The New Senior Secondary Curriculum for Sierra Leone

Subject Syllabus for Engineering Science
Subject stream: Sciences and Technologies

This subject syllabus is based on the National Curriculum Framework for Senior Secondary Education. It was prepared by national curriculum specialists and subject experts.

SSSC
Senior Secondary School Curriculum

Curriculum elements for Engineering Science – an applied subject

Rationale

Engineering science is a broad discipline that embraces mathematics, physics, applied science and chemistry. It enables the combination of multidisciplinary resources to propose and develop innovative and sustainable solutions and transform the latest scientific discoveries into new enabling technologies. It also assists in the communication between scientists and engineers at all levels of research and development, design and production.

In Sierra Leone, the core sciences, physics, chemistry, and biology are considered the major science subjects. Engineering science, however, is regarded as an alternative to physics as such, is taught in a limited number of schools. This misunderstanding stems from the fact that people do not know what engineering science is all about.

Engineering science focuses on developing individuals with

- Scientific thinking with keen interest in practical technology;
- Engineering thinking to have a firm grasp of the basic sciences to enable them use this expertise to develop new technology.

In many daily activities, the basic principle of engineering science is applied. When the engineering science of these applications is explained in a structured manner, it will transform creative thinking and activate innovative thinking.

Objective

The objective of this syllabus is to help teachers prepare and equip learners for a practical approach to the subject area that will encompass competency within a three-year period.

Structure and Organization of the Syllabus Content

The syllabus has two parts. The first part comprises class level competencies and class level objectives. The second part is the syllabus content it includes: topic, sub-topics, specific objectives to be achieved, teaching and learning strategies, teaching and learning resources, assessment criteria/tools.

Class level competencies are general competencies intended to be achieved within the class level or within each year of study. Class level competencies reflect the skills, knowledge and attitudes which learners should show within that level of study. However, these competencies are not discrete but continuous. It is possible that a particular competency may require over one year to be developed.

Class-level objectives are those that must be met within a class. They are teaching objectives specific to a particular class level. The class-level objectives in this program are set out in broad terms and have been derived from the competencies.

The main topics in this program are drawn from the class's competencies and objectives. Each main topic was broken down into several sub-topics. Each sub-topic includes some of the content of the topic at hand. The subtopics are also organized in such a way as to reach a logical order and facilitate the learning process. The horizontal treatment of this syllabus is controlled by the sub-topics. This means that for each sub-topic, there are learning objectives, teaching and learning strategies, teaching and learning resources, assessment strategies and the estimated number of periods.

Learning objectives describe the knowledge, attitude, skills, aspirations and behaviour outcomes that a Learner is expected to be able to demonstrate. They also reflect the development process of specified skills within the cognitive, affective and psychomotor domains.

Teaching and learning strategies outline what teachers and learners are expected to do during the teaching and learning process. The education and learning strategies of this program are simply suggestive. Teachers are free to use them or develop them themselves. Teacher should work as a facilitator to support learners in learning. Activities based on participatory and cooperative learning are encouraged so that learners are able to work in groups effectively and participate in learning processes.

Teaching and learning materials are suggested. If the required materials are not available, the teacher and learners should work together to gather or improvise alternative resources available in the classroom.

The assessment strategies suggested in this programme are based on the learning objectives. Formative and summative assessment approaches should focus on assessing all competencies and abilities developed in the course. They should ensure that all levels of cognitive, affective and psychomotor areas are observed.

Competencies and objectives by term and year

Competency	Objective Achieved
YEAR 1	
Term 1	
Applying engineering science in everyday activities Applying measurements of physical quantities and use of measuring instruments Using types of forces and their effects in everyday activities Applying properties of matter in everyday activities.	Identify the application of engineering science in everyday activities Make appropriate measurements of physical quantities Uses of types of forces and their vector effects in everyday activities Identify the properties of matter

Term 2	
Applying phenomena of work, energy and power in everyday activities Applying production and transmitting of sound and its effects in everyday activities Applying properties of light in life	Identify the effects of motion of bodies and machines Make appropriate computations of work, energy and power in everyday activities Production and transmission of sound and its effects in everyday activities Identify properties of light
Term 3	
Applying friction in solving technical problems in daily life Using principles of moments in daily life Classifying simple machines Interpreting the principle of fluid mechanics in every-day life Applying the concepts of heat transfer and temperature measurement	Apply concept of friction in daily life State the principles of moments Classify simple machines Apply the principle of fluid mechanics in every-day life Concepts of heat transfer and temperature measurement
YEAR 2	
Term 1	
Applying principles of thermal energy in heat manipulations Develop concepts and principles of electricity Basic building units for electronic circuits. Basics electricity and magnetism	Developing principles of thermal energy in heat manipulations, Develop concepts and principles of electricity Explain basic building units for analogue electronic circuits. Basics electricity and magnetism
Term 2	
Applying vectors on forces and motion Concept of angular and periodic motion; Concept of forces on forces acting on a rotating body Applying projectile motion in everyday activity Applying the concepts and laws of heat and thermal energy in heat engine processes	Vectors application on forces and motion Develop knowledge on angular and periodic motions Develop knowledge on forces acting on a rotating body Develop knowledge in projectile motion and analysis Develop knowledge on laws of heat and thermal energy in heat engine processes
Term 3	
Operation of simple machines to simplify work Mechanical properties of material Demonstrate the stress effect on solid material Explain the image formation by curved mirrors	Explain principles of simple machines Develop knowledge of mechanical Properties of material Explain the effect of stress on solid material, Develop knowledge of image formation on curved mirrors
YEAR 3	
Term 1	

Application and operation electromagnetism Lenses and characteristics and parameter Electrolysis processes Fuel parameters	Develop knowledge on the electromagnetism Develop knowledge on lenses characteristics and parameters Description of electrolysis and its uses Description of fuel parameters
Term 2	
Alternating current parameters Thermal conductivity Internal combustion engines	Knowledge in solving alternating current circuit analysis Manipulating thermal conductivity Knowledge in internal combustion engine
Term 3	
Revision and examinations	

Teaching Syllabus

Year 1/Term 1

Sub-topics	Specific Objectives	Teaching and Learning Strategies	Teaching and Learning Resources	Assessment
Topic: Introduction to Engineering Science				
Concept of Science	Learners will be able to: a) Explain the concept of science. b) Identify branches of science. c) Explain the importance of science in reallife	(i) Teacher to guide learners to: - Brainstorm the concept ofscience. - Identify the branches ofscience. - Explain the importance ofscience in real life. (ii) Teacher should give feedback and use learners' responses as feedback to support learners in performing the tasks mentioned in (i).	Chalk & black/white board & pen marker	1. Learner able to explain the concept of science? 2. Is learner able to identifythe branches of science? 3. Is learner able to explainthe importanceof science in real life?
Concepts of Engineering Science	Learners will be able to: a) Explain the concept of Engineering Science. b) Identify the applications of Engineering Science in everyday activities. c) Explain the importance of Engineering Science.	(i) Teacher to use questioning strategies (what, how and why questions) to guide learners to: - Explain the concept ofEngineering Science. - Identify the areas whereEngineering Science is applied. - Explain the importance ofEngineering Science. (ii) Teacher should give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in (i).	Chalk & black/white board & pen marker	1. Is learner able to identify the application of Engineering Science in everyday activities? 2. Is learner able to explain the importanceof Engineering Science? 3. Is learner able to explainthe importanceof Engineering

				Science? During the course of the teaching topic, teacher should assess competency of learners with oral questions. On completion of the topic, teacher should assess learners using written quiz.
Topic: Measurements				
Concepts of Measurement	Learners will be able to: a) Explain the concepts of measurement. b) Explain the importance of measurement inreal life. c) Measure the dimensions of various objects.	(i) Teacher should use brainstorming technique to guide learners to explain theconcepts of measurement. (ii) Teacher guide learners to discuss the importance of measurement ineveryday activities. (iii) Teacher to create activities and guide Learners to measure the dimensions of various objects. (iv) Teacher should monitor and facilitate Learners in performing the given tasks in (iii). (v) With the aid of pre-prepared assessment guideline, teacher should guide learners to assess activities performedin part (iv). (vi) Teacher should give feedback and use learners'responses as feedback to support learners in performing the tasks mentioned in part (i-v).	• Ruler & metre rule • Tape measure • Beam balance • Stop watch • Vernier calliper • Micro gauge meter • Spring balance • Ruler • Clock • Measuring cylinder	1. Is learner able to explainthe concepts of measurement? 2. Is learner able to state the importance of measurement in real life? 3. Is learner able to measurethe dimensions of various objects? During the course of the teaching topic, teacher should assess competency of learners with oral questions on shapes and objects their

				associated dimensions. On completion of the topic, teacher should assess learners using written quiz.
Physical Quantities	Learners will be able to: a) Define the term physical quantity. b) Identify two types of physicalquantities. c) Identify the seven fundamentalphysical quantities and seven derived physical quantities. d) Differentiate between derivedphysical quantities and fundamental physical quantities. e) Use appropriate instruments for measuring fundamental quantities.	(i) Teacher to use brainstorming questions to guide learners to define theterm physical quantity. (ii) Teacher to guide learners to identify the sevenfundamental quantities and several derived quantities. (iii) Learner's response to be discussion by class. (iv) Teacher to use questioningstrategies (what, why and howquestions) to guide learners to differentiate between derived physical quantitiesand fundamental physical quantities. (v) Teacher to use question and answer method to guidelearners to: - Identify the appropriate instruments for measuring seven fundamental physical quantities (vi) Teacher to design activities and ask learners to use appropriate instruments for measuringfundamental quantities. (vii) Teacher should monitor and facilitate learners in performing the tasks given inpart (vi). (viii) With the aid of pre-prepared assessment guideline, teacher should guide learnersto assess activities performedin part (vi). (ix) Teacher should give feedback and use		During the course of the teaching topic, teacher should assess competency of learners with oral questions on the different kinds of quantities. On completion of the topic, teacher should assess learners using written quiz.

		learners'responses as feedback to support learners in performing the tasks mentioned in part (i-viii).		
Topic: Measuring Instruments				
Basic Instruments	Learners will be able to: a) Name the basic instruments used for measurements. b) Describe the basic instrumentsused for measurement. c) Explain uses ofthe measuring instruments. d) Use the basic measuring instruments.	(i) Teacher guidelearners to - Name the basic instrumentsused for measurements. - Describe basic instrumentsused for measurements. - Explain use of the measuring instruments. (ii) Teacher to create activities and guide learners to use the basic measuring instruments. (iii) Teacher should monitorand facilitate learners in using the basic measuring instruments. (iv) Learner to present responses for class discussion. (v) Teacher should give feedback and use learner's'responses as feedback to support learners in performing the tasks mentioned in part (i-iii).	• Ruler & metre rule • Spring balance • Beam balance • Measuringcylinder • Burette • Calibratedbeaker • Pipette • Ruler • Tape measure • Stop watch	1. Is learner able to name the basic instruments used for measurements? 2. Is learner able to describethe basic instruments used for measurements? 3. Is learner able to explainuses of the measuring instruments? 4. Is learner able to use basic measuring instruments? On completion of the topic, teacher should assess learner's ability in the use of measuring instruments.
Errors in measurements	Learners will be able to: a) Define error in measurement. b) Investigate the sources of errorsin measurement. c) Explain the concepts of parallax error,zero	(i) Teacher to use brainstorming questions to guide learners definethe error in measurement. (ii) Teacher guidelearners to: - Investigate the sources of errors in measurement andhow to minimize them. - Explain the concepts of parallax error, zero errorand instrumental error.	• Ruler & Metre rule • Spring balance • Beam balance • Measuringcylinder • Burette • Calibratedbeaker • Pipette	1. Is the learner able to define an error in measurement? 2. Is learner able to investigate the sources of errors in measurements? 3. Is learner able to

	error andinstrumental error.	(iii) Learners to present their responses for class discussion. (iv) Teacher should give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in part (i-iii).	• Ruler • Tape measure • Stop watch	explainthe concepts of parallax error, zero error and instrumental error? On completion of the topic, teacher should assess learner's ability to detect error in the instrument.
Measuring Length	Learners will be able to: a) Define length. b) State the SI unitof length. c) Name the basic instruments for measuring length d) Measure various lengths. e) Measure diameter of a tube by using Vernier calliper. f) Measure the thickness of wire using micrometer screw-gauge.	(i) Teacher to use questions toguide the learners to: - Define length of a body. - State the SI unit of length. (ii) Teacher to create activitiesand guide learners to: - Measure the items of different lengths such as books, desks, wall and floor. - Measure the inside and outside diameters of tubesby using Vernier caliper. - Measure thickness or diameter of wires by usinga micrometer screw-gauge. (iii) The teacher should monitor and facilitate learners in performing the tasks given inpart (ii). (iv) Learners to present their workfor sharing and discussion. (v) With the aid of pre-prepared assessment guideline, the teacher should guide learnersto assess activities performedin part (ii). (vi) The teacher should give feedback and use learners' responses as feedback to support learners in performingthe tasks	• Ruler & Metre rule • Steel rule • Tape measure • Vernier calliper • Micrometer screw-gauge • Wall • Floor • SI table Books • Internet • Ruler • Desks • Table • Tubes • Conduit pipe • Wires of different diameters	1. Is learner able to define the length of abody? 2. Is learner able to state the SI unit of length? 3. Can the learner measure various lengths? 4. Is learner able to measure diameters of tubes? 5. Is learner able to measurethe diameters of wires using micrometer screw-gauge?

		mentioned in part (i-iv).		
MeasuringMass	Learners will be able to: a) Define the term mass. b) Explain the concept of massof a substance. c) State the SI unitof mass. d) Name the basic instruments for measuring mass. e) Measure accurately the mass of a body using beam balance.	(i) Teacher to use questions toguide the learners to: - Define mass of a substance. - Explain the concept of massof a substance. - State the SI unit of mass. (ii) Teacher to create activities and guide learners in pairs to measure accurately the mass ofan object using beam balance. (iii)The teacher should monitorand facilitate learners in measuring the mass of an object using beam balance. (iv) With the aid of pre-prepared assessment guideline, the teacher should guide learnersto assess activities performedin part (ii). (v) The teacher should give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in part (i-iv).	• Beam balance • Digital balance • Chalk/whiteboard • Pens • Exercise book	1. Is learner able to define the term mass? 2. Is learner able to explainthe concept of mass of asubstance? 3. Can the learners state the SI unitof mass? 4. Can the learner name the basic instruments for measuringmass? 5. Is learner able to measure accurately the mass of a body?
Measuring Weight	Learners will be able to: a) Define theconcept of weight. b) State the SI unit of weight. c) Name the basic instruments for measuringweights. d) Measure the weight of a body using a spring balance	(i) The teacher to guide learnersin pairs to: - Define the concept ofweight. - State the SI unit of weight. - Name the basic instrumentsfor measuring weight. (ii) The teacher to use questioning strategies (why, how and what questions) to guide learners to: - Explain the difference between mass and weight ofa body. - Explain the relationship between mass and weight. (iii) The teacher to create activitiesand	• Spring balance • Various weights (stones) • Beam balance • Digital balance • Chalk/whiteboard • Exercise books • Manila cards	1 Can the learner define the of concept weight? 2 Can the learners state the SI unit of weight? 3 Can the learner name the basic instruments for measuring weight? 4 Can the learner measure the weight of a body using spring balance?

		require learners to: - Change unit of weight intounits of mass using the formula w = mg. - Measure weight of a bodyusing spring balance. - Measure weights and masses of different objects. (iv) The teacher should monitor and facilitate learners in performing the tasks given inpart (iii). (v) Learners to present their workfor sharing and discussion. (vi) With the aid of pre-prepared assessment guideline, the teacher should guide learnersto assess activities performedin part (iii). (vii) The teacher should give feedback and use learners'responses as feedback to support learners in performing the tasks mentioned in part (i-v).		5 Is learner able to explainthe difference between mass and weight? 6 Is learner able to state the relationship between mass and weight? 7 Can the learner measure weights and masses of differentobjects? 8 Can the learner convert unit of weight to units of mass?
Measuring Volume	Learners will be able to: a) Define the term volume of substance. b) State the SI unitof volume. c) Name the basic instruments for measuring volume. d) Measure thevolume of a regular solid body. e) Measure the volume of an irregular solid body. f) Measure thevolume	(i) Teacher to guidelearners to: - Define the term volume ofsubstance. - State the SI unit of volume. (ii) Teacher to create activitiesand require learners to: - Measure the volumes ofdifferent regular objects. - Measure the volumes of different irregular objects. - Measure the volumes ofliquids. - Calculate the volumes ofliquids and solids. (iii) Teacher should monitor and facilitate learners in performing the tasks given in (ii).	• Calibrated measuringcylinder • Various solidsand liquids • 1 litre, 10 litresetc. vessels • Chalk/whiteboard • Exercise books • Manila cards • Multimedia Projector • Eureka can	1. Is learner able to define the term volumeof substance? 2. Is learner able to state the SI unit of volume? 3. Can the learner name the basic instruments for measuring volume? 4. Is learner able to measurethe volume of a regular solid body?

