements and compounds.
- Financial Literacy: as the learner gains knowledge on making informed decisions on savings by exploring and selecting appropriate elements and compounds for use based on their bond types and structures.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Matter and Chemical Reactions	**3.4 Acids, Bases and Salts** (12 lessons) • *Definition of acids and bases* • *Reactions of Acids and bases* ***Salts*** • *Types of salts* • *Preparation of salts* • *Behaviour of salts when*	By the end of the sub strand, the learner should be able to: a) distinguish acids and bases using the universal indicator and pH chart, b) explain the role of acids and bases in biological processes, c) identify products of chemical reactions of acids and bases, d) classify salts according to their behaviour when exposed to air, e) outline applications of salts in real life situations,	The learner is guided to: ● discuss with peers the meaning of acids and bases *(limited to the presence of hydrogen ions and hydroxide ions for acids and bases respectively),* ● test acidic and basic substances in the environment using the universal indicator and pH chart to determine their strengths *(bleaching agents, vinegar, salts, soda, juices, water, wood ash, antacids),* ● discuss with peers the functions of acids and bases in simple biological processes *(digestion, respiration),* ● carry out experiments and present findings on chemical properties of dilute acids and bases *(reaction of acids with bases, acids with carbonates and metals)* ● carry out experiments to investigate the behaviour of salts when exposed	1. Why are salts important in day to day life? 2. How do salts behave when exposed to air?

	exposed to air • *Application of salts*	f) advocate for proper usage of salts in day to day life.	to air *(hygroscopic, deliquescent and efflorescent salts),* ● listen attentively to peers when discussing the various applications of salts *(Agriculture, food industry, medicine, laundry),* ● discuss with peers the effect of salts to the environment *(eutrophication, soil and air pollution),* ● use available digital and print media to search for information on the applications of salts in day to day life and present in plenary.	

Core competencies to be developed:

- Communication and collaboration: as the learner listens attentively to peers giving ideas when discussing the various applications of salts.
- Self-efficacy: as the learner carries out experiments and present findings on chemical properties of dilute acids and bases.
- Digital literacy: as the learner uses digital devices to search for information on the applications of salts in day to day life.

Values:

- Responsibility: as the learner carefully uses digital devices to search for information and presents in plenary the various applications of salts in day to day life.

● Respect: as the learner respects each other's opinion while discussing with peers the meaning of acids, bases and salts.
Pertinent and Contemporary Issues (PCIs): ● Socio-economic and Environmental education: as the learner discusses the effect of salts on the environment. ● Safety and security: as the learner carry out experiments and present findings on chemical properties of dilute acids and bases

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Matter and Chemical Reactions	**3.5 Rates of Reactions** (12 lessons) • *Rates of reactions Factors affecting the rates of reactions (Temperature, Pressure, Catalyst, Light, Concentration, Surface area)* • *Factors affecting some industrial processes*	By the end of the Sub Strand, the learner should be able to: a) describe rate of chemical reactions, b) perform experiments involving the rate of chemical reactions, c) explain factors that influence the rate of reactions in both biological and chemical process, d) account for the efficiency of chemical reactions in industrial processes, e) appreciate the significance of manipulating factors affecting chemical reactions in nature.	The learner is guided to: • discuss with peers the meaning of the rate of a chemical reaction, • carry out simple experiments to investigate the rate of chemical reactions, • carry out experiments to investigate factors that affect the rate of reactions (biological and chemical), • discuss with peers the factors that affect the rate of a reactions in both biological and chemical processes, • discuss with peers the importance of maintaining optimum conditions industrial processes, • brainstorm on the efficiency and safety of the Haber process *(recycling of materials, optimum*	How do various factors affect the rate of reactions?

	• *Efficiency of industrial processes (Haber process)*		*conditions and safety on the environment),* • use available digital devices and print media to search for information on the importance of optimum conditions in industrial processes	

Core competencies to be developed:

- Communication and collaboration: as the learner discusses with peers the factors that affect the rate of a chemical reaction
- Digital literacy: as the learner uses digital devices and print media to search for information on the importance of optimum conditions in industrial processes.

Values:

- Responsibility: as the earner carefully uses digital devices to search for information on the importance of optimum conditions in industrial processes.
- Respect: as the learner respects each other's opinion while discussing with peers in a group the importance of efficient industrial processes.