	of liquids. g) Calculate thevolume of liquids and solids.	(iv) Learners to present their workfor sharing and discussion. (v) With the aid of pre-prepared assessment guideline, the teacher should guide learnersto assess activities performedin (ii). (vi) The teacher should give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in (i-v).		5. Is learner able to measurethe volume of an irregular solid body? 6. Can the learner measure the volume of liquids? 7. Is learner able to calculatethe volumes of liquids and solids?
Measuring Density	Learners will be able to: a) Define theconcept ofdensity. b) State SI units of density. c) Explain conceptsof density of regular object. d) Name the basic instruments for measuringdensity. e) Measure thedensity of a regular solid object. f) Measure the density of an irregular solid. g) Measure the density of liquids. h) Calculate densities of liquids and solids.	(i) Teacher to use brainstorming questions toguide learners to: - Define the concept ofdensity. - State the SI units of density. - Explain the concepts of density of regular object. (ii) Teacher to create activitiesand require learners to: - Measure the density of aregular solid object. - Measure the density of anirregular solid object. - Measure the density ofliquids. - Calculate densities ofliquids and solids. (iii) Teacher should monitor and facilitate learners in performing the tasks given in (ii). (iv) With the aid of pre-prepared assessment guideline, the teacher should guide learnersto assess activities performedin (ii). (v) Teacher should give feedback and use	• Beam balance • Measuring cylinder • Water • Calibrated beaker • Eureka can or Overflow can • Regular objects • Regular and irregular materials • Regular and irregular objects • Density bottle	1. Is learner able to definethe concept of density? 2. Is learner able to state the SI units ofdensity? 3. Is learner able to explainconcepts of density of regular object? 4. Is learner able to name the basic instruments for measuring density? 5. Is learner able to measurethe density of a regular solid object? 6. Is learner able to measurethe density of irregular solid objects? 7. Is learner able to

		learners' responses as feedback to support learners in performingthe tasks mentioned in (i-iv).		measurethe density of liquids? 8. Is learner able to calculatedensities of liquids and solids? On completion of the topics on physical quantities, teacher should assess learners using written quiz on their measured dimensions and the instruments used.
Measuring Relative Density	Learners will be able to: a) Define the term relative density. b) Explain why relative densityhas no units. c) Explain the applications of hydrometer. d) Measure the density of a liquid using a hydrometer. e) Calculate the relative densitiesof substances. f) Calculate the relative densitiesof liquids.	(i) Teacher to use brainstorming questions to guide learners to define theterm relative density of a substance. (ii) Teacher to use questioningstrategies (what, why and howquestions) to guide learners toexplain why relative density has no units. (iii) Teacher to create activitiesfor learners to: - Measure the relative densityof a liquid. - Calculate the relative densities of substances. - Calculate the relativedensities of liquids. (iv) Teacher should monitor and facilitate learners in performing the tasks given in (iii). (v) Learners to present their workfor sharing and discussion. (vi) With the aid of prepared assessment	• Water • Measuring cylinder • Can • Solid objects • Regular and irregular objects • Milk • Density Bottle • Iron nails • Rubber band • Eureka can • Hydrometer • Spring balance • Solid objects • String • Cork • Density bottle • Measuringcylinder	1. Is learner able to define the term relativedensity of a substance? 2. Is learner able to explainwhy relative density has no units? 3. Is learner able to name the basic instruments for measuring relative density? 4. Is learner able to measurethe relative density of a liquid? 5. Is learner able to calculatethe relative densities of substances?

		guideline, the teacher should guide learnersto assess activities performed in (iii). (vii) The teacher should give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in (i-vi).		6. Is learner able to calculatethe relative densities of liquids? During the course of the teaching topic, teacher should assess competency of learners with oral questions. On completion of the topic, teacher should assess learners using both practical activities and written quiz.
Topic: Forces				
Concept of Force	Learners will be able to: a) Explain the concept of force. b) State the SI units of force.	(i) Teacher to use questions toguide learners to: - Explain the meaning offorce. - State the SI units of force. (ii) Teacher should give feedback and use learners' responses as feedback to support learners in performingthe tasks in (i).	• Spring balance • Spiral spring • Magnetic poles	1. Is learner able to explainthe concept of forces? 2. Is learner able to state the SI units offorce?
Types of Forces	Learners will be able to: a) Identify fundamental andnon-fundamental types of forces. b) Describe the properties of each type of fundamental	(i)Teacher to guide learner to: - Identify types of fundamental and non-fundamental forces. - Describe the properties ofeach type of fundamentaland non-fundamental forces. - State the effects of forceson bodies.	• Spiral spring • Helical spring • Magnetic poles • Rubber band • Moving objects • Motor vehicles	1. Is learner able to identifythe types of fundamental and non-fundamental forces? 2. Is learner able to describethe

	and non-fundamental forces. c) Explain the effects of forces on bodies.	(ii) Learners to present their responses for class discussion. (iii) Teacher should give feedback and use learners' responses as feedback to support learners in performing the tasks (i) and (ii).		properties of each type of fundamental and non- fundamental forces? 3. Is learner able to explain the effects of forces on bodies?
Effects of Force	Learners will be able to: a) Identify the effects of force. b) Explain the applications of force in everyday activities. c) Perform an experiment to demonstrate the effects of force	(i) Teacher to use questions to guide learners to discuss the effects of force. (ii) Teacher to use questioning strategies (what, why and how questions) to guide learners to explain the applications of force in everyday activities (iii) Teacher to create activities and guide learners to perform an experiment to demonstrate the effects of force. (iv) Teacher should monitor and facilitate learners in performing the tasks given in (iii). (v) With the aid of pre-prepared assessment guideline, teacher should guide learners to assess activities performed in (iii). (vi) Teacher should give feedback and use learners' responses as feedback to support learners in performing the tasks mentioned in (i-v).	• Jelly cans • Sponge • Spiral spring • Helical spring • Motor vehicles springs	1. Is learner able to identify the effects of force? 2. Is learner able to state the applications of force in everyday activities? 3. Can learner perform an experiment to demonstrate the effects of force? During the course of the teaching topic, teacher should assess competency of learners with oral questions. On completion of the topic, teacher should assess learners using written quiz.
Scalar and Vector Quantities	Learners will be able to: a) Define the terms scalar and vector	(i) Teacher to guide learners to brainstorm on meaning of scalar and vector quantities.	• Chart showing Physical quantities	1. Can learner differentiate between scalar

	quantities. b) Identify scalarand vector quantities. c) Differentiate between scalar and vector quantities.	(ii) Teacher uses questions to guide learners to identify thescalar and vector quantities. (iii)Teacher to use questioningstrategies (what, how and whyquestions) to guide learners todifferentiate scalar and vector quantities. (iv) Teacher should give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in (i-iii).	• Chart showing a list of scalars and vectors	and vector quantities? 2. Is learner able to identify scalar and vector quantities? 3. Is learner able to differentiate between scalar and vector quantities?
Vector Treatment of Force	Learners will be able to: a) Draw diagramsto show how a force is represented by a directed line segment (avector). b) Find the resultant of twoforces acting ata point, in the same direction and on same plane by scale drawing. c) Find the resultant of two forces acting at a point, inthe opposite directions, by accurate drawing. d) Find the resultant of twoforces acting ata point, makingan acute angle between them, by means of drawing. e) Find the resultant of twoforces acting ata point, makinga right	(i) Teacher to create activitiesand guide to: - Draw diagrams to show how a force is representedby a directed line segment(a vector). - Find the resultant of twoforces acting at a point, in the same direction and on same plane by scale drawing. - Find the resultant of two forces acting at a point, inthe opposite directions, bymeans of drawing. - Find the resultant of twoforces acting at a point, making an acute angle between them by scale drawing. - Find the resultant of two forces acting at a point, making a right angle between them scale drawing. - Find the resultant of twoforces acting at a point, making an obtuse angle between them by scale drawing. - Resolve a force into horizontal component and vertical component by scaledrawing. (ii) The teacher should monitor and facilitate learners in performing the tasks given in(i).	• Graph papers • Mathematical set • Protractor • Set square • Divider • Compass • Pencils • Pencil eraser • Chalk/whiteboard • Ruler	1. Is the learner able to draw diagrams to show how a force is represented by a vector? 2. Is the learner able to find the resultant of two forces acting ata point, in the same direction and on same plane by scale drawing? 3. Is the learner able to find the resultant of two forces acting at a point, inthe opposite directions, by means ofdrawing? 4. Is the learner able to find the resultant of two forces acting ata

	angle between them scale drawing. f) Find the resultant of twoforces acting ata point, making an obtuse angle between them byscale drawing. g) Resolve a force into horizontal component and vertical component byscale drawing.	(iii) Learners to present their responses for class discussion. (iv) With the aid of pre-prepared assessment guideline, the teacher should guide learnersto assess activities performedin (i). (v) The teacher should give feedback and use learners' responses as feedback to support learners in resolvinga force into horizontal component and vertical component by an accurate scale drawing		point, makingan acute angle between them scale drawing? 5. Is the learnerable to find the resultant of two forces acting at a point,making a right angle between them by scale drawing? 6. Is the learner able to find the resultant of two forces acting ata point, makingan obtuse angle betweenthem by scale drawing? 7. Is the learner able to resolvea force into horizontal component and vertical component by scale drawing? On completion of the above topics, the teacher should assess learners through a class test with specific emphasis on the vector approach of forces.

Topic: Properties of Matter				
Structure ofMatter	Learners will be able to: a) Explain theconcept of matter. b) Explain the nature of matter. c) Explain the kinetic theory ofmatter. d) Classify three states of matter.	(i) Teacher to use questions toguide learners to explain the concept of matter. (ii) Teacher guidelearners to: - Identify examples of matter. - Justify the particulate natureof matter by applying Brownian motion in liquid and gases. - Discuss the kinetic theoryof matter. (iii) Teacher to create activities and guide learners to: - Demonstrate the movementof particles in smoke and coloured substances using amicroscope and torch. - Classify the three states ofmatter. (iv) Teacher should monitor and facilitate learners in performing the tasks given in (iii). (v) Learners to present their responses for class discussion. (vi) With the aid of pre-prepared assessment guideline, teacher should guide learnersto assess activities performedin (iii). (vii) Teacher should give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in (i-vi).	▪ Various objects ▪ Coloured substances ▪ Microscope ▪ Pollen grain ▪ Marble ▪ Smoke cell ▪ Light source(torch) ▪ Magnifying lens ▪ Smoke ▪ Solids: stones, wood ▪ Liquids: water,milk, etc. • Gas: Oxygen gas, hydrogengas •	1. Is learner able to explainthe concept of matter? 2. Is learner able to explainthe nature of matter? 3. Is learner able to explainthe kinetic theory of matter? 4. Is learner able to classifythree states of matter? During the course of the teaching topic, teacher should assess competency of learners with oral questions. On completion of the topic, teacher should assess learners using written quiz.
Adhesion and Cohesion	Learners will be able to: a) Explain the concepts of adhesion and cohesion.	(i) Teacher to use thumb up/thumb down technique to guide the learners to answer questions related to adhesion and cohesion. (ii) Teacher to use questions toguide	• Glass tubes with narrowbores of different diameters • Kerosene lampwith wick	1. Can learner explain the concepts of adhesion and cohesion?

	b) Identify applications of adhesion and cohesion in everyday activities.	learners to: - Explain the concepts ofadhesion and cohesion. - Identify applications of adhesion and cohesion ineveryday activities. (iii) Teacher should give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in (i) and (ii).	• Blotting paper • Towel • Tape • Glue • Water • Needle • Ink • Paper	2. Can learner Identify applications of adhesion and cohesion in everyday activities? On completion of the above topics, the teacher should assess learners through a class test with specific emphasis on the vector approach of forces.
Surface Tension	Learners will be able to: a) Explain the concept of surface tension. b) Identify the applications of surface tension	(i) Teacher to use brainstorming questions toguide learners to: - Explain the concept ofsurface tension. - Identify the applications ofsurface tension. (ii) Teacher to guide learners to discuss the applications of surface tension. (iii) Learners to present their responses for class discussion. (iv) Teacher should give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in (i) and (ii).	• Mosquito larva • Soap • Needle • Water • Beaker/trough • Thread • Pond skater	1. Can learner explain the concept of surface tension? 2. Is learner able to identifythe applicationof surface tension? During the course of the teaching topic, teacher should assess competency of learners with oral questions.
Capillarity	Learners will be able to: a) Explain theconcept of capillarity.	(i) The teacher to organize learners in groups to guide them to: - Explain the concept ofcapillarity. - Identify the applications ofcapillarity in	▪ Glass tubes with narrow bores • of different diameters	1. Is learner able to explainthe concept of capillarity?

	b) Identify the applications of capillarity in everyday activities. c) Carry out an experiment on capillarity.	everyday activities. (ii) The Teacher to create activities and guide learners to: - Carry out an experiment oncapillarity. - Carry out an experiment to show the rise of water in glass tubes with narrow bores of different diameters. (iii) The teacher should monitor and facilitate learners in performing the tasks given in(ii). (iv) With the aid of pre-prepared assessment guideline, the teacher should guide learnersto assess activities performedin (ii). (v) Learners to present their responses for sharing anddiscussion. (vi) The teacher should give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in (i-v).	• Kerosene lamp with wick • Blotting paper • Towel	2. Can learner identify the applications of capillarity in everyday activities? 3. Can learnercarry out an experiment on capillarity? During the course of the teaching topic, teacher should assess competency of learners with oral questions. On completion of the topic, teacher should assess learners using written quiz.
Osmosis	Learners will be able to: a) Explain theconcept of osmosis. b) Identify the applications of osmosis in everyday activities. c) Carry out an experiment for verifying the concept ofosmosis.	(i) Teacher to use questionsto guide learners to: - Explain the concept ofosmosis. - Identify the applications ofosmosis in everyday activities. (ii) Teacher to create activitiesand arrange learners to carry out an experiment for verifying the concept of osmosis. (iii)Teacher should monitor and facilitate learners in performing the tasks given in (ii). (iv) With the aid of pre-prepared assessment guideline, teacher should	• Irish potato • Beaker with water • Sugar • Table salt	1. Is the learner able to explainthe concept of osmosis? 2. Is the learner able to identify the applicationsof osmosis in everyday activities? 3. Can the learner carry out an experiment for verifying the concept of

		guide learnersto assess activities performedin (ii). (v) Teacher should give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in (i-iv).		osmosis? During the course of the teaching topic, teacher should assess competency of learners with oral questions. On completion of the topic, teacher should assess learners using written quiz.
Diffusion	Learners will be able to: a) Explain theconcepts of diffusion. b) Identify the applications of diffusion in everyday activities. c) Carry out an experiment for verifying the concept ofdiffusion.	(i) Teacher to use questions toguide students to: - Explain the concepts ofdiffusion. - Identify the applications ofdiffusion in everyday activities. (ii) Teacher to create activitiesand arrange students to carry out an experiment forverifying the concepts of diffusion. (iii) Teacher should monitor and facilitate students in performing the tasks given in (ii). (iv) With the aid of pre-prepared assessment guideline, the teacher should guide studentsto assess activities performedin (ii). (v) The teacher should give feedback and use students' responses as feedback to support students in performingthe tasks mentioned in (i-iv).	• Irish potato • Beaker with water • Sugar • Table salt	1. Is the student able to explainthe concept of osmosis? 2. Is the student able to identify the applicationsof osmosis in everyday activities? 3. Can the student carry out an experiment for verifying the concept of osmosis? During the course of the teaching topic, teacher should assess competency of learners with oral questions.

				On completion of the above topics, the teacher should assess learners through a class test with specific emphasis on everyday applications.

Year 1/Term 2

Sub-topics	Specific Objectives	Teaching and Learning Strategies	Teaching and LearningResources	Assessment
Topic: Linear Motion				
Distance and displacement	Learners will be able to: a) Explain the concept of distance and displacement. b) Distinguish concepts of distance and displacement. c) State the SI unitof distance and displacement.	(i) The teacher to use questionsto guide students to explain the concept of distance and displacement. (ii) Teacher should give feedback and use students' responses as feedback to support students in performingthe tasks mentioned in (i) and (ii).		1. Can learner explain the concept of distance and displacement? 2. Can learner distinguish concepts of distance and displacement? 3. Is the learner able to state the SI unit of distance and displacement?

Speed and Velocity	Learners shouldbe able: a) Distinguish the conceptsof speed andvelocity. b) State the SI unitsof speed and velocity. c) Determine the average velocityof a body. d) Calculate the average velocityof a body.	(i) Teacher to use questions toguide learners to discuss the concepts of speed and velocity. (i) Teacher to guide learners in to: - Identify SI units of speedand velocity. - Distinguish the concepts ofspeed and velocity. (ii) Teacher to create activities and guide students to calculate average velocity of a body. (iii) Teacher should monitor and facilitate students in performing the tasks given in(iii). (iv) Student to present response for class discussion. (v) With the aid of pre-prepared assessment guideline, teacher should guide learnersto assess activities performedin (iii).		1. Is learner able to distinguish between speed and velocity? 2. Can learners state the SI unitsof speed and velocity? 3. Can learner determine the average velocityof a body? 4. Can learner calculate the average velocityof a body? On completion of the topic, the teacher should assess learners with a quiz on constant and average velocity and uniform motion and their applications in everyday life.

Acceleration	Learners will be able to: a) Interpret velocity vs time graph. b) Explain the concepts of acceleration. c) Explain the concepts of retardation. d) Determine the acceleration and retardation of a body	(i) Teacher to use brainstorming questions toguide learners to interpret velocity time graph. (ii)Teacher to use questions toguide learners to explain the concepts of acceleration and retardation. (iii) Teacher to create activities and guide learners to: - Determine the rate of change in velocity withtime. - Determine the accelerationand retardation of a body. (iv) Teacher should monitor and facilitate learners in performing the tasks given in(iii). (v) With the aid of pre-prepared assessment guideline, teacher should guide learnersto assess activities performedin part (iii). (vi) Teacher should give feedback and use learners' responses as feedback to supportlearners in performing the tasks mentioned in (i-v).	Velocity timegraph on graph sheet	1. Is learner able to interpretthe velocity-time graph? 2. Is learner able to explain the concepts of acceleration and retardation? 3. Is learner able to determine the acceleration and retardation of a body?

Equations of Uniformly Accelerated Motion	Learners will be able to: a) Explain the concepts uniformly of accelerated motion. b) Derive equationsof uniformly accelerated motion. c) Use equations of uniformly accelerated motion in everyday activities. d) Solve problems related to equations of uniformly accelerated motion in everyday activities. e) Solve problems related graphical interpretation of uniform velocity motion in everyday activities.	(i) Teacher to use brainstorming questions to explain the concepts of uniformly accelerated motion. (ii) Teacher to create activities and guide learners to: - Derive equations of uniformly acceleratedmotion. - Use equations of uniformly accelerated motion in everyday activities. - Solve problems related to equations of uniformly accelerated motion in everyday activities. (iii) Teacher should monitor and facilitate learners in performing the tasks given in part (ii). (iv) Teacher should monitor and facilitate learners in performing the tasks given in part (ii). (v) Learners to present their work for class discussion. (vi) With the aid of pre-prepared assessment guideline, the teacher should guide learners to assess activities performed in (iii). (vii) The teacher should give feedback and use learners' responses as feedback to support learners in performing the tasks mentioned in (i-v).		1. Is learner able to explainthe concepts of uniformly accelerated motion? 2. Is learner able to deriveand use the equations of uniformly accelerated motion? 3. Can learneruse equations of uniformly accelerated motion in everyday activities? On completion of the above topics, the teacher should assess learners by testing them with problems on constant motion, constant velocity and uniform velocity. Test should both analysis and graphical interpretation.

Motion under Gravity	Learners will be able to: a) Explain the concept of gravitationalforce. b) Determine acceleration dueto gravity. c) Explain the applications of gravitational force in everyday activities.	(i) Teacher to use brainstorming questions to guide learners to explain the concept of gravitational force. (ii) Teacher guide learners to: - Share ideas on a body thrown vertically upwardsand a falling body - Discuss how to determine acceleration due to gravity. - Determine the linear momentum of a given massand velocity. - Determine the accelerationdue to gravity, experimentally. - Explain applications of gravitational force in everyday activities. (iii) Learners to present their responses for class discussion. (iv) The teacher should give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in (i-iii)	• Stones • Balls • Pendulum bob • Engineering science textbooks	1. Is learner able to explain the applicationsof gravitationalforce in everyday activities? On completion of the topic, the teacher should assess learners with a quiz on gravity and gravitational force.

Newton's First Law of Motion	Learners will be able to: a) State Newton's first law of motion. b) Mention examples for the Newton's first law of motion. c) Define the law of inertia. d) State the SI unit of inertia. e) Describe the functionalities of Newton's first law of motion. f) Calculate the inertia of a body.	(i) Teacher to use questions to guide learners to: - State Newton's first law of motion. - Mention examples for the Newton's first law of motion. - Define the law of inertia. - Show example of inertia. - Identify unit of inertia. - Show the effects of inertia. (ii) Teacher to create activities and guide students to calculate average velocity of a body. (iii) Teacher should monitor and facilitate students in performing the tasks given in(iii). (iv) Teacher to use questioning strategies (what, why and how questions) to guide learners to describe the functionalities of Newton's first laws. (v) Teacher should give feedback and use learners' responses as feedback to support learners in performing the tasks mentioned in (i-iv).	• Pendulum bob • Stop watch • String	1. Can learner state Newton's first law of motion? 2. Is learner able to mention the examples of the Newton's first law of motion? 3. Can learner define the law of Inertia? 4. Can learner identify the unit of inertia? 5. Is learner able to describe the functionalities of Newton's first laws? 6. Is learner able to solve inertia problems? On completion of the topic, the teacher should assess learners with a quiz on inertia.

Newton's Second Law of Motion	Learners will be able to: a) State Newton's second law of motion. b) Explain the concept of linear momentum. c) State the SI units of linear momentum. d) Describe the functionalities Newton's second law. e) Carry out activities to determine the functionalities of Newton's second law. f) State the relationship between the velocity and mass of a body moving in a straight line. g) Solve problems related to equations of momentum.	(i) Teacher to use questions to guide learners to: - State Newton's second law of motion. - Explain the concept of linear momentum. (ii) Teacher to guide learners to: - State the SI unit of linear momentum. - Explain the concept of Second law of motion in terms of momentum. - Explain the relationship between momentum and force. (iii) Teacher to use questioning strategies (what, why and how questions) to guide learners to: - State the relationship between the velocity and mass of a body moving in a straight line. - Describe the functionalities of Newton's second law. (iv) Teacher to design activity and guide learners in groups to: - Conduct frictional force experiment when a body starts motion on a rough surface. - Demonstrate action of the Newton's second law of motion, by using two learners, one with heavy weight and other one with low weight to run in front of a class. (v) The teacher should monitor and facilitate learners in performing the tasks given in (ii) and give feedback and use learners' responses to support learners in performing tasks (i-iv).	• Pendulum bob • Stop watch • String • Cork	1. Is the learner able to state Newton's second law of motion? 2. Is the learner able to explain the concept of linear momentum? 3. Is the learner able to explain the concept of linear momentum? 4. Is the learner able to state the SI units of linear momentum? On completion of the topic, the teacher should assess learners with a quiz on types of momentum, impulse, and change of momentum.

Newton's Third Law of Motion	Learners will be able to: a) State Newton'sthird law of motion. b) Differentiate between balanced forceand balanced action force. c) Describe the differences between balanced forceand balanced action force. d) Identify actionand reaction force pairs. e) Distinguish between actionand reaction forces. f) Demonstrate the Newton's third law of motion. g) Describe the functionalities of Newton's third law.	(i) Teacher to use questions to guide learners to state Newton's third law of motion. (ii) Teacher to guide learners to: - Differentiate between balanced force and balancedaction force. - Identify action and reactionforce pairs. - Distinguish between actionand reaction forces. (iii) Teacher to design activityand guide learners to demonstrate Newton's third law of motion a ball. (iv) Teacher to use questioningstrategies (what, why and how questions) to guide learners to: - Describe the differences between balanced force and balanced action force. - Describe the functionalitiesof Newton's third law. (v) Teacher should give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in (i-iv).	• Pendulum bob • Stop watch • String • Cork	1. Can learners state Newton's third law of motion? 2. Is learner able to differentiate between balanced force and balanced action force? 3. Can learner describe the differences between balanced force and balanced action force? 4. Is learner able to identifyaction and reaction force pairs? 5. Can learner distinguish between action and reaction forces? 6. Is learner able to demonstrate the Newton's third law of motion? 7. Can learner describe the functionalities of Newton's third laws? On completion of the topic, the teacher should assess

				learners with a quiz on: - Balanced and unbalanced forces - Action and reaction forces - Application on everyday life
Topic: Work, energy and power				
Work	Learners will be able to: a) Explain the concept of work. b) State the SI units of work. c) State the equation of work done. d) Solve problems on work done numerically and graphically.	(i) Teacher to use questions to guide learners to: - Explain the meaning of the term work. - State the SI unit of work. (ii) Learners to: - Discuss about the equation of work done. - Illustrate the formula of work done and solve it graphically and numerically - State the equation of work done. (iii) Teacher to create activities and guide learners to solve the problems on work done numerically and graphically. (iv) Teacher should monitor and facilitate learners in solving the problems on work done numerically and graphically. (v) Teacher use learners' responses as feedback to support learners to perform the tasks mentioned in (i-iv).		1. Is learner able to explain the concept of work? 2. Can learners state the SI units of work? 3. Can learners state the equation of work done? 4. Can learners solve the problems on work done numerically and graphically? On completion of the topic, the teacher should assess learners with a quiz on work done especially inclined.

Energy	Learners will be able to: a) Explain theconcept of energy. b) State the SI unit of energy. c) Identify different forms of energy. d) Explain differences between potential energyand kinetic energy. e) State the equation of for the two forms of energy.	(i) Teacher to use brainstorming questions to guide learners to explain theterms energy. (ii) Teacher use questions toguide learners to differentiate the concepts of potential and kinetic energy. (v) Teacher to create activities to illustrate the potential energy and kinetic energy to learners. (vi) Teacher should monitorand facilitate learners in solving the problems on potential energy and kinetic energy. (vi) Teacher use learners' responses as feedback to support learners to perform the tasks mentioned in (i-iv)	• Pendulum	1. Is learner able to explainthe concept ofenergy and its SI units? 2. Is learnerable to state the SI unit of energy? 3. Is learner able to distinguish between potential and kinetic energy? 4. Can learner distinguish between the formula for potential energy and kinetic energy? 5. Can learners solve the problems on work done On completion of the topic, the teacher should assess learners with a quiz on mechanical energy and identification of the types.

Forms of Energy	Learners will be able to: a) Identify forms of energy. b) Explain the applications ofeach form of energy in everyday activities.	(i) Teacher to use questions toguide learners to list different forms of energy, namely: - Mechanical energy (Kineticenergy and Potential energy) - Heat energy - Light energy - Sound energy - Chemical energy - Nuclear energy - Electrical energy - Wind energy - Hydro electric energy (ii) Teacher to explain to learners the application of each form of energy in everyday activities. (iii) Learners to present their responses classdiscussion. (iv) Teacher should give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in (i-iii).		1. Can learner mention forms of energy? 2. Can learnerexplain the applications of each form of energy in everyday activities? On completion of the topic, the teacher should assess learners with a quiz on the applications of each form of energy in everyday activities.

Principle of Conservation of Energy	Learners will be able to: a) State the principle of conservation of energy. b) Explain conversionof energy fromone form to another. c) Describe the applications of the different formsof energy.	(i) Teacher to use brainstorming questions to guide learners to explain "principle ofconservation of energy". (ii) Teacher to organise learners in groups and guidethem to: - Explain principles of energy conservations. - Describe the applications of different forms of energy. (iii) Teacher to use questioningstrategies (what, why and howquestions) to guide learners to explain transformation of energy from one form to another. (iv) Teacher should give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in (i-iii).		1. Can learners state the principle of conservation of energy? 2. Can learner explain transformationof energy fromone form to another? 3. Can learner explain applications ofthe forms of energy? On completion of the topic, the teacher should assess learners with a quiz on the applications of each form of energy conversion on everyday activities

Power	Learners will be able to: a) Define the term power. b) State the SI units of power. c) Solve problemson power. d) Explain the relationship between energyand power.	(i) The teacher to use brainstorming questions to guide learners to define theterm power. (ii) Teacher to use questions toguide learners to state the SI units of power. (iii) Teacher to organise learners in groups and guide them to explain the relationship between energyand power. (iv) Teacher to create activities and guide learners to solve problemson power. (v) Teacher should monitor and facilitate learners in solving problems on power. (vi) Teacher should give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in (i-v).		1. Can learner define the termpower? 2. Can learners state the SI units of power? 3. Can learners solve problemson power? 4. Can the learner explain the relationship between energy and power? On completion of the topic, the teacher should assess learners with a quiz application of is converted to power everyday activities including problems.

Topic: Sound waves				
Introduction to Sound Waves	Learners will be able to: a) Explain themeaning of sound. b) Define soundwave. c) Identify the behaviour ofsound wave. d) Explain howsound is produced. e) Perform an experiment which illustrateshow sound is produced. f) Identify the behaviour ofsound waves.	(i) Teacher to use brainstorming questions toguide learners to: - Explain the meaning ofsound. - Define the term soundwave. (ii) Teacher to use questions to guide learners explain howsound is produced. (iii) The Teacher to create activities and guide learners to: - Demonstrate how sound is produced. - Perform an experiment which illustrates how soundis produced. - Perform an experiment to investigate the behaviour of sound waves (i.e., reflection, refraction, diffraction and interference) (vii) The teacher should monitorand facilitate learners in performing the tasks given in (iii). (viii) Teacher uses learners' responses to give feedback to support learners in performingthe tasks mentioned in (i-iv).	Sound generating instrument/tool	1. Is learner able to explainthe meaning ofsound? 2. Is learnerable to definesound wave? 3. Is learner able to identify the behaviour ofsound wave? 4. Is learner able to explainhow sound is produced? 5. Can learner perform an experiment which illustrateshow sound is produced? 6. Is the learner able to identifythe behaviour of sound waves? On completion of the topic, the teacher should assess learners in a test on the difference between sound and sound waves; production of sound; reflection, refraction, diffraction and interference of sound.

Sources of Sound	Learners will be able to: a) Identify various sounding bodies. b) Explain how sound is transmitted fromone point to another. c) Demonstrate how sound is transmitted.	(i) Teacher to use questionsto guide learners to identifyvarious sounding bodies. (ii) Teacher to guide learners to explain how sound istransmitted from one point toanother. (iii) Teacher to use questionsto guide learners to identifyvarious sounding bodies. (iv) Teacher to guide learners to explain how sound istransmitted from one point toanother. (v) Teacher to create activities and guide learners to demonstrate how sound is transmitted. (i) Teacher to monitor and facilitate learner in performing the tasks given in (iii). (ii) Learners to present their responses for classdiscussion. (iii) Teacher to give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in (i-v).	•	1. Is learner able to identifyvarious sounding bodies? 2. Can learnerexplain how sound is transmitted from one point to another? 3. Is learnerable to demonstrate how sound istransmitted? On completion of the topic, the teacher should assess learners with a quiz on sounding bodies and mode of transmission of sound.

Velocity of Sound in Air	Learners should be able to: a) Explain themeaning of velocity of sound. b) Explain the factors affectingvelocity of sound in air. c) Define terms frequency, velocity, wavelength, amplitude andperiod of a sound wave. d) Explain the relationship between velocity, frequency andwave length. e) Explain the relationship between frequency andperiod of a sound-wave. f) Solve problemson sound.	(i) Learners to brainstorm the meaning of velocity of sound. (ii) The teacher to use questions toguide learners to explain the factors affecting the velocity of sound in air. (iii) The teacher to organize learners in groups and guidethem to: - Define terms frequency, velocity, wave length, amplitude, and period of asound wave. - Explain the relationship between frequency velocityand wave length. - Explain the relationship between frequency velocityand wave length. - Explain the relationshipbetween frequency and period of a sound wave. - Solve problems on sound. (iv) Learners to present their responses for class discussion. (v) Teacher to create activities and guide learners to solve problems on sound. (vi) Teacher to monitorand facilitate learner in solving problems on sound. - Teacher to give feedback and use learners'responses as feedback to support learners in performing the tasks mentioned in (i-v).		1. Is learner able to explainthe meaning of velocity of sound? 2. Is learner able to explain factors affectingvelocity of sound? 3. Is learnerable to define terms frequency, velocity, wave length, amplitude, andperiod of a sound wave? 4. Is learner able to explain the relationshipbetween velocity, frequency and wavelength? 5. Is learner able to explain the relationshipbetween frequency and period of a sound wave? 6. Is learnerable to solve problems on sound? On completion of the topic, the teacher should assess learners with a quiz on factors affecting velocity of sound in air; the relationship between velocity, frequency and wave length; calculations associated with sound wave.

Reflection of Sound	Learners will be able to: a) Define the concept of reflection ofsound. b) State the laws of reflection ofsound. c) Describe the application of reflection of sound wave.	(i) Teacher to use questions toguide learners to: - Define the concept ofreflection of sound. - State the laws of reflectionof sound (ii) Teacher guide learners to: - Describe the applications oflaws of reflection of sound. - Describe the applications ofreflection of sound wave. (iii) Learners to present their responses for classdiscussion. (iv) Teacher to give feedback and use learners'responses as feedback to support learners in performing the tasks mentioned in (i-iii).		1. Is the learner able to definethe concept of reflection of sound? 2. Is the learnerable to state the laws of reflection of sound? 3. Is the learner able to describethe applicationsof law of reflection of sound? 4. Is the learner able to describethe applicationsof reflection of sound wave? On completion of the topic, the teacher should assess learners with a quiz on: - Laws of reflection of sound wave; - Application of reflection of sound waves

Reverberation	Learners will be able to: a) Explain the concept of reverberation. b) Explain how reverberation is produced. c) Explain the advantages and disadvantages of reverberation. d) Explain the effects of soundreverberation in buildings. e) Explain how the effects of sound reverberation can be minimized. f) Identify the difference between reverberationand echo.	(i) Teacher to use questions toguide learners to: - Explain the concept ofreverberation - Explain how reverberationis produced. (ii) Teacher to use questioningstrategies (what, why and howquestions) to guide learners to: - Explain the advantagesand disadvantages of reverberation. - Explain how the effects of sound reverberation can beminimized. (iii) Teacher to guide learners to: - Explain how reverberationis produced. - Explain the effects of soundin buildings. - Identify the difference between reverberation andecho. (iv) Learners to present their responses for class discussion. (v) The teacher to give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in (i-iii).		1.Is learner able to explainthe concept ofreverberation? 2.Is learnerable to explain how reverberation is produced? 3.Is learnerable to explain the advantages and disadvantages of reverberation? 4.Is learner able to explainthe effects of sound reverberation inbuildings? 4.Is learner able to explainhow the effectsof sound reverberation can be minimized? 5. Can learneridentify the difference between reverberation and echo? On completion of the topic, the teacher should assess learners with a quiz on: reverberation in a building; causes and effects of sound reverberation in building; difference between reverberation and echo; minimisation of reverberation in building.

Topic: Light (Optics)				
Introduction to Light	Learners will be able to: a) Explain themeaning oflight. b) Identify the sources of light. c) Distinguish luminous fromnon-luminous bodies. d) Explain the concept of raysand beams of light. e) Verify that lighttravels in a straight line. f) Identify transparent, translucent and opaquematerials.	(i) Learners to brainstorm on the meaning oflight. (ii) Teacher to use questions toguide learners to: - Explain the meaning oflight. - Mention the sources oflight. - Explain the concept of raysand beams of light. (iii) Teacher to use questioningstrategies (what, why and howquestions) to guide learners to differentiate the luminous bodies from non-luminous. (iv) Teacher guide learners to; - Discuss the concept of raysand beams of light. - Identify transparent, translucent and opaquematerials. - Describe transparent, translucent and opaquematerials. - Verify that light travels in astraight line. (iv) Teacher to guide learnersto demonstrate how light travels in a straight line. (v) Teacher to give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in (i-v).	• Source of light • Piece of card board • Ray box • Glass block • Paper • Ruler • Pins • Optical pins • Plane mirrors • Thumb pins • Protractor • Opaque materials, • Transparent materials, • Translucent material	1. Is learner able to explainthe meaning oflight? 2. Is learner able to distinguish luminous from non-luminous bodies? 3. Is learner able to explain the concept of rays and beamsof light? 4. Is learnerable to verifythat light travels in a straight line? 5. Is learner able to identify transparent, translucent and opaque materials? On completion of the topic, the teacher should assess learners with a quiz on: - Definition of light; - Definition of luminous - Definition of translucent.