Pertinent and Contemporary Issues (PCIs):

Socio-economic and Safety and security: as the learner observes safety precautions while carrying out simple experiments to investigate the rate of a chemical reaction.

Suggested Assessment Rubric

Level / Indicator	Exceeds expectations	Meets expectations	Approaches expectations	Below expectations
Ability to classify the 20 elements into groups and periods of the periodic table.	Classifies all the 20 elements into groups and periods of the periodic table.	Classifies more than 15 elements into groups and periods of the periodic table.	Classifies at least 10 elements into groups and periods of the periodic table.	Classifies less than 5 elements into groups and periods of the periodic table.
Ability to outline the uses of elements of the periodic table	Exhaustively outlines the uses of elements of the periodic table	Outlines the uses of elements of the periodic table	Outlines some uses of elements of the periodic table	Outlines the uses of a few elements of the periodic table
Ability to describe the relationship between the bond types and the physical properties of elements and compounds	Clearly describes the relationship between the bond types and the physical properties of elements and compounds, with illustrations	Clearly describes the relationship between the bond types and the physical properties of elements and compounds	Makes an effort to describe the relationship between the bond types and the physical properties of elements and compounds	Describes the relationship between the bond types and the physical properties of elements and compounds, with hints

Level / Indicator	Exceeds expectations	Meets expectations	Approaches expectations	Below expectations
Ability to identify products of chemical reactions of acids and bases	Identifies all products of chemical reactions of acids and bases, with ease	Identifies most products of chemical reactions of acids and bases	Identifies some products of chemical reactions of acids and bases	Identifies some products of chemical reactions of acids and bases, with prompts
Ability to explain factors that influence the rate of reactions in both biological and chemical process	Comprehensively explains all factors that influence the rate of reactions in both biological and chemical process	Explains all factors that influence the rate of reactions in both biological and chemical process	Explains some factors that influence the rate of reactions in both biological and chemical process	Explains a few factors that influence the rate of reactions in both biological and chemical process with prompts

STRAND 4.0: GENERAL PHYSICS

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
4.0 General Physics	**4.1 Turning effect of force** (11 lessons) ● *Moments of a force at a point,* ● *Moments of anti-parallel forces,* ● *Applications of turning effect of force in real life.*	By the end of the Sub Strand, the learner should be able to: a) determine moments of a force at a point, b) calculate the moments of anti-parallel forces using a formula, c) apply the turning effect of force in real life situations, d) appreciate the importance of the turning effect of force in everyday life.	The learner is guided to: • use digital devices and/or print media to search for information on moments of a force at a point, • watch animations and simulations on moments of anti-parallel forces from the internet and present in a plenary, • demonstrate the principle of moments by balancing a metre rule, • solve numerical problems involving both moments of a force and moments of anti-parallel forces, • walk around the school in groups to identify where turning effect of force is applied, • watch video clips on how the concept of turning effect of force is applied in real life situations,	How is the turning effect of force important in daily life?

			• discuss with peers other instances where the turning effect of force can be utilised.	

Core competencies to be developed:

- Critical thinking and problem solving as the learner solves numerical problems involving both moments of a force and moments of anti-parallel forces.
- Digital literacy as the learner interacts with digital technology as they search for information on moments of a force at a point and moments of anti-parallel forces.

Pertinent and Contemporary Issues (PCIs):

Life skills and values: The learner appreciates the need of increasing the effort distance in making the turning effect of force better.

Values:

- Integrity: The learner displays honesty while using digital devices to search for information on moments of a force at a point and moments of anti-parallel forces.
- Respect: The learner respects others opinions while discussing with peers on the examples involving turning effect of force in daily life.

Strand	Sub strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
4.0 General Physics	**4.2 Linear motion with constant acceleration** (16 Lessons) *Terms used in linear motion (distance, displacement, speed, velocity and acceleration),* • *Equations of linear motion (no derivations needed),* • *Examples of linear motion with constant acceleration in real life,*	By the end of the sub strand, the learner should be able to: a) explain terms used in linear motion, b) calculate variables of motion using equations of linear motion, c) carry out experiments on the effect of gravity on bodies under free fall, d) appreciate the significance of linear motion and free fall in real life.	The learner is guided to: • discuss with their peers the meaning and differences between the terms used in linear motion, • use digital devices/print media to search for the equations of linear motion, • solve numerical problems in linear motion with constant acceleration using equations of linear motion, • discuss with peers the applications of linear motion in real life and present in plenary, • drop objects from a certain height to observe the increase in speed of the objects and infer the effect of gravity on the objects, • observe safety measures when dropping objects to experiment the effect of gravity on objects,	1. Why do we learn linear motion? 2. How is free fall motion important in real life? 3. What are the dangers of free fall in our day to life?