Reflection of Light	Learners will be able to: a) Explain the concept of reflection oflight. b) Differentiate between regular and irregular (or diffuse)reflection.	(i) Teacher to use questions toguide learners to: - Explain the concept ofreflection of light. - Discuss how regular andirregular (or diffuse) reflections occur. (ii) Teacher to guide learners to differentiate regularfrom irregular (or diffuse) reflection. (iii) Learners to present their responses for classdiscussion. (iv) Teacher should give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in (i-iii).	▪ Pins ▪ Optical pins ▪ Plane mirrors ▪ Thumb pins ▪ Protractor • Shining rough surface	1. Is learner able to explainthe concept of reflection of light? 2. Is learner able to differentiate between regular and irregular (or diffuse) reflection?
Reflection of Light from a Plane Mirror	Learners will be able to: a) Explain the meaning of reflection oflight from a plane mirror. b) Explain the properties of images formedby a plane mirror. c) Determine the number of images formedin mirrors placed at an angle betweenthem. d) Explain the applications ofplane mirrors.	(i) Teacher to use questions toguide learners to: - Explain the meaning of reflection of light from aplane mirror - Explain the properties of images formed by a planemirror. (ii) Teacher to organize learners in groups and guidethem to: - Explain the properties of images formed by a planemirror. - Explain the applications ofplane mirrors. (iii) Teacher to create activities and guide learner to: - Demonstrate how reflection of light from aplane mirror takes place. - Determine number of images formed in plane mirrors placed at an angle between them.		1. Can learner explain the meaning of reflection of light from a plane mirror? 2. Is learner able to explain the properties of images formed by a plane mirrors? 3. Is learner able to determine number of images formed in plane mirrors placed at an angle between them? 4. Can learner explain the applications of plane mirrors?

		(iv) The teacher should monitor and facilitate learners in performing the tasks given in (iii). (v) With the help of prepared assessment guideline, teacher should guide learnersto assess activities done on determining the number of images formed in mirrors placed at an angle between them. (vi) Teacher should give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in (i-iv).		On completion of the topic, the teacher should assess learners with a quiz on: - Difference between regular and irregular reflection; - Properties of plane mirror image; - Images formed in relationship angle between 2 mirrors; - Construction of a periscope.
Reflection of Light of plane mirror	Learners will be able to: a) Explain the meaning of theterm reflection. b) Explain how aplane mirror ismade. c) Draw a diagram which illustrates how rays of lightreflect on a planemirror. d) State the law of reflection. e) Describe an experiment which verifies the law of reflection. f) Conduct experiment whichverifies the law ofreflection. g) Describe an	(i) Teacher to use questions toguide learners to: - Brainstorm on the meaningof the term reflection. - State the law of reflection. (ii) Teacher to use questioningstrategies (what, why and how questions) to guide learners to: - Explain how a plane mirroris made. - Describe the applications of reflection of light in everyday activities. - Describe experiment which verifies the law of reflection. - Describe an experiment to locate the image of an objectas seen in a plane mirror.	• Mirrors • Torch • Protractor • Optical pins	1. Is the learner able to explain the meaning of the termreflection? 2. Is the learner ableto explain how a plane mirror ismade? 3. Is the learner ableto draw a diagramwhich illustrates how rays of light reflect on a plane mirror? 4. Is the learner able to state the law ofreflection? 5. Is the learner

	experiment to locate the imageof an object as seen in a plane mirror. h) Conduct experiment on locating the image of an object as seen in a plane mirror. i) Identify the applications of reflection of lightin everyday activities	(iii) Teacher guidelearners to: - Draw a diagram which showshow rays of light are reflectedon a plane mirror. - Conduct experiment which verifies the law of reflection. - Conduct experiment on locating the image of anobject as seen in a planemirror. (iv) Teacher should monitor andfacilitate learners in performingthe tasks given in (iii). (v) Learner to present their responses for classdiscussion. (vi) Teacher should give feedback and uses feedback tosupport learners in performingthe tasks given in part (i-iii).		able to describe experiment whichverifies the law ofreflection? 6. Is the learner able to describe an experiment to locatethe image of object as seen in a plane mirror? 7. Is the learner able to conduct an experiment on locating the image of an object as seenin a plane mirror? 8. Is the learner able to identify the applications of reflection in everyday activities? On completion of the topic, the teacher should assess learners with a quiz on: - Laws of reflection; - Draw the rays on a plane mirror; - Application of plane mirror.
Pin-hole camera	Learners will be able to: a) Explain the concept of pin-hole camera.	(i) Teacher to use questions toguide learners to explain the concept of pin-hole camera. (ii) Teacher to use questioningstrategies	Pin-hole camera models	1. Can learner explain the concept pinhole camera?

	b) Explain the principle of action of a pin hole camera. c) Explain the properties of images formedby a pin-hole camera. d) State the merits and demerits of pinhole camera.	(what, why and howquestions) to guide learners to: - Explain the properties ofimages formed by a pin-hole camera. - Explain the applications ofthe pin-hole camera. (ii) Teacher to guide learners to: - Explain the principles of action of a pin hole camera. - Explain the properties of image formed by a pin-holecamera. - Explain the merits and demerits of pinhole camera. (iii) Learners to present their responses for sharing anddiscussion. (iv) Teacher to create activities and guide learners to draw a pinhole camera and illustrate its construction. (v) Teacher should monitor and facilitate learners in performing the tasks given in (v). (vi) Teacher should give feedback and use learners'responses as feedback to support learners in performing the tasks mentioned in part (i-v).		2. Is learner able to explainthe principle ofaction of a pin-hole camera? 3. Is learner able to explain the properties of image formed by a pin-hole camera 4. Is learner able to explain the applications of the pin-hole camera? e) Can learner explain the merits and demerits of pinhole camera? On completion of the topic, the teacher should assess learners with a quiz on: - Properties of pinhole camera; - Application of pinhole camera; - Merits/demerits of pinhole camera.

Year 1/Term 3

Sub-topics	*Specific Objectives*	*Teaching and Learning Strategies*	*Teaching and Learning Resources*	*Assessment*
Topic: Friction				
1.1 Friction	Learners will be able to: a) Define the term friction. b) State the laws of friction. c) Identify types of friction. d) Explain factors on which friction depends. e) Identify advantages and disadvantages of friction. f) State relationship between frictional force(F) and the normal reactionforce. g) Calculate the coefficient offriction.	(i) Teacher to use brainstorming questions to guide learners to define theterm friction. (ii) The teacher to use questions toguide learners to: - State the laws of friction. - Mention types of friction. - Explain factors on whichfriction depends. (iii) Teacher to guide learners to: - Identify the advantages and disadvantage of friction. - Explain relationship between frictional force andthe normal reaction force. - Explain relationship between frictional force (F) and the normal reactionforce. (iv) Learners to present their responses for sharing anddiscussion. (v) The teacher to design activities for learners to: - Demonstrate on how tominimize and improve friction. - Calculate the coefficient offriction. (vi) The teacher should monitor and facilitate learners in performing the tasks given in(iii). (vii) With the help of prepared assessment guideline, teacher	• Rollers • Bearings • Grease	1. Is learner able to definethe term friction? 2. Is learner able to state the laws of friction? 3. Is learner able to identifytypes of friction? 4. Is learner able to explainfactors on which friction depends? 5. Is learner able to mention advantages and disadvantages of friction? 6. Is learner able to explain how to minimize and maximizethe friction onobjects? 7. Is learner able to explain relationship between frictional forceand the normalreaction force? 8. Is learner able to explain relationship

		shouldguide learners to assess activities performed on (iii). (viii) Teacher should give feedback and use learners'responses as feedback to support learners in performing the tasks mentioned in (i-v).		between frictional force(F) and the normal reaction force 9. Is learner able to calculatethe coefficient of friction? On completion of the topic, the teacher should assess learners with a quiz on: - Definition of friction; - Laws of friction; - Factors on which friction depends - Minimum and maximum friction - Coefficient of friction - Solving analytic problems on friction

Topic: Turning Forces				
Stability of Equilibrium	Learners will be able to: a) Define the term equilibrium. b) Define the term equilibrium. c) Explain the three states (types) of equilibrium.	(i) Teacher to use brainstorming questions to guide learners to define theterms stability and equilibrium. (ii) Teacher to use questionsto guide learners to explain the three states (types) of equilibrium. (iii) The teacher should give feedback and use learners'responses as feedback to support learners in performing the tasks mentioned in (i) and (ii).	• Cones • Ball • Bunsen burner • Objects with broad bases	(i) Is learner ableto define the terms stability and equilibrium? (ii)Is learner able to explainthe three states(types) of equilibrium? On completion of the topic, teacher should assess learners using written quiz on the following: -Definition of stability -Definition of equilibrium -States of equilibrium
2.2 Centre of Gravity	Learners will be able to: a) Explain the meaning of centreof gravity. b) Determine the centre of gravity of regular body. c) Determine the centre of gravityof irregular body.	(i) Teacher to use brainstorming questions to guide learners to explain themeaning of centre of gravity. (ii) Teacher guide learners to: - Determine the centre of gravity of a regular body. - Determine the centre of gravity of irregular body. (iii) Teacher should monitor and facilitate the tasks givenin (ii). (iv) Learners to present their responses for classdiscussion. (v) Teacher should give feedback and use learners'responses as feedback to support learners in performing the tasks mentioned in part (i) and (ii).	• Plumb-line • Body of different shapes (circular, square, rectangular, triangular) • Metre rule • Ruler	1. Is the learner ableto explain the meaning of centre of gravity? 2. Is learner ableto determine the centre of gravity of a regular body? 3. Is learner ableto determine the centre of gravity of a regular body On completion of the topic, teacher should assess learners using written quiz on the following:

				- Definition of centre of gravity of a body; - Centre of gravity the regular and irregular bodies.
Centroid	Learners will be able to: a) Explain the meaning of centroid. b) Explain the difference between centreof gravity and centroid. c) Determine the centroid of different shapes	(i) Teacher to use brainstorming questions to guide learners to explain themeaning centroid. (ii) Teacher guide learners to: - Differentiate between centre of gravity and centroid. - Determine the centroid of different shapes.	• Different shapes (circular, square, rectangular, triangular) • Metre rule • Ruler	1. Is the learner ableto explain the meaning of centroid? 2. Is learner ableto explain the difference between centre of gravity and centroid? 3. Is learner ableto determine the centre of gravity of a regular body On completion of the topic, teacher should assess learners using written quiz on the following: - Definition of centroid; - Difference between centre of gravity and centroid. *Centroid of shapes.*
Shear force	Learners will be able to: a) Define beam and shear force. b) Identify examplesof shear force. c) Identify the kinds of loads that causes	(i) Teacher to use brainstorming questions to guide learners to explain themeaning of beam and shear force. (ii) Teacher to use questionsto guide learners to: - Mention examples offorce shear force. (iii) Teacher to use questionsto guide		1. Is the learner ableto explain the meaning of beam and shear force? 2. Is the learner ableto identify of shear force? 3. Is the learner ableto kinds of load that

	shear force. d) Explain the nature of shear force graph.	learners to: - explain the kind of loads that causes shear force; (iv) Teacher to use questionsto guide learners to: - Mention examples offorce shear force; (v) Teacher to use questionsto guide learners to explain the kind of loads that causes shear force; (vi) Teacher guidelearners to draw the graph which showshow shear force acts on a beam.		causes shear force? 4. Is the learner ableto determine kind of graphical shape created by an applied load on a beam? On completion of the topic, the teacher should assess learners with a quiz on: - Definition of a beam and shear force; - Kinds of loads that causes shear force; - Shear force graphical representation of the each kind of applied force.
Moment of a force	Learners will be able to: a) Define momentof a force. b) State the SI unitsof moment of a force. c) Identify examplesof moment of force. g) Explain the meaning of theline of action of moment of aforce. h) Determine the perpendicular distance from apoint to the lineof action of a force.	(i) Teacher to use questionsto guide learners to: - State meaning of themoment of a force - State the SI units ofmoment of a force - Mention examples ofmoment of force - Explain the meaning of theline of action of a force (ii) Teacher to organise learners in groups and guide them to determine theperpendicular distance from a point to the line of action ofa force. (iii) Learners to present their responses for classdiscussion. (iv) Teacher should give feedback and	• Board of uniform thickness • Ruler • Weights	1. Is learner able to define moment of a force? 2. Is learner ableto state the SI unit of moment of aforce? 3. Is learner able to identify examples of moment of force? 4. Is learner ableto explain the meaning of the line of action of aforce? 5. Is learner ableto determine the perpendicular distance from a point to the line ofaction of

		use learners'responses as feedback to support learners in performing the tasks mentioned in (i) and(ii).		a force? On completion of the topic, teacher should assess learners using written quiz on the following: - Definition of moment of force and line of action; - Examples of moment of force in everyday activities; - Distance of line of action of an applied force.
Principle ofMoments	Learners will be able to: a) State the principle of moments. b) Perform an experiment to verify theprinciple of moments. c) Give examples where the principle of moments is usedin everyday activities. d) Solve problemsusing the principle of moments.	(i) Teacher to use questioning strategies (what,why and how questions) toguide learners to state the principle of moments. (ii) Teacher to arrange learners in groups and guide them to mention examples where the principle of moment of moments is usedin everyday activities. (iii) Teacher to create activities to guide learners to: - Perform an experiment to verify the principle ofmoments. - Solve problems using theprinciple of moments. (iv) With the help of prepared assessment guideline, the teacher shouldguide learners to assess activities performed on (iii). (v) Teacher should monitor and facilitate the tasks givenin (iii) and (iv).		1. Is learner able to state the principle of moments? 2. Is the learner able to performan experiment to verify the principle of moments? 3. Is the learner able to give examples wherethe principle of moments of moment is used in everyday activities? 4. Is learner ableto solve problems using the principleof moments? On completion of the topic, teacher should assess learners using

		(vi) Learners to present their responses for classdiscussion. (vii) Teacher should give feedback and use learners'responses as feedback to support learners in performing the tasks mentioned in (i-iv).		written quiz on the following. - Principle of moments - Examples of application of principle of moments in everyday activities - Analytic problems using principle of moments
Couple andTorque	Learners will be able to: a) Define the term couple. b) Define the term torque. c) Mention examples of couple. d) Mention examples oftorque. e) Solve problemson torque.	(i) Teacher to use brainstorming questions toguide learners to: - Define the term couple. - Define the concept oftorque. (ii) Teacher to use questionsto guide learners to: - Mention examples ofcouples. - Mention examples oftorques. (iii) Teacher to create activities and guide learners to solveproblems on torque. (iv) Teacher should give feedback and use learners'responses as feedback to support learners in performing the tasks mentioned in (i-iii).	• Spanner • Car steering	1. Is learner able to define the term couple? 2. Is learner able to mention examplesof couple? 3. Is learner able to define theconcept torque? 4. Is learner able to mentionexamples of torque? 5. Is learner able to solve problems on torque? On completion of the topic, teacher should assess learners using written quiz. - Definition of couple and torque - Examples of couple and torque in everyday activities Analytic problems on couple and torque

Topic: Simple machines				
Meaning of Simple Machine	Learners will be able to: a) Give the meaningof simple machines. b) Identify different simple machines.	(i) Teacher to use brainstorming questions for learners to give the meaningsimple machines. (ii) Teacher to use questions and answer methods to guidelearners to list various simplemachines. (iii) Teacher should give feedback and use learners'responses as feedback to support learners in performing the tasks mentioned in (i) and (ii).	• Lever • Pulleys • Screws • Jack • Inclined plane • Single fixed pulley • Single movable pulley • Block and tackle pulley system • Weston's differential pulley • Screw jack • Wheel and differential axle • Hydraulic press	1. Is learner able to give the meaning of simplemachines? 2. Is learner able to identify different simplemachines? On completion of the topic, teacher should assess learners using written quiz. - Definition of simple machine - Examples of types of simple machines in everyday activities
Levers	Learners will be able to: a) Identify the three classes of levers. b) Mention examples foreach class of levers. c) Determine mechanical advantage, velocity ratio andefficiency of a lever. d) Identify the applications of levers in everyday real life.	(i) The teacher to use questionsto guide learners to: a. Identify the three classesof levers. b. Mention examples for eachclass of levers. (ii) Teacher to use questionsto guide learners to: - Identify the three classesof levers. - Give examples for eachclass of levers. (iii) Teacher guide the learners to: - Determine mechanical advantage, velocity ratioand efficiency of a lever - Identify the applications oflevers in everyday life.	• Scissors • Claw-hammer • Coal tong • Nut-crackers • Wheel barrow • Crow bar • Wire cutter • Fishing rod • Oar in water • Biceps muscle and forearm	1. Is learner ableto identify the three classes of levers? 2. Is learner able to mention examples for eachclass of levers? 3. Is learner able to determine mechanical advantage, velocity ratio andefficiency of a lever? 4. Is learner ableto identify the applications of levers in everyday life?