	• *Freely falling bodies.*		• discuss with peers the safety measures put in real life situations to minimise fatal injuries resulting from free fall concept, • do individual assignments on examples of bodies under free fall motion and present the findings in a group discussion.	

Core competencies to be developed:

- Communication and collaboration: the learner works with peers to discuss and present in plenary the application of linear motion in real life.
- Learning to learn as the learner does individual assignments on examples of bodies under free fall motion and presents the findings in a group discussion.

Pertinent and Contemporary Issues (PCIs):

Safety and security: The learner observes safety measures when dropping objects to experiment the effect of gravity on objects.

Values:

- Peace: The learner displays tolerance and calmness as they discuss and present in plenary the application of linear motion in real life.
- Unity: The learner displays cooperation, collaborates with others while dropping objects to experiment the effect of gravity.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
4.0 General Physics	**4.3 Waves** (18 lessons) ● *Definition of terms used in waves (wavelength, period, amplitude, frequency and velocity)* ● *The wave equation* ● *Real life effects of properties of waves (reflection, refraction and diffraction)* ● *Application of properties of*	By the end of the sub strand, the learner should be able to: a) explain the terms used in waves, b) interpret the wave equation as used in science, c) calculate the wave characteristics using the wave equation, d) demonstrate the effects of properties of waves in real life, e) appreciate the applications of properties of waves in real life.	The learner is guided to: ● search from the internet/print media/non-print media, the definition of terms used in waves and properties of waves, ● discuss in peers the wave equation, ● solve numerical problems on wave characteristics using the wave equation, ● carry out experiments to investigate reflection of sound waves using the echo method, ● watch video clips from YouTube on refraction of sound waves both during the day and night and illustrate the concept diagrammatically in class, ● carry out experiments to establish that sound waves can be heard round a corner,	1. How are waves applicable in our day-to-day life? 2. How do waves affect our environment?

	waves in real life.		● search and discuss with peers the applications of properties of waves (reflection, refraction and diffraction) in day-to-day life (you may use digital devices, interviews or any other available means).	

Core competencies to be developed:

- Learning to learn: as the learner searches the applications of reflection, refraction and diffraction of waves.
- Digital literacy: as the learner searches from the internet/print media/nonprint media, the definition of terms used in waves and properties of waves.

Values:

Unity: as the learners play different roles in turns with peers while carrying out experiments to investigate reflection of sound waves using the echo method.

Pertinent and Contemporary Issues:

Safety and security: as the learner appreciates some of the applications of waves related to safety in water transport.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
4.0 General Physics	**4.4 Magnetism and electromagnetic induction** (15 lessons) ● *Magnetization and demagnetization* ● *Magnetic fields* ● *Introduction to electromagnetic induction,* ● *Factors affecting the magnitude of induced electromotive force (e.m.f) (qualitative treatment),*	By the end of the sub strand, the learner should be able to: a) describe the methods of magnetization and demagnetization in soft iron, b) describe the magnetic field patterns around a magnet, c) describe induced e.m.f, d) perform an experiment on electromagnetic induction, e) explain factors affecting the magnitude of induced e.m.f, f) appreciate the applications of	The learner is guided to: ● carry out experiments on magnetization and demagnetization soft iron (electrical, induction, hammering and stroking), ● discuss the observations made in the methods to determine the most suitable method of magnetization, ● carry out experiments on demagnetization (electrical, hammering and heating), ● search from the internet (or any other available resources), the direction of magnetic fields, ● draw the magnetic field patterns around a magnet, ● discuss with peers the meaning of the term induced e.m.f,	1. How is the study of electromagnetic induction important in our daily life? 2. How can electromagnetic induction generate income for a country?

	● *Application of electromagnetic induction.*	electromagnetic induction in day-to-day life.	● carry out an experiment to demonstrate electromagnetic induction using a U-shaped magnet, galvanometer and a straight conductor, ● use available digital and print media to search for information on the factors affecting the magnitude of induced e.m.f, ● discuss in groups ways that electromagnetic induction can be applied in day-to-day living. **Project** Design and make a simple electric bell using locally available materials.	