		(iv) Learners to present their responses for classdiscussion. (v) Teacher should give feedback and use learners'responses as feedback to support learners in performing the tasks mentioned in (i-iii).		On completion of the topic, teacher should assess learners using written quiz. - Definition of lever - Classification of levers; - Examples of classes lever in everyday activities; - Problems on advantage, velocity ratio andefficiency of a lever.
Pulleys	Learners will be able to: a) Identify different pulley systems. b) Determine mechanical advantage, velocity ratio and efficiency ofdifferent pulley systems. c) Solve problems involving mechanical advantage and velocity ratio of pulley systems. d) Identify the applications of pulley systems in everyday activities	(i) Teacher to use questionsto facilitate the learners to identify different pulley systems, namely: - Single fixed pulley - Single movable pulley - Block and tackle pulleysystem - Weston's differentialpulleys. (ii) In groups, the teacher to guide learners to: - Discuss how to determine mechanical advantage, velocity ratio and efficiencyof pulley systems. - Determine mechanical advantage, velocity ratioand efficiency of pulley systems. - Identify the applications ofpulley systems in everyday activities. - Learners to present their responses for classdiscussion. - Teacher to create activities and guide learners to solve problems involving mechanical advantage,	• Single fixedpulley • Single movable pulley • Block and tackle pulleysystem • Weston's differential pulleys	1. Is learner able to identifydifferent pulleysystems? 2. Is learner able to determine mechanical advantage, velocity ratio and efficiency ofpulleys system? 3. Is learner able to solve problems involving mechanical advantage and velocity ratio of different pulley system? 4. Is learner able to identify the applications of pulley systems in everyday activities? On completion of the topic, the teacher

		velocity ratio and efficiency of pulley systems. (iii) Learners to present their responses for classdiscussion. (iv) Teacher to create activities and guide learners to solve problemsinvolving mechanical advantage, velocity ratio and efficiency of pulley systems.		should assess learners through a test on the following: - Definition of pulley - Classification of pulley systems; - Examples of classes pulley systems in everyday activities; - Problems on advantage, velocity ratio andefficiency of a pulley system
Inclined planes	Learners will be able to: a) Explain the concept of inclined plane. b) Determine mechanical advantage, velocity ratio andefficiency of an inclined plane. c) Solve problems involving mechanical advantage, velocity ratio andefficiency of an inclined plane. d) Determine theuse of inclinedplanes in everyday activities.	(i) Teacher to use questions to guide learners to explain the concept of inclined plane. (ii)Teacher guide learners to: - Explain why it is easier to push a heavy load up an inclined plane than to lift itvertically. (iii) With the aid of prepared assessment guideline, teacher should guide learnersto assess activities done on inclined planes. (iv) Teacher should monitor and facilitate learners in performing the tasks given in (iv) and (v). (v) Teacher should give feedback and use learners'responses as feedback to support learners in performing the tasks mentioned in (i-v).	• Inclined plane • Heavy loads • Ladder • Staircase	1. Is learner able to explain the concept of aninclined plane? 2. Is learner able to determinemechanical advantage, velocity ratio andefficiency of an inclined plane? 3. Is learner ableto solve problems involving efficiency of a machine? 4. Can learner determine the use of inclined planesin everyday activities? On completion of the topic, teacher should assess learners using written quiz. - Definition of inclined plane; - Application of inclined plane in

				everyday activities; Problems on advantage, velocity ratio andefficiency of a inclined plane.
Screw Jack	Learners will be able to: a) Describe the structure of the screw jack. b) Determine the mechanical advantage, velocity ratio andefficiency of a screw jack. c) Use the screw jack in everydaylife.	(i) Teacher to use questionsto guide the learner to describe the structure of the screw jack. (ii) Teacher guide learners to: - Discuss on how to determine the mechanical advantages of velocity ratioand efficiency of a screw jack. - Discuss the various situations where the screwjack is used. (iii) Teacher to design activities and guide learnersto use the screw jack. (iv) With the aid of prepared assessment guideline, teacher to guide learners to use the guideline to assess activities done on screw jack. (v) Teacher should monitorand facilitate learners in performing the tasks given in part (iii) and (iv). (vi) Teacher to give feedback and use learners' responses as feedback to support learners to performthe tasks mentioned in (i-iv).	• Heavy load • Screw jack	1. Can learnerdescribe the structure of the screw jack? 2. Can learner determine the mechanical advantages, velocity ratio andefficiency of a screw jack? 3. Is learner ableto apply the screwjack in everyday life? On completion of the topic, teacher should assess learners using written quiz. - Definition of screw jack. - Application of screw jack in everyday activities. - Problems on advantage, velocity ratio andefficiency of a screw jack.
Wheel and Axle	Learners will be able to: a) Describe the structure of a wheel and axle. b) Determine the mechanical advantage, velocity	(i) Teacher guide learners to: - Describe the structure of awheel and axle. - Determine the mechanical advantage, velocity ratio and efficiency of a wheel and axle. - Explain how to use the wheel and	• Wheel-and-axle • Bicycle • Heavy loads • Windlass	1. Is learner able to describe the structure of awheel and axle? 2. Is learner able to determine mechanical

	ratio andefficiency of a wheel and axle. c) Use the wheel and axle in dailylife.	axle in daily life. (ii) Learners to present their responses for class discussion. (iii) Teacher to create activitiesfor learners to: - Determine the mechanical advantage, velocity ratio and efficiency of a wheel and axle. - Use the wheel and axle indaily life. (iv) With the aid of preparedassessment guideline, teacher to guide learners to assess activities done on wheel and axle: - Use the wheel and axle indaily life. (v) With the aid of preparedassessment guideline, teacher to guide learners to assess activities done on wheel and axle. (i) Teacher should monitor and facilitate learners in performing the tasks given inpart (iii) and (iv). (ii) Teacher should give feedback and use learners'responses as feedback to support learners in performing the tasks mentioned in part (i-iv).		advantage, velocity ratio andefficiency of a wheel and axle?
Hydraulic press	Learners will be able to: a) Describe the structure of a hydraulic press. b) Determine the mechanical advantage, velocity ratio andefficiency of a hydraulic press. c) Use the hydraulic	(i) Teacher guide learners to: - Study the main features of the hydraulic press anddescribe its structure. - Discuss how to determine the mechanical advantage, velocity ratio and efficiencyof a hydraulic press. (ii) Learners to present their responses for class discussion.		1. Is the learner able to describe the structure of a hydraulic press? 2. Is the learner able to determinethe mechanical advantage, velocity ratio andefficiency of a hydraulic

	press in everyday activities	(iii) Teacher to create activities for learners to: - Determine the mechanical advantage, velocity ratio and efficiency of a hydraulic press. - Use the hydraulic press in daily life. (iv) With the aid of prepared assessment guideline, teacher to guide learners to assess activities done on hydraulic press. (v) Teacher should monitor and facilitate learners in performing the tasks given in part (iii) and (iv). (vi) Teacher should give feedback and use learners' responses as feedback to support learners in performing the tasks mentioned in part (i-iv).		press? 3. Is learner able to use the hydraulic press in everyday activities? On completion of the topic, teacher should assess learners using written quiz. - Definition of hydraulic press. - Application of hydraulic press in everyday activities. - Analytic problem solving on advantage, velocity ratio and efficiency of a hydraulic press.
Topic: Fluid Mechanics				
Pressure	Learners will be able to: a) Define the term pressure. b) State the SI units of pressure. c) Explain the application of pressure in everyday activities. d) Explain the relationship between Pressure (P), Force (F) and Area (A). d) Solve problems on pressure.	(i) Teacher to use brainstorming questions to guide the learners to define the term pressure. (ii) Teacher guide learners to: - State the SI units of pressure - Explain the relationship between Pressure, Force and Area. (iii) Teacher guide learners to: - Calculate pressure when rectangular solids rest on different sides. - Solve problems on pressure using the relationship between Pressure and Area.	• Rectangular blocks • Bucket of water • Cylindrical solid object • Bench • Spring balance • Regular object of known weight	1. Is learner able to define the term pressure? 2. Is learner able to state the SI units of pressure? 3. Is learner able to explain the relationship between pressure force and area? 4. Is learner able to solve problems involving pressure? 5. Is learner able to explain the

	e) Calculate pressure when rectangular solidsrest on different sides.	(iv) With the aid of prepared assessment guideline, teacher should guide learnersto assess activities done on pressure. (v) Teacher should monitor and facilitate learners in performing the tasks given in(iii) and (iv). (vi) Learners to present their responses for classdiscussion. (vii) Teacher to give feedbackand use learners' responses as feedback to support learners to perform the tasks mentioned in (i-v). -		application of pressure in everyday activities? On completion of the topic, teacher should assess learners using written quiz. - Definition of pressure; - Application of pressure in everyday activities; - Analytic problem solving of pressure on a rectangular solid.
Atmospheric pressure	Learners will be able to: a) Define the term atmosphere. b) Explain the meaning of atmospheric pressure. c) Explain the application of atmospheric pressure.	(i) Teacher to use brainstorming questions toguide learners to: - Define the concepts ofatmosphere. - Explain the meaning of atmospheric pressure. (ii) Teacher guide learners to explain the application of atmosphericpressure. (iii) Teacher guide learners to explain the application of atmosphericpressure. (iv) Learners to present their responses for classdiscussion. (v) Teacher should use learners' responses as feedback to support learnersto define the concepts of atmospheric pressure and its application.	• Syringe • Bicycle pump • Manometer • Barometer • Lift pump • Siphon • Hydraulic press	1. Is learner able to define the term atmosphere? 2. Is learner able to explainthe meaning of atmospheric pressure? 3. Is learner able to explainthe applicationof atmospheric pressure? On completion of the topic, teacher should assess learners using written quiz. - Definition of

				atmospheric pressure; - Application of atmospheric pressure in everyday activities.
Liquid Pressure	Learners will be able to: a) Define liquidpressure. b) Identify the properties of liquid pressure. c) State Pascal's principle. d) Identify applications of Pascal's principle. f) Calculate the pressure in liquids.	(i) Teacher to use brainstorming questions to guide learners to define liquidpressure. (ii) Teacher guide learners to: (iii) Identify properties of liquid pressure. (iv) State Pascal's principle. (v) Discuss about the computation of pressure inliquids. (vi) Learners to present their responses for class discussion. (vii) Teacher to create activities and guide learners to calculate the pressure in liquids. (viii) Teacher should monitorand facilitate learners in calculating the pressure in liquids. (ix) Teacher should give feedback and use learners'responses as feedback to support learners in performing the tasks mentioned in (i-iv).	• Syringe • Bicycle pump • Manometer • Barometer • Lift pump • Siphon • Hydraulic press • Bucket of water	1. Is learner ableto define liquid pressure? 2. Is learner able to identify the properties ofliquid pressure? 3. Is learner ableto state Pascal principle? 4. Is learner ableto identify the applications of Pascal principle in everyday life. 5. Is the learner able to calculate the pressure in liquids? On completion of the topic, teacher should assess learners using written quiz. - Definition of liquid pressure; - Properties of liquid pressure; - Applications of Pascal's principle in everyday activities. - Analytic problem solving on liquid pressure

Absolute Pressure, Vacuum Pressure, and Gauge pressure	Learners will be able to: a) Explain termsof Absolute pressure, Vacuumpressure, and Gauge pressure. b) Calculate absolute pressureand gauge pressure. c) Identify the applications of absolute pressure, vacuum pressure, and gauge pressure.	(i) The teacher to use questionsto guide learners to explain the meaning of absolute pressure, vacuum pressure and gauge pressure. (ii) Teacher guide learners to identify the applications of absolute pressure, vacuum pressure,and gauge pressure. (iii) Teacher to create activities and guide learners to calculate absolute pressure and gauge pressure. (iv) Teacher should monitor and facilitate learners in calculating absolute pressureand gauge pressure. (v) Teacher should give feedback and use learners'responses as feedback to support learners in performing the tasks mentioned in (i-iii).	• Bourdon gauge • Bicycle tubes • Car tubes • Gas cylinder	1. Is learner able to explain the meaning of absolute pressure, vacuum pressure, and gauge pressure? 2. Is learner able to calculate absolute pressureand gauge pressure? On completion of the topic, teacher should assess learners using written quiz. - Definition of Absolute pressure, Vacuumpressure, and Gauge pressure; - Identify Absolute pressure, Vacuum pressure, and Gauge pressure; - Applications of Absolute pressure, Vacuumpressure, and Gauge pressure; - Analytic problem solving on Absolute pressure, Vacuum pressure, and Gauge pressure
Standard Atmospheric Pressure	Learners will be able to: a) Define standard atmosphericpressure and its value.	(i) Teacher to use brainstorming questions toguide learners to: - Explain the term standardpressure and. - Give the value and unit of standard	• Siphon • Syringe • Simple barometer • Atmosphere • Water	1. Is learner able to define theterm standard atmospheric pressure and its

	b) Define Homogeneous fluid. c) Express standard atmospheric pressure in SI units.	atmospheric pressure. (ii) Teacher to use questions to guide learners to express standard atmospheric pressurein SI units. - Teacher should give learners feedback and use learners' feedback to support them in defining theterm standard atmospheric pressure and stating its SI units.	• Communicating vessel • Fortin barometer • Aneroid barometer • Bicycle tube • Car tubes • Gas cylinder • Various types of manometers • Siphon • Syringe • Simple barometer • Atmosphere • Water • Communicating vessel • Fortin barometer • Aneroid barometer • Bicycle tube • Car tubes • Gas cylinder • Various types of manometers	value? 2. Is learner able to define theterm homogeneous fluid? 3. Is learner able to state the value and express standard atmospheric pressure in SI units?
Measurement of Pressure	Learner will be able to: a) Identify pressure measuring instruments. b) Describe the physical structure of pressure measuring instruments. c) Explain the mode of actionof various barometers and manometers.	(i) Teacher to use questions to guide the learners to identify the instruments for measuringpressure. (ii) Teacher guide learners to; - Explain the mode of action of various barometers and manometers. - Explain the mode of actionof the bourdon gauge. (iii) Teacher to create activities and guide learners to performexperiments on measuring atmospheric pressure	• Communicating vessel • Fortin barometer • Bourdon gauge • Bicycle pump • Car tubes • Gas cylinder • Various types of manometer • Barometer	1. Is learner able to identifythe instrumentsfor measuring pressure? 2. Is learner able to describe the physical structure of pressure measuring instruments? 3. Is learner ableto explain the mode of action of the various barometers and

	d) State the internal parts of a Bourdon gauge. e) Explain the modeof action of Bourdon gauge.	using instruments such as simple barometer, Bourdon gauge, manometer etc. (iv) With the aid of preparedassessment guidelines, teacher guides learners to assess and provide feedback to the activities done in (i-iii). (v) Teacher to monitor and facilitate learners in performing the tasks given in (iii). (vi) Teacher should give feedback and use learner's responses as feedback to support learners in performingthe tasks in (i-iv).		manometers? 4. Is learner ableto identify the internal parts of a Bourdon gauge? 5. Is learner ableto explain the mode of action of the Bourdon gauge On completion of the topic, teacher should assess learners using written quiz on the following; - Description of the physical structure of types of pressure measuring instrument; - Description of the mode of actionof various barometers andmanometers; - Internal parts of a Bourdon gauge; - Description of the mode of actionof Bourdon gauge.
Applications of Pressure	Learners will be able to: a) Explain the applications of pressure onsuction pad/cup. b) Describe the application of pressure onsyringe.	(i) Teacher guide learners to: - Explain the applications ofpressure on suction pads. - Describe the applicationsof pressure on syringe. - Describe the mode of action of a suctionpump. - Describe the mode of action of a diaphragm pump.	• Suction pads • Syringe • Various pumps • Siphon • Various valves • A sketch of a simple hydraulic press • Flip chart	1. Is learner able to explain the applicationsof pressure on suction pads? 2. Is learner able to describethe applicationof pressure on

	c) Describe the mode of action of a suction pump. d) Describe the mode of action of a diaphragm pump. e) Describe siphon principle. f) Describe various types of the valves and their mode of action. f) Describe applications of hydraulic press. g) Explain the principle of construction of a dam. h) Explain the relationship between pressure, force and area of pistons of hydraulic press.	- Describe siphon principle. - Describe the various types of valves and their modes of action. - Describe the applications of hydraulic press. - Explain the principle of construction of a dam. (ii) Teacher to create activities and guide learners to: - Illustrate the applications of syringe. - Illustrate the applications of various types of pumps. (iii) Teacher to use questions to guide learners to: - Explain the principle of construction of a dam. - Describe a simple water system. - Explain the relationship between pressure, force and area of pistons of hydraulic press (iv) Teacher should give feedback and use learners' responses as feedback to support learners in performing the tasks mentioned in (i-iii).	• Computer • Projector • Hydraulic press	syringe? 3. Is learner able to describe the mode of action of a suction pump? 4. Is learner able to describe the mode of action of a diaphragm pump? 5. Is learner able to describe siphon principle? 6. Is learner able to describe applications of hydraulic press? 7. Is learner able to explain the principle of construction of a dam? 8. Is learner able to explain the relationship between pressure, force and area of pistons of hydraulic press? On completion of the topic, the teacher should assess learners through a test on the following: - Suction pad applications. - Application of pressure on syringe. - Mode of action of a suction pump

				- Mode of action of a diaphragm pump. - Siphonprinciple; - Applications of hydraulic press. - Principle of dam construction.
Archimedes' principle	Learners will be able to: a) State Archimedes' principle. b) Perform an experiment which illustrates Archimedes' principle. c) Describe an experiment for measuringrelative density using Archimedes' principle. d) Solve problems involving Archimedes' principle	(i) Teacher to use questionsto guide learners to state theArchimedes' principle. (ii) Teacher guide learners to: - Explain the process of performing an experimentwhich illustrates Archimedes' principles. - Describe an experiment for measuring relative density using Archimedes'principle. - Explain how to solve problems involving Archimedes' principle. (iii) Teacher to create activitiesfor learners to: - Perform an experimentto verify Archimedes' principle. - Demonstrate an experimentto measure relative density using Archimedes'principle. - Solve problems involvingArchimedes' principle. (iv) Teacher should monitor and facilitate learners in performing the tasks given in part (iii). (v) Teacher should give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in (i-iii).	• Hydrometer • Spring balance • Solid objects • String • Water • Cork • Density bottle • Container • Measuring cylinder • Eureka can	1. Is learner able to state theArchimedes' principle? 2. Is learner able to perform an experiment which illustrates Archimedes' principle? 3. Is learner able to describean experiment for measuring relative density using Archimedes' principle? 4. Is learner ableto solve problems involving Archimedes' principle?