Core competencies to be developed:

- Creativity and imagination: as the learner designs and carries out an experiment on electromagnetic induction.
- Learning to learn: as the learner carries out experiments of magnetising a magnetic material and demagnetizing a magnet.
- Digital literacy: as the learner uses available digital media (or any other available resources) to search for information on the factors affecting the magnitude of induced e.m.f.

Values:

- Unity: as the learner is assigned various roles in carrying out experiments to demonstrate electromagnetic induction.
- Responsibility: as the learner takes care of the apparatus (U-shaped magnet, galvanometer and straight conductors) while carrying out experiments on electromagnetic induction.

Pertinent and Contemporary Issues:

- Financial literacy: as the learner acquires information that through electromagnetic induction, electricity can be produced thereby generating a source of income.
- Life skills: as the learner explains the methods of magnetization and demagnetization.

Suggested Assessment Rubric

Level / Indicator	Exceeds Expectation	Meets Expectation	Approaches Expectation	Below Expectation
Ability to apply the turning effect of force in real life situations	Applies the turning effect of force in real life situations giving appropriate examples	Applies the turning effect of force in real life situations	Applies the turning effect of force in a few real life situations	Applies the turning effect of force in a few real life situations with prompts
Ability to perform experiments on free fall to determine the force of gravity as per the following guidelines: 1. Measure a reasonable height h above the ground, 2. From the height h, drop a stone from rest and immediately start the stopwatch, 3. Record in a table the height and the time taken for the fall 4. Repeat steps 1 to 3 for two more	Performs experiments on free fall to determine the force of gravity following all guidelines procedurally and arrives at the correct value of $\boldsymbol{g}$	Performs experiments on free fall to determine the force of gravity following all guidelines	Performs experiments on free fall to determine the force of gravity following the guidelines but missing some steps	Performs experiments on free fall to determine the force of gravity following guidelines but is assisted in almost every step

Level / Indicator	Exceeds Expectation	Meets Expectation	Approaches Expectation	Below Expectation
attempts, recording the time taken for each attempt, 5. Find the average time for the fall, 6. Use the formula $h = \frac{1}{2}gt^2$ to determine the value of g				
Ability to apply the properties of waves in real life situations	Applies the properties of waves in real life situations giving appropriate examples	Applies the properties of waves in real life situations	Applies some of the properties of waves in real life situations	Applies some of the properties of waves in real life situations with prompts
Ability to experiment on electromagnetic induction using the following procedure: 1. Using a sensitive galvanometer, a straight copper conductor, a U-shaped magnet and	Experiments electromagnetic induction following all the procedures stepwise and draws all the expected conclusions with further explanations	Experiments electromagnetic induction following all the procedures stepwise and draws expected conclusions	Experiments electromagnetic induction following all the procedures and draws some of the expected conclusions	Experiments electromagnetic induction following all the procedures and is assisted in every step to draw conclusions

Level / Indicator	Exceeds Expectation	Meets Expectation	Approaches Expectation	Below Expectation
connecting wires, connect the apparatus to demonstrate electromagnetic induction, 2. Observe the deflection in the galvanometer when the conductor is: a) stationary between the poles, b) moved parallel to the direction of the magnetic field, c) moved vertically upwards between the poles, d) moved at an angle to the direction of the magnetic field.				

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

Assessment Methods in Science	Learning Resources	Non-Formal Activities
• Reflections • Game Playing • Pre-Post Testing • Model Making • Explorations • Experiments • Investigations • Conventions, Conferences and Debates • Teacher Observations • Project • Journals • Portfolio • Oral or Aural Question(s)s • Learner's Profile • Written Tests • Anecdotal Records	• Laboratory Apparatus and Equipment • Textbooks • Models • Digital media (Radio and TV education programmes, Kenya education cloud and OERs) • Print media (charts, pictures, journals, magazines) • Digital Devices • Software • Recordings • Resource persons	• Visit the science historical sites. • Use digital devices to conduct scientific research. • Organising walks to have live learning experiences. • Developing simple guidelines on how to identify and solve some community problems. • Conducting science document analysis. • Participating in talks by resource persons on science concepts. • Participating in science clubs and societies. • Attending and Participating in Science and Engineering fairs. • Organising and participating in exchange programs.

		• Making oral presentations and demonstrations on science issues.

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