Law of flotation	Learners will be able to: a) State the law of flotation. b) Explain the term upthrust. c) Explain the term buoyancy d) Describe the three states of buoyancy. e) Perform an experiment to verify the law offlotation. f) Solve problems involving floatation.	(i) Teacher to use brainstorming questions to guide learners to state the lawof flotation (ii) Teacher guide learners to: - Explain how to perform an experiment to verify the law of flotation. - Explain the upthrust. - Explain the buoyancy. - Describe the three states of buoyancy. (iii) Learners to present their responses for classdiscussion. (iv) The teacher to create activitiesfor learners to: - Perform an experiment toverify the law of flotation. (v) With the aid of prepared assessment guideline, the teacher guide learners to assess the activities performed on part (iv). (vi) Teacher should monitorand facilitate learners in performing the tasks given in (iv). (vii) Teacher to give feedback and use the learners' responses as feedback to support learnersin performing the tasks mentioned in part (i-v).	• Eureka can • Beaker • Sinker • Meter rule • Sand • Model of a ship • Balloon	1. Is learner able to state the four law of flotation. 2. Is learner able to perform an experiment toverify the law offlotation? 3. Is learner ableto explain the term upthrust? 4. Is learner ableto explain the term buoyancy? 5. Is learner ableto solve problems involving flotation? On completion of the topic, the teacher should assess learners through a test on the following: - Buoyancy and upthrust - Relative densities - Types of buoyancy - Problems on relative densities, upthrust and buoyancy
Topic: Heat				
Introduction to heat	Learners will be able to: a) Define the term heat. b) Explain the effects of heat	(i) Teacher to use brainstorming questions toguide learners to: - Define the term heat. (ii) Teacher to use questionsto guide learners to explain the effects of heat. (iii) Teacher should give learners feedback	• Candle • Thermometers • Alcohol • Mercury • Bunsen burner • Kerosene stove	1. Is learner able to define the termheat? 2. Is learner ableto explain the effect of heat?

		and use thefeedback to support learners in stating theories of heat and explaining the effects of heat.		On completion of the topic, teacher should assess learners using written quiz on the definition and effects of heat.
Temperature	Learners will be able to: a) Define the term temperature. b) Explain the relation betweentemperature andheat.	(i) Teacher to use brainstorming questions to guide learners to define theterm temperature. (ii) Teacher to use questioning strategies (what,why and how questions) to guide learners to explain therelation between temperatureand heat. (iii) Teacher to give learners feedback and use the feedback to support learners to define the term temperatureand explain the relationship between temperature and heat.	• Candle • Thermometers • Alcohol • Mercury • Bunsen burner • Kerosene stove	1. Is learner able to define the term temperature? 2. Is learner able to explain the relationship between temperature and heat? On completion of the topic, teacher should assess learners using written quiz on the definition of heat and the difference between heat and temperature.
Instruments for Measuring Temperature	Learners will be able to: a) Identify the instrument usedto measure temperature. b) Describe uses of thermometers. c) Explain the applications of mercury thermometer.	(i) Teacher to use questionsto guide learners to identifythe instrument used to measure temperature. (ii) Teacher guide learners to: - Illustrate the applicationsof mercury thermometer. - Describe uses ofthermometers. (iii) Learners to present their responses for classdiscussion. (iv) Teacher should give learners feedback and use the feedback to support learners to state and describeinstruments used to	• Alcohol, clinical mercury • Hot water • Container • A maximum and minimum thermometer • Alcohol thermometer • Mercury thermometer	1. Is learner able to identify the instrument used to measure temperature? 2. Is learner able to describe uses of thermometers? 3. Is learner able to explain the applicationsof mercury thermometer?

		measure temperature.		On completion of the topic, teacher should assess learners using written quiz on the applications of mercury thermometer and uses.
Temperature Measurement Points	Learners will be able to: a) Define the term fixed temperaturepoints. b) Name four typesof temperature scales c) Describe howto graduate a temperature scale. d) Explain the difference between the Celsius scale andthe Fahrenheit scale. e) State the SI unitsof temperature f) State the namesof the fixed temperature points which are necessary tomake a scale. g) Explain the term Faulty thermometer h) Solve problems on temperature	(i) Teacher to use questionsto guide learners to: - Define the term fixedtemperature points. - Name three types oftemperature scales. - State the SI units oftemperature. (ii) Teacher guide learners to: - Describe how to graduate a temperature scale. - State the name of the fixed temperature points which are necessary to make a scale. - Explain the difference between the Celsius scaleand the Fahrenheit scale. - Explain the problems associated with Faulty thermometer. (iii) Learners to present their responses for class discussion. (iv) Teacher should give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in (i-iii).	• Alcohol thermometer • Mercury thermometer • Sample of Thermometers with Celsius and Fahrenheit scales	On completion of the topic, teacher should assess learners using written quiz on the following: - .types of temperature scales; - Fixed temperature points - Faulty thermometer Analytic problems on temperature
Types of Thermometers	Learner will be able to: a) Identify differenttypes of thermometers. b) Explain the principle action of	(i) The teacher to use questionsto guide learners to: - Identify different types of thermometers. - Mention ways of improving sensitivity of athermometer.	• Alcohol , clinical mercury • Hot water • Container • A maximum and minimum	1. Is learner able to identify different types of thermometers? 2. Is learner ableto explain the principle action of

	thermometers. c) Mention waysof improving sensitivity of athermometer.	(ii) The teacher to organize learners in groups and guidethem to: - Explain the principle actionof thermometers. - List ways of improvingthe sensitivity of a thermometer. (iii) Teacher to create activitiesand guide learners to solve problems on temperature conversion from one temperature scale to another. (iv) Teacher should monitorand facilitate learners in performing the tasks mentioned in (iii). (v) Teacher should give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in (i-iii).	thermometer • Alcohol thermometer • Mercury thermometer	thermometers? 3. Is learner ableto mention ways of improving sensitivity of a thermometer? On completion of the topic, teacher should assess learners using written quiz on the following: - .types of thermometer. - Proving thermometer sensitivity.
Conduction	Learner will be able to: a) Define the term 'conduction' ofheat. b) Identify good andbad conductors ofheat. c) Describe an experiment which illustratesheat transfer by conduction. d) Perform an experiment which illustrates the heat transfer by conduction.	(i) Teacher to use questionsto guide the learners to: - Define the term 'conduction' of heat. - Identify good and badconductors of heat. (ii) Teacher guide learners to: - Describe an experimentwhich illustrates heat transfer by conduction. (iii) The Teacher to create activities and guide learners to perform an experiment which illustratesheat transfer by conduction. (iv) With the aid of prepared assessment guideline, the teacher should guide learners to assess the activities performed on heat transfer by conduction.	• Copper wire • Piece of wood • Water • Basking in the sun • Oil • Source of power • Iron rod • Aluminium rod • Cooking pot • Source of heat • Thermos flask • Flip chart • Marker pens • Insulators • Plastic • Metallic material • Source of power	1. Is learner ableto define the term conduction of heat? 2. Is learner able to identifygood and bad conductors of heat? 3. Is the learner able to describe an experiment which illustratesheat transfer by conduction? 4. Is learner ableto perform an experiment which illustrates the heat

		(v) Teacher should monitorand facilitate learners in performing the tasks mentioned in part. (iv) Teacher should give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in (i-v).		transfer by conduction?
Convection	Learner will be able to: a) Define the term 'Convection' ofheat. b) Identify good andbad conductors ofheat. c) Describe an experiment which illustratesheat transfer by Convection. d) Perform an experiment whichillustrates the heat transfer by Convection.	(i) Teacher to use questionsto guide the learners to: - Define the term 'Convection' of heat. - Identify good and badconductors of heat. (ii) Teacher guide learners to: - Describe an experimentwhich illustrates heat transfer by Convection. (iv) Teacher to create activities and guide learners to perform an experiment which illustratesheat transfer by Convection. (vi) With the aid of prepared assessment guideline, the teacher should guide learners to assess the activities performed on heat transfer by Convection. (vii) Teacher should monitorand facilitate learners in performing the tasksmentioned in part. (v) Teacher should give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in (i-v).	• Copper wire • Piece of wood • Water • Basking in the sun • Oil • Source of power • Iron rod • Aluminum rod • Source of power • Cooking pot • Source of heat • Thermos flask • Flip chart • Marker pens • Insulators • Plastic • Metallic material •	1. Is learner ableto define the term Convection of heat? 2. Is learner able to identifygood and bad conductors of heat? 3. Is learner able to describe an experiment which illustratesheat transfer by Convection? (i) Is learner ableto perform an experiment which illustrates the heat transfer by Convection?
Radiation	Learner will be able to:	(i) The teacher to use questions to guide learners to define theterm 'radiation' of	• Copper wire • Piece of wood	1. Is learner able to define the term

	a) Define the term 'radiation' of heat. b) Describe an experiment which illustratesheat transfer by radiation. c) Distinguish between radiationand convection of heat d) Distinguish between radiation and conduction. e) Perform an experiment which illustrates the transfer of heat by radiation.	heat. (ii) Teacher guide learners to: - Describe an experimentwhich illustrates heat transfer by radiation. - Distinguish between radiation and convection. - Distinguish between radiation and conduction. (iii) With the aid of pre-prepared assessment guideline, teacher guides learners to use the guideline to assess theactivities performed on heat radiation. (iv) Teacher creates activities and guide learners to perform an experiment which illustratesthe transfer of heat by radiation. (iv) Teacher should monitorand facilitate learners in performing the tasks mentioned in (iii). (v) Learners to present their responses for classdiscussion. (vi) The teacher should give feedback and use learners'responses as feedback to support learners in performing the tasks mentioned in (i-v).	• Water • Basking in the sun • Oil • Source of power • Iron rod • Aluminium rod • Source of power • Cooking pot • Source of heat • Thermos flask • Flip chart • Marker pens • Insulators • Plastic • Metallic material	'radiation' of heat? 2. Is learner able to describe an experiment which illustrates heat transfer by radiation? 3. Is learner ableto distinguish between radiation and convection? 4. Is the learner able to distinguish between radiation and conduction? 5. Is learner ableto perform an experiment which illustrates the transfer of heat by radiation? On completion of the topic, teacher should assess learners using written quiz on the description of the kinds of heat transfer.

Year 2/Term 1

Sub-topics	Specific Objectives	Teaching and Learning Strategies	Teaching and LearningResources	Assessment
Topic: Heat				
Introduction to Thermal Expansion	Learners will be able to: a) Explain themeaning of thermalexpansion. b) Identify examplesof thermal expansion in daily life. c) Mention typesof thermal expansions.	(i) Teacher to use questionsguide learners to: - Explain the meaning of theterm thermal expansion. - Explain how solid expands. - Mention types of thermal expansion. (ii) Teacher should give learners feedback and use thefeedback to support learners in performing the tasks given.	• Source of heat • Solid materials	1. Is learner able to explainthe meaning of thermal expansion? 2. Is learner able to identifyexamples of thermal expansionin daily life? 3. Is learner able to mention types of thermalexpansions?
Solid Expansion	Learners will be able to: a) Explain the meaning of solid expansion. b) Identify examples of solid expansion in daily life. c) Explain how solid expands. d) Perform an experiment to verify the expansion ofsolids when heated.	(i) Teacher to use questionsguide learners to: - Explain the meaning ofsolid expansion. - Identify examples of solid expansion in daily life. - Explain how solid expands. (ii) Teacher to create activitiesand guide learners to conduct an experiment to verify the expansion of solids when heated. (iii) With the aid of prepared assessment guideline, the teacher should guide learnersto use the guideline to assess the activities performed in (ii).	• Solar energy • Ball and ring • Bar breaker • Solid materials • A chart of metalsof various expansivities • Source of hear (gas, electricity, charcoal, wood, kerosene)	1. Is learner ableto explain the meaning of solid expansion? 2. Is learner able to identify examples of solid expansion in daily life? 3. Is learner ableto explain how solids expand? 4. Is learner able to performan experiment to verify the expansion of solids when heated?
Liquid Expansion	Learners will be able to:	(i) Teacher to use questionsto guide learners to:	• Ice • Cold water	1. Is learner ableto explain the

	a) Explain the meaning of liquidexpansion. b) Explain how a liquid expands. c) Perform an experiment to find out how aliquid expandswhen heated.	- Explain the meaning ofliquid expansion. - Describe how liquidsexpand. (ii) Teacher to guide learnersto perform an experiment to find out how a liquid expandswhen heated. (iii)With the aid of prepared assessment guideline, the teacher guide learnersto assess the activities performed in (ii). (iv) Teacher should monitorand facilitate learners in performing the tasks mentioned in (ii) and (iii). (v) Teacher should give learners feedback and use the feedback to support learners in explaining and solving problems on liquid expansions	• Hot water • Source of heat • Measuring cylinder • Thermometer • Tall glass	meaning of liquid expansion? 2. Is learner ableto explain how liquids expand? 3. Is learner ableto perform an experiment to find out how a liquid expands when heated? On completion of the topic, teacher should assess learners using written quiz in the following: - Thermal expansion in everyday activities. - Effect of solid and liquid expansion.
Gas Expansion	Learners will be able to: a. Define the term gas expansion. b. Explain the laws of gas. c. State Charles' law, Boyle's law, and Pressure law. d. Explain how a gas expands. e. Perform an experiment to find out how gas expands when heated.	(i) Teacher to use questionsto guide the learners to: - Define the term gasexpansion. - Explain the laws of gas. - State Charles' law, Boyle'slaw, and Pressure law. - Explain how gases expand. (ii) Teacher to create activities for learners to: - Perform an experiment tofind out how gas expandswhen heated. - Solve problems involvinglaws of		1. Is learner able to define the termgas expansion? 2. Is learner ableto explain the laws of gases? 3. Is a learner able to state Charles' law, Boyle's law, and Pressure law? 4. Is learner ableto explain how agas expands? 5. Is learner able to

	f. Solve problems involving laws of gases.	gases. (iii) With the aid of prepared assessment guideline, teacher to guide learners to assess the activities performed in (ii). (iv) Teacher should monitorand facilitate learners in performing the tasks mentioned in part (ii and (iii). (v) Teacher to give feedbackand use learners' responses as feedback to support learners to perform the tasksmentioned in (i-iii).		perform an experiment tofind out how gas expands when heated? 6. Is learner able to solve problems involving laws of gases? On completion of the topic, teacher should assess learners using written quiz in the following: - Gas laws; Analytic problems in gas laws.
Measurement of Thermal Expansion	Learners will be able to: a) Explain the meaning of measurementof thermal expansion. b) Identify apparatusfor measuring thermal expansion. c) Describe methodsof measuring thermal expansion. d) Explain the reallife applicationsof thermal expansion.	(i) Teacher to use brainstorming questions to guide the learners to explainthe meaning of measurementof thermal expansion. (ii) Teacher guide learners to: - Identify apparatus for measuring thermal expansion. - Describe methods of measuring thermal expansion. - Explain the real life applications of thermal expansion. (iii) Teacher should give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in (i-iii).	• Ball and ring • Bar breaker • Bunsen burner	1. Is learner able to explain the meaning of the measurement of thermal expansion? 2. Is learner able to identifyapparatus for measuring thermalexpansion? 3. Is learner able to describemethods of measuring thermal expansion? 4. Can learner explain the reallife applicationof thermal expansion?
Linear Expansion	Learners will be able to:	(i) Teacher to use questionsto guide	• Ball and ring	1. Is learner able to

	a) Define the termcoefficient of linear expansion. b) State the SI units of the coefficient of linear expansion. c) Perform an experiment to measure the coefficient of linear expansion. d) Solve problems in linear expansions.	learners to: - Define the coefficient oflinear expansion. - State the SI units of the coefficient of linearexpansion. (ii) Teacher to create activitiesand guide learners to: - Perform an experiment to measure the coefficient of linear expansion. - Solve problems in linear expansions. (iii) With the aid of prepared assessment guideline, the teacher to guide learners to use the guideline to assess the activities performed on linear expansions. (iv) Teacher should monitorand facilitate learners in performing the tasks mentioned in (ii) and(iii). (v) Learners present their workfor class discussion. (vi) Teacher to give feedbackand use learners' responses as feedback to support learners to perform the tasksmentioned in part (i-iv)	• Bar breaker • Solid materials • A chart of metalsof various expansivities	define the coefficient of linear expansion? 2. Is learner able to state the SI unitsof coefficient of linear expansion? 3. Is learner able to performan experiment to measure the coefficient of linear expansion?
Area Expansion (Superficial Expansion)	Learners will be able to: a) Define the termcoefficient of area (superficial) expansion. b) State the SI units of the coefficient of area expansion.	(i) Teacher to use questionsto guide learners to: - Define the coefficient ofArea expansion. - State the SI units of the coefficient of areaexpansion. (ii) Teacher to create activitiesand	• Ball and ring • Bar breaker • Solid materials • A chart of metals of various expansivities	1. Is learner able to define the coefficient of area expansion? 2. Is learner able to state the SI unitsof coefficient of area expansion?

	a) Perform an experiment to measure the coefficient of area expansion. b) Perform an experiment to measure the coefficient of area expansion. c) Solve problems in area expansions.	guide learners to: - Perform an experiment to measure the coefficient of Area expansion. - Solve problems in Area expansions. (iii) With the aid of prepared assessment guideline, the teacher to guide learners to use the guideline to assess the activities performed on Area expansions. (iv) Teacher should monitorand facilitate learners in performing the tasks mentioned in (ii) and(iii). (v) Learners present their workfor class discussion. (vi) Teacher to give feedbackand use learners' responses as feedback to support learners to perform the tasksmentioned in (i-iv)		3. Is learner able to performan experiment to measure the coefficient of area expansion? 4. Is learner able to performan experiment to measure the coefficient of area expansion?
Volume Expansion (Cubical Expansion)	Learners will be able to: a) Define the termcoefficient of volume (cubical) expansion. b) State the SI units of the coefficient of volume expansion. c) Explain the relation betweendensity and the coefficient of expansion. d) Explain the peculiar (anomalous)expansion of water. e) Identify theapplicationsof volume expansion in real	(i) Teacher to use questions to guide learners to: - Define the coefficient of volume expansion. - Name the SI units of the coefficient of volume expansion. (ii) Teacher to organize learners in groups and guidethem to: - Explain the relation between the density and thecoefficient of expansion. - Explain the peculiar (anomalous) expansion of water.	• Ball and ring • Bar breaker • Solid materials • A chart of metals of various expansivities	1. Is learner able to define the coefficientof volume expansion? 2. Is learner able to state the SI unitsof the coefficient of volume expansion? 3. Is learner ableto explain the relation between the density and the coefficient of expansion? 4. Is learner able to explainthe peculiar

	life. c) Perform an experiment to measure the coefficient of volume expansion. d) Solve problems in volume expansions.	- Identify the applications of volume expansion in real life. (iii) Learners present their responses for classdiscussion. (iv) Teacher should give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in (i-iv).		(anomalous) expansion of water? 5. Can learner identify the applications of volume expansion in real life?
Applications of Thermal Expansion	Learners will be able to: a. Identify theapplicationsof thermal expansion. b. Explain theimportanceof thermal expansion. c. Perform an experiment to determine the coefficient of volume expansion. d. Solve problems on volume expansion.	(i) Teacher to organize learners in groups and guidethem to: - Identify the applications of thermal expansion. - Explain the importance of thermal expansion. (ii) Teacher to create activitiesand organize learners in groups to: - Conduct an experiment to determine the coefficient of volume expansion. - Solve problems on volume expansion. - Show the relation between density and coefficient of expansion. - Illustrate the peculiar (anomalous) expansion of water. (iii) With the aid of prepared assessment guideline, the teacher to guide learners to use the guideline to assess the activities performed on applications of thermal	• Chart with values of different linear expansivities • Electricity • Fire wood • Source of heat (i.e., fire, kerosene, gas) • Charcoal • Thermometer • Graph paper • Ruler • Ice	1. Is learner able to identifythe applicationof thermal expansion? 2. Can learnerexplain the importance of thermal expansion? 3. Is learner able to perform an experiment to determine the coefficientof volume expansion? 4. Is learner ableto solve problemson volume expansion? On completion of the above topics, the teacher should assess learners through a class test on the analytic problem on thermal linear,

		expansions. (iv) The teacher should monitorand facilitate learners in performing the tasks mentioned in (ii) and (iii). (v) Learners to present their workfor class discussion. (vi) The teacher should give learners feedback and use the learners' responses as feedback to support learners to state and solve problems onthermal expansion.		superficial and cubic expansion
Topic: Electricity				
Static Electricity	Learners will be able to: a) Explain the structure of an atom. b) Differentiate between positive and negative charges by testing. c) Explain how a body can be electrified. d) Perform experiments which illustrateelectrification through frictionand induction. e) State Coulomb'slaw. f) State the SI unit of electric charge. g) Define potentialdifference. h) Explain the meaning of electric potential. i) Define and namethe SI units of potentialdifference.	(i) Teacher to use questionsto guide learner to: - Brainstorm about thestructure of an atom. - Define the term potential difference. - Explain the meaning ofelectric potential. - State Coulomb's law. - State the SI unit of electric charge - Define and name the SI units of potential difference. (ii) Teacher guidelearners to: - Differentiate betweenpositive and negativecharges by testing. - Explain how a body can be electrified. (iii) Teacher to create activitiesand guide learners to: - Show positive and negative		1. Is learner ableto explain the structure of an atom? 2. Is the learner able to differentiate between positive and negative charges by testing? 3. Is the learner able to explain how a body can be electrified? Is learner able to performexperiment which illustrates electrification through frictionand induction? 4. Is learner able to state the Coulomb's law? 5. Is learner ableto state the SI units of

		charges by testing. - Conduct experiments which illustrate electrification through friction and induction. (iv) With the aid of prepared assessment guideline, the teacher to guide learners to use the guideline to assess the activities performed on electric charges and potentials. (v) Teacher should monitorand facilitate learners in performing the tasks mentioned in (iii) and (iv).		electric charge? 6. Is learner able to explain the meaning of electric potential? 7. Is learner able to define potential difference? 8. Is learner ableto state the SI units of potential difference? On completion of the topic, teacher should assess learners using written quiz on the following: - Atom structure - Static electricity - Electric potential and potential difference.
Current Electricity	Learners will be able to: a) Define the term current electricity. b) Distinguish between static electricity and current electricity.	(i) Teacher to use questionsto guide learners to: - Define the term current electricity. (ii) Teacher to organize learners in groups and use questions to guide them to state the difference betweenstatic electricity and currentelectricity. (iii) Learners to present their responses for classdiscussion. (iv) Teacher should give feedback and use learners' responses as feedback to support learners in	• Dynamos • Electroscope • Ammeter • Voltmeter • Galvanometer • Cells • Copper wire • Battery	1. Is the learner able to define the term current electricity? 2. Is the learner able to distinguish between static electricity and current electricity? On completion of the topic, teacher should assess learners using written quiz on the difference between

		performingthe tasks mentioned in (i-iii).		static and current electricity.
Electric Current	Learners will be able to: a) Define the termelectric current. b) State its SI units of electric current. c) State the relationship between electriccurrent, charge and time. d) Calculate electriccurrent. e) State the factors affecting electriccurrent.	(i) The teacher to use questionsto guide learners to: - Define the term electric current. - State SI units of electric current. (ii) The teacher to organize learners in groups and use questions to guide them to: - State the relationship between electric current, charge and time. - State the factors affecting electric current. (iii) Teacher to create activitiesand guide learners to calculate electric current. (iv) Teacher should monitorand facilitate learners in performing the tasks mentioned in (i)-(ii). (v) Learners to present their responses for classdiscussion. (vi) Teacher should give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in (i-iii).	• Ammeter • Cell • Wire • Resistors • Galvanometer • Battery • Voltmeter	1. Is learner ableto define the term electric current? 2. Is learner ableto state the SI units of electric current? 3. Is learner able to state the relationship between electric current, charge and time? 4. Is learner able to calculateelectric current? 5. Is learner ableto state the factors affecting electric current? On completion of the topic, teacher should assess learners using written quiz on the following: - Relationship between electric current, charge - Factors affecting electriccurrent - Analytic problems on electric current
Voltage	Learners will be able to:	(i) Teacher to use questionsto guide learners to:	• Ammeter • Cell	1. Is learner able to explain the

	a. Explain the meaning of voltage. b. Define the term voltage and stateits SI units. c. Define the term electromotive force and state itsSI units. d. Perform an experiment to illustrate factorsaffecting an electric current. e. Indicate the direction of flowof electrons and current. f. Explain the use of voltmeters andammeters. g. Identify the effects of electriccurrent. h. Perform an experiment to illustrate the heating, magneticand chemical effects of an electric current. i. Make a simpleelectric circuit.	- Explain meaning of voltage - Define the term voltage and state its SI units. - Define the term electromotive force - State the unit of electromotive force. (ii) Teacher guide learners to: - Explain the use of voltmeters and ammeters. - Identify the effects ofelectric current. - Describe an experiment which verifies Ohm's law. - Elaborate application of voltmeters and ammeters. (iii) Teacher to create activitiesand guide learners in groups to: - Conduct an experiment to illustrate the factors which affect an electric current. - Demonstrate the directionof flow of electrons and current. - Perform an experimentto illustrate the heating,magnetic and chemicaleffects of an electric current. - Conduct an experimentto explain the heating, magnetic and chemicaleffects of current. - Make a simple electriccircuit. (iv) Teacher should monitorand facilitate learners in performing the tasksmentioned in (iii). (v) Learners to present their	• Resistors • Wire • Galvanometer • Battery • Voltmeter	meaning ofvoltage? 2. Is learner ableto define voltage and state its SI units? 3. Is learner able to define electromotive force and state itsSI units? 4. Is learner able to perform an experiment to illustrate the factors which affect an electric current? 5. Is learner ableto indicate the direction of flow of electrons and current? 6. Is learner ableto explain the useof voltmeters and ammeters? 7. Is learner ableto identify the effects of electric current? 8. Is learner able to performan experiment to illustrate the heating, magnetic and chemical effects of an electric current? 9. Is learner ableto make a simple electric circuit?

		responses for class discussion. (vi) Teacher should give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in (i-iv).		On completion of the topic, teacher should assess learners using written quiz on the following: - Electromotive force - Effects of electric current - Current and electrons - Ability to use voltmeter and ammeter
Ohm's Law	Learners will be able to: a) State Ohm's law. b) Describe an experiment whichverifies Ohm's law. c) Conduct an experiment whichverifies Ohm's law. d) State the conditions under which Ohm's lawis valid. e) Solve problems involving the useof Ohm's law.	(i) Teacher to use questionsto guide learners to state Ohm's law. (ii) Teacher guide learner to: - Describe an experiment which verifies Ohm's law. - State the conditions under which Ohm's law is valid. (iii) Teacher to create activitiesand guide learners in groups to: - Conduct an experiment which verifies Ohm's law. - Solve problems involvingthe use of Ohm's law. (iv) Teacher should monitorand facilitate learners in performing the tasksmentioned in (iii). (v) Learners to present their responses for classdiscussion. (vi) Teacher should give learners	• Ammeter • Cell • Resistors • Wire • Galvanometer • Battery • Voltmeter	1. Is learner ableto state Ohm's law? 2. Is learner ableto describe an experiment which verifies Ohm's law? 3. Is learner ableto conduct an experiment which verifies Ohm's law? 4. Is learner able to state the conditions under which Ohm's lawis valid? 5. Is learner ableto solve problems involving the use of Ohm's law?

		feedback and use the learners' responses as feedback to support learnersto state Ohm's law and its applications.		
Resistance	Learners will be able to: a) Define the termresistance. b) Describe theprocess of calculating the effective resistance whenresistors are in series andparallel. c) Calculate the effective resistance whenresistors are in series andparallel.	(i) Teacher to use questions to guide learners to define theterm resistance. (ii) Teacher guide learner to describe process of calculating effective resistancewhen resistors are in series and parallel. (iii) Teacher guide learner to calculate the effective resistance when resistors are in series and in parallel. (iv) The teacher should monitorand facilitate learners in performing the tasksmentioned in (iii). (v) With the aid of -prepared assessment guideline, the teacher should guide learnersto use the guideline to assess the activities performed on calculating the effective resistance when resistors are in series and parallel. (vi) Learners to present theirwork for class discussion. (vii) Teacher should give feedback and use learners'responses as feedback to support learners in performing the tasks mentioned in (i-iii).	• Resistors • Ammeter • Voltmeter • Rheostat • Switch • Wire • Cells • Source of power	1. Is learner ableto define the term resistance? 2. Is the learner able to describe the process of calculating the effective resistancewhen resistors are in series and parallel? 3. Is the learner able to calculate effective resistancewhen resistors are in series and in parallel? On completion of the topic, teacher should assess learners using written quiz on the following: - Drawing of series, parallel and series-parallel resistor circuits - Calculation of effective resistance
Electric Cells	Learners will be able to: a) Explain the meaning of	(i) Teacher to use questionsto guide learners to: - Explain the meaning ofelectric	• Cells • Coils • Galvanometer	1. Is the learner able to explainthe meaning ofelectric

	electric cells. b) Define the termsprimary and secondary cells. c) Describe the construction of primary and secondary cells. d) Identify the functions of the components of primary and secondary cells. e) Explain the advantages and disadvantages of parallel and seriesas arrangements of cells.	cells. - Define the terms primaryand secondary cells. (ii) Teacher guide learner to describe the construction of primary and secondary cells. (iii) Teacher to use questioning strategies (what, why and how questions) to guide learners to: - Identify the functions of the components of primary and secondary cells. - Explain the advantages and disadvantages of series and parallel arrangements of cells. (iv) Learners to present their responses for classdiscussion. (v) Teacher should give learners feedback and use the learners' responses as feedback to support learners to explain the meaning, functions, advantage and disadvantage of electric cells. (vi) Teacher to give feedbackand use learners' responses as feedback to support learners to perform the tasksmentioned in (i-iv).	• Ammeter • Primary cells • Secondary cells • Circuits in series and parallel arrangement • Bulbs • Wires • Source of power	cells? 2. Is learner able to define the terms primary and secondary cells? 3. Is learner able to describethe constructionof primary and secondary cells? 4. Is learner able to explain the function of components of primary and secondary cells? 5. Is learner ableto explain the advantages and disadvantages of parallel and series as arrangements of cells? On completion of the topic, teacher should assess learners using written quiz on the following: - Electric cell classification - Construction of each type of electric cell - Function of the parts of an electric cell - Electric cell connects and effect on voltage

				and current
Topic: Basic Electronics				
Electronic components	Learners will be able to: a) Explain the meaning of electronics. b) Identify the basic components in electronics.	(i) Teacher to use questions to guide learners to guide learners to: - Brainstorm about the concept of electronics. - Identify the basic components required in electronics. (ii) Teacher should give learners feedback and uses learners' responses as feedback to support learners in explaining the meaning and identify basic components in electronics.	• Transistors • Resistors • Capacitors • Inductors • Diode • Light emitting Diode (LED) • Integrated circuits (IC)	1. Is learner able to explainthe meaning of electronics? 2. Is the learner able to identify the basic components in electronics?
Resistors and its Colour Codes	Learners will be able to: a) Identify and explain various types and sizes of resistors. b) Explain functionsof each resistor. c) Compare resistorread value and measured one. d) Identify the practical application of various types ofresistors. e) Read resistorcolour codes.	(i) Teacher to use questioning strategies (what, why and how questions) to guide learners to: - Identify and explain various types and sizes of resistors. - Explain functions of each resistor. - Describe the colour coding system of resistors. (ii) Teacher to organize learners into groups and guide them to: - Compare resistor read value and measured one. - Identify the practical application of various types of resistors (iii) Teacher to create activities and	• Several types of resistors	1. Is the learner able to identify and explainvarious types and sizes of resistors? 2. Is the learner able toexplain functions of each resistor? 3. Is learner able to describe the colour coding system of resistors? 4. Is learner able to compare resistor read value with the measured value? 5. Is learner able to identify the practical

		guide learners to read resistor colour codes. (iv) Teacher should monitor and facilitate learners in reading resistor colour codes. (v) Learners to present their responses for class discussion. (vi) The teacher should give learners feedback and uses learners' responses as feedback to support learners to perform the tasks done on (i-iii).		applications of various types of resistors? 6. Is learner ableto read resistor colour codes? On completion of the topic, teacher should assess learners using written quiz on the resistor colour code and value.
Capacitor and colour codes	Learners will be able to: a) Explain varioustypes, sizes andfunctions of capacitors. b) Explain the term capacitance. c) Describe the practical application of various types ofcapacitors. d) Differentiate thecolour coding system of capacitors. e) Read capacitorcolour codes f) Describe theprocess of calculating the effective capacitance when capacitors are in series andparallel. g) Calculate the effective capacitance when capacitors are in series andparallel.	(i) Teacher to use questionsto guide learners to explain various types, sizes and functions of capacitors. (ii) Teacher to use questioning strategies (what, why and how questions) to guide learners to define capacitance of a capacitor. (iii) Teacher guide learners to: - Describe practical application of various types of capacitors. - Differentiate the colour coding system of capacitors. (iv) Teacher to create activitiesfor learners to read capacitor colour codes. (v) Teacher should monitor and facilitate learners in reading capacitor colour codes. (vi) Teacher guide learner to describe process of calculating effective capacitance when capacitors are in series and parallel.	• Several types of capacitors	1. Can the learner identify different types of capacitors? 2. Can learner explain capacitance? 3. Is learner able to describethe practical applications of various types of capacitors? 4. Is learner ableto differentiate the colour coding system of capacitors? 5. Is learner ableto read capacitor colour codes 6. Is the learner able to describethe process of

		(vii) Teacher guide learner to calculate the effective capacitance when capacitors are in series and in parallel. (viii) Learners to present their responses for classdiscussion. (ix) Teacher to give learners feedback and uses learners' responses as feedback to support learners to perform thetasks done on (i-iv).		calculating the effective capacitance when capacitors are in series and parallel? 7. Is the learner able to calculate effective capacitance when capacitors are in series and in parallel? On completion of the topic, teacher should assess learners using written quiz on the following: - Capacitor colour code and value - Drawing of series, parallel and series-parallel Capacitor circuits - Calculation of effective capacitance
Inductors	Learners will be able to: a) Describe varioustypes, sizes of inductors. b) Identify functionsof each inductor. c) Describe theprocess of calculating the effective inductance wheninductors are in series andparallel.	(i) Teacher to use questions to guide learners to describe various types, sizes of inductors. (ii) Teacher to use questioning strategies (what, why and how questions) to guide learners to identify (iii) Teacher guide learner to describe process of calculating effective inductance when	• Several types of inductors •	1. Is learner able to describe various types, sizes of inductors? 2. Is learner able to identify functions of each inductor? 3. Is learner able to describethe process of calculating the

	d) Calculate the effective inductance wheninductors are in series andparallel	inductors are in series and parallel. (iv) Teacher guide learner to calculate the effective inductance when inductors are in series and in parallel. (ii) Teacher should give learners feedback and uses learners' responses as feedback to support learners in performing the tasks done in (i-iii).		effective inductance when inductors are in series and parallel? 4. Is learner able to calculate effective inductance when inductors are in series and in parallel? On completion of the topic, teacher should assess learners using written quiz on the following: - Inductor colour code and value - Drawing of series, parallel and series-parallel Inductor circuits - Calculation of effective inductance
Semiconductors and Insulators	Learners will be able to: a) Explain the termvalence and conduction bands. b) Distinguish between conductors, semiconductorsand insulators by using Fermi-energy levelconcept. c) Describe the effects of temperature onconductivity of conductors,	(i) Teacher to use questions toguide learners to explain the meaning of the term valence and conduction bands. (ii) Teacher to use questioning strategies (what, why and how questions) to guide learners to: - Differentiate conductors, semiconductors and insulators by using the Fermi energy level concept. - Describe the effects of temperature on conductivity	• Insulators • Battery • Conductors • Chart of energy level • Semi-conductors • Galvanometer • Thermometer • Insulators • Marker pens	1. Can the learner explain the meaningof valence and conduction bands? 2. Is learner able to identify conductors and semiconductors basing on their conductivity? 3. Can learner

	Semiconductorsand insulators. d) Describe the mechanism of doping intrinsic semi-conductors. e) Differentiate between extrinsicand intrinsic semiconductors.	of conductors,semiconductors and insulators. - Describe how doping of intrinsic semiconductor is conducted. - Differentiate betweenextrinsic and intrinsicsemiconductors. (iii) Learners to present their responses for classdiscussion. (iv) Teacher should give learners feedback and uses learners' responses as feedback to supportlearners in performing the tasks done on (i) and (ii).		explain the processof doping of semiconductor material? 4. Is learner ableto distinguish between extrinsic and intrinsic semiconductor material? 5. Is learner ableto differentiate between extrinsic and intrinsic semiconductors? On completion of the topic, teacher should assess learners using written test on the following: - Fermi energy level - Effect of temperature on semiconductors - Extrinsicand intrinsic semiconductors - Concept of doping
Diodes	Learners will be able to: a) Describe the construction of P – N junction. b) Explain the mode of action of a P – N junction. c) Explain the term depletion region. d) Explain the term	(i) Teacher to organise learnersin groups and guide them to: - Describe the construction ofP – N junction. (ii) Teacher to use questioning strategies (what, why and how questions) to guide learners to: - Identify the types of diodes.	• Chart showing diodes • Diode samples • P –N junction diode • Direct current (DC) source • Connecting wire	1. Can learner describe the construction of P-N junction? 2. Is learner able to explain the modeof action of a P-N junction? 3. Is learner able to

	recombination. e) Explain the mode of action of a P – N junction. f) Identify the types of diodes. g) Identify diode terminals (Anode and cathode). h) Teacher should give learnersfeedback and uses learners' responses as feedback to supportlearners in performing the tasks done in (i-iii).	- Identify diode terminals(Anode and cathode). - Explain the concept of depletion - Explain the concept of recombination - Describe the construction ofa half wave rectifier. (iii) Teacher to create activities and guide learners in groups to: - Illustrate the construction of P – N junction. - Construct the rectifier circuit (iv) Teacher should monitor and facilitate learners in performingthe tasks given in (iii). (v) Learners to present their responses for classdiscussion. (vi) Teacher should give learners feedback and uses learners' responses as feedback to support learners in performing the tasks done in (i-iii).		explain depletion region. 4. Is learner able to explain recombination. 5. Is learner ableto identify diode terminals (Anode and cathode) and construct the rectifier circuit? 6. Is learner able to illustrate the construction of P–N junction? 7. Is learner ableto construct the rectifier circuit? On completion of the topic, teacher should assess learners using written test on the following: - Concept of depletion and recombination - Mode of action of a diode - Mode of action of a rectifier.
Transistors	Learners will be able to: a) Describe the construction ofPNP and NPN transistor. b) Identify transistor legs/terminals (Emitter, Base andcollector)	(i) Teacher guide learner to: - Describe the construction of PNP and NPN transistor. - Identify transistor legs/ terminals (Emitter, Base and collector). - applications oftransistors in	• Transistors • NPN and PNP transistors • Voltage amplifier • Switch	1. Is the learner able to explain the construction of PNP and NPN transistor? 2. Is learner able to explain the modeof action of PNP

	c) Outline the applications of transistors in dailylife. d) Explain the mode of action of PNP and NPNtransistor.	daily life - Explain the mode of actionof PNP and NPN transistor. (ii) Teacher should monitor and facilitate learners in performing the tasks given in (iii). (iii) Learners to present their responses for classdiscussion. (iv) With the aid of prepared assessment guideline, the teacher should guide learnersto use the guideline to assess the activities performed in (iii).		transistor? 3. Is the learner able to identify transistor terminals? 4. Is the learner able to identify the applications of transistor in daily life? 5. Is the learner able to explain the mode of action of PNP transistor?
Topic: Electricity and Magnetism				
Magnets	Learners will be able to: a) Explain themeaning of magnet. b) Describe an experiment whichillustrates the properties of magnets. c) Explain the theory underlyingthe concept of magneticproperties. d) Explain the concept of a magnetic field in relation to themagnetic theory. e) Perform an experiment whichillustrates the properties of a magnet.	(i) Teacher to use questions to guide learners to brainstorm on the meaning of a magnet. (ii) Teacher guide learners to: - State the theory underlyingthe concept of magnetism. - Explain the concept of a magnetic field in relation tothe magnetic theory. - Describe an experiment which illustrates the properties of magnets. (iii) Teacher to create activities and guide learners to perform an experiment which illustratesthe properties of a magnet. (iv) Teacher should give learners feedback and use thefeedback to support learners in explaining the concept of a magnetic field in relation tothe magnetic theory. (v) Teacher should monitor and	• Iron fillings • Source of electricity • Wire • Compass needle • Cardboard	1. Is learner able to explain the meaning of magnet and concept of magnetic field? 2. Is learner able to describe an experiment which illustrates the properties of magnets? 3. Is learner able to explain the theory underlying the concept of magnetic properties? 4. Is learner able to explain the concept of a magnetic field in relation to magnetic theory? 5. Is learner able to perform an

		facilitate learners in performing the tasks given in (iii). (vi) Learners to present their responses for classdiscussion. (vii) With the aid of prepared assessment guideline, the teacher should guide learnersto use the guideline to assess the activities performed in (iii). (viii) Teacher should give learners feedback and use thefeedback to support learners in explaining the concept of a magnetic field in relation tothe magnetic theory.		experiment which illustrates the properties of amagnet? On completion of the topic, teacher should assess learners using written quiz on the following: - Properties of a magnet - Concept of magnetism and magnetic field
Magnetisation and Demagnetisation	Learners will be able to: a) State the laws of magnetism. b) Explain themeaning of the term magnetisation. c) Explain themeaning of the term demagnetisation. d) Describe the experiment which illustrates different methods of demagnetisation. e) Outline and explain the properties of materials suitable for magnetisation f) Describe the experiment which illustrates different methods of magnetisation. g) Explain themeaning of the term demagnetisation. h) Describe the experiment which illustrates different methods of	(i) Teacher to use questions to guide learners to: - State the laws of magnetism. - Explain the meaning of the term magnetisation. - Explain the meaning of the term demagnetisation. (ii) Teacher guide learners to: - Describe an experiment to illustrate different methods of demagnetisation. - Outline the properties of suitable materials for magnetisation. - Describe the experiment which illustrates different methods of magnetisation. (iii) Learners to present responses class discussion. (iv) Teacher should give learners feedback and use the feedback	• Piece ofmagnets • Iron nails • Office pins • D. C. source • Wire • Ferrous materials • Iron fillings • Solenoid (coil) • Colbalt • Aluminium • Manganese • Magnetite • Nickel • Wire	1. Is learner able to state the laws of magnetism? 2. Is learner able to explain the meaning of the term magnetisation? 3. Is learner able to explain the meaning of the term demagnetisation?

	demagnetisation. i) Outline and explain the properties of materials suitable for magnetisation. j) Describe the experiment which illustrates different methods of magnetisation.	to support learners in explaining the concept magnetisation and demagnetisation and state their properties.		

Year 2/Term 2

Sub-topics	Specific Objectives	Teaching and Learning Strategies	Teaching and Learning Resources	Assessment
Topic: Forces				
Resolving Vectors by Graphical and Analytical Methods	Learners will be able to: a) Add vectors using graphicaland analytical methods. b) State the triangle law (Sine and Cosine rules),parallelogram andpolygon laws of forces. c) Find the resultant of vectors by using triangle law (Sine and Cosine rules), parallelogram and polygon laws of forces (vectors).	(i) Teacher guide learners to: - Explain on how to add vectors by graphical andanalytical methods. - State the triangle, parallelogram and polygon laws of forces. (ii) Teacher to create activities for learners to: - Add vectors by graphical and analytical methods. - Find the resultant of vectors by using triangle law (Sine and Cosine rules), parallelogram and polygon laws of forces (vectors)? With the aid of prepared assessment guideline, the teacher to guide learners to use the guideline to assess the activities performed in (ii). (iii) Teacher should monitor and facilitate learners in performing the tasks mentioned in (ii) and		1. Is learner able to state the triangle, parallelogram, polygon laws of forces? 2. Is learner able to find the resultant of vectorsby using triangle law (Sine and Cosine rules), parallelogram andpolygon laws of forces (vectors)? On completion of the topic, teacher should assess learners using written quiz on the following; - Resultant of vectors graphical approach

		(iii). (iv) Learners to present their responses for class discussion. - The teacher should give learners feedback and use the learners' responses as feedback to support learners to state and find direction of a vector graphically and analytically.		Resultant of vectors analytic approach
Resultant and Equilibrant Forces	Learners will be able to: a) Define the term resultant force. b) Define the term equilibrant force. c) Distinguish resultant force from equilibrant force. d) Solve problems involving resultant force andequilibrant force.	(i) Teacher to use brainstorming questions toguide learners to: - Define the term resultant force and equilibrant force. - Define term equilibriumforce. (ii) Teacher to use questioning strategies (what, why and how questions) to guide learners to state the difference between resultant force from equilibrant force. (iii)Teacher should give learners feedback and use the learners' responses as feedbackto support the learners to distinguish the terms resultant and equilibrant force.		1. Is learner ableto define the term resultant force? 2. Is learner ableto define the term equilibrant force? 3. Can learner distinguish resultant from equilibrant force? 4. Can learners solve problems involving resultant force and equilibrant force? On completion of the topic, teacher should assess learners using written quiz on difference between resultant force and equilibrium force.
Relative motion	Learners will be able to: a) Explain the concept of relative motion. b) Calculate the relative velocity oftwo bodies.	(i) Teacher to use questions toguide learners to explain the concept of relative motion. (ii) Teacher to organize learners in groups and guide learners to discuss the conceptof relative	• Graph papers • Ruler • Mathematicalset • Tape measure • Timer	1. Is learner ableto explain the concept of relativemotion? 2. Is learner able to calculate relative velocity of two

	c) Apply the conceptof relative motion in everyday activities.	velocity of two objects moving in the same direction and in the opposite direction. (iii) Teacher guide learners to: - Find the relative velocities of two bodies by drawing or calculation. - Use the concept of relative motion in daily life. (iv) With the aid of pre-prepared assessment guideline, teacher guide learners to assess the activities performed on part(iii). (v) Teacher should monitor and facilitate learners in performing the tasks mentionon (iii) and (iv). (vi) Learners to present their responses for class discussion. (vii)Teacher should give learners feedback and usethe learners' responses as feedback to support learners tostate and apply the concept of relative motion in daily life.		bodies? 3. Is learner able to apply the concept of relativemotion in daily life? On completion of the topic, teacher should assess learners using written quiz on the following; - Definition of relative motion - Examples of relative motion in everyday activities. Graphical and analytic problems in relative motion
Topic: Angular Motion				
Concept of Angular Motion and Angular Displacement	Learners will be able to: a) Define the termangular motion. b) Give examples of angular motion. c) Define the term angular displacement. d) State the SI unit of angular motion.	(i) Teacher to use questions toguides learners to brainstorm the meaning of the term: - Angular motion. - Angular displacement (ii) The teacher to use questions to guide learners to: - Give examples of angular motion in daily life.	• Bicycle wheels • Wheels • Protractor	1. Is learner ableto define angular motion? 2. Is learner ableto give examples of angular motionin daily life? 3. Is learner able to define the term angular

	e) State the SI unit of angulardisplacement. f) Explain the relation betweena degree and a radian. g) Explain the convert angle to arc length.	- State the SI unit of angular displacement. (iii) Teacher to use questioning strategies (what, why and how questions) to guide learners to: - Describe the angular motion and name its unit. - Explain the relation between a degree and a radian. - Explain the convert angle to arc length (iv) Teacher should give learners feedback and use the learners' responses as feedback to support learnersin explaining the concepts of angular motion and displacement and their SI units.		displacement andstate its SI units? 4. Is learner able to state the SI unit of angular displacement? 5. Is learner able to state the SI unitsof angular motion? 6. Is learner ableto convert angle to arc length 7. Is learner ableto explain the relation between a degree and a radian? On completion of the topic, teacher should assess learners using written quiz on the following: - Converting from radian to degree visa - Examples of angular motion
Angular velocity	Learners will be able to: a) Define angular velocity. b) State the SI unit of angular velocity. c) Explain the relation between linear velocity andangular velocity.	(i) Teacher to use questions toguide learners to: - Define the term angularvelocity. - State the SI unit of angular velocity. (ii) Teacher guide learners to explain the relation between linear velocity and angular velocity.	• Bicycle wheels • Wheels • Protractor	1. Is learner ableto define angular velocity? 2. Is learner ableto state the SI units of angular velocity? 3. Is learner ableto explain the

	d) Solve problems on angular velocity.	(iii) Teacher to create activities and guide learners to solve problems on angular motion. (iv) Teacher should monitor and facilitate learners to solve problems on angular motion. (v) Teacher should give learners feedback and use the learners' responses as feedback to support learners to state the term angular velocity and solve problems on angular motion.		relation between linear velocity and angular velocity? 4. Is learner able to solve problems on angular motion? On completion of the topic, teacher should assess learners using written quiz on the following; - Define angular velocity - Difference between linear velocity and angular velocity - Analytic problem on angular velocity
Angular Acceleration	Learners will be able to: a) Define the term angular acceleration. b) State the SI unit of angular acceleration. c) Explain the relation between linear acceleration and angular acceleration. d) Explain the applications of linear acceleration and angular acceleration.	(i) Teacher to use questions to guide learners to: - Define the term angular acceleration. - State the SI unit of angular acceleration. (ii) Teacher guide learners to: - Explain the relation between linear acceleration and angular acceleration. - Explain the applications of linear acceleration and angular acceleration. (iii) The teacher should give learners feedback and use the learners'	• Bicycle wheels • Wheels • Protractor	1. Is learner able to explain the term accelerated angular motion? 2. Is learner able to state the equation of uniformly accelerated angular motion? 3. Is learner able to solve problems on accelerated angular motion? On completion of the topic, teacher should assess learners using

		responses as feedbackto support learners to explain the term angular acceleration and their applications.		written quiz on the following; - Define angular acceleration - Difference between linear acceleration and angular acceleration, - Analytic problem on angular acceleration.
Circular Motion	Learners will be able to: a) Explain the meaning of theterm circular motion. b) State SI units ofcircular motion. c) Describe the circular motion. d) Solve problems on circular motion.	(i) Teacher to use questions to guide learners to: - Explain the meaning of term circular motion. - State SI units of circular motion. - Describe circular motion. (ii) Teacher to create activitiesand guide learners in groups to solve problems on circular motion. (iii) Teacher should monitor and facilitate learners in solving problems on circular motion. (iv) Learners to present their responses for classdiscussion. (v) Teacher should give learners feedback and usethe learners' responses as feedback to support learners in explaining term circular motionand solve problem on circular motion.	• Bicycle wheels • Wheels • Protractor	1. Is the learner able to explain the meaning of the term circular motion? 2. Is the learner able to state SI units of circular motion? 3. Is the learner able to describe circular motion? 4. Is the learner able to solve problems on circular motion? On completion of the topic, teacher should assess learners using written quiz on definition circular motion with example. Also difference between circular motion and rotational motion.
Topic: Rotational Forces				

Centripetal and Centrifugal Force	Learners will be able to: a) Explain the meaning of the term centrifugal force. b) Explain the meaning of the term centripetal force. c) Solve problems on centrifugal forces. d) Cite examples of centrifugal forces and where they areapplied.	(i) Teacher to use questions toguide learners to: - Explain the meaning of the term centrifugal force and give its unit. (ii) Teacher guide learners to: - Explain how to solve problems on centrifugal forces. - Give examples of centrifugal forces in real lifesituations. (iii) Teacher to create activities and guide learners in groups tosolve problems on centrifugal forces. (iv) Teacher should monitorand facilitate learners in solving problems oncentrifugal forces. (v) Learners to present their responses for class discussion. (vi) Teacher should give feedback and use learners' responses as feedback to support learners in performingthe tasks mentioned in (i-iii).	• Bicycle wheels • Wheels • Protractor	1. Is learner ableto define the term centrifugal force? 2. Is learner ableto solve problemson centrifugal forces? 3. Is learner able to cite examples of centrifugal forces and where they are applied? On completion of the topic, teacher should assess learners using written quiz on the following: - Differentiate between centripetal and centrifugal forces - Example of centrifugal force application. - Analytic problem on centrifugal force
Centripetal Acceleration	Learners will be able to: a) Explain the meaning of the term centripetal acceleration. b) State the SI unitsof centripetal acceleration. c) Solve problemson centripetal acceleration. d) Cite examples of centripetal acceleration	(i) Teacher to use questions toguide learners to: - Explain the meaning of term centripetal acceleration. - State the SI units of centripetal acceleration. - Name the unit of centripetal acceleration. (ii) Teacher guide learners to: - Explain how to solve problems		1. Is learner able to define the centripetal acceleration? 2. Is learner able to state theSI of centripetal acceleration? 3. Is learner ableto define the term centrifugal force?

	andwhere they are applied.	on centripetalacceleration. - Cite examples of centripetal acceleration and where theyare applied. (iii) Teacher to create activities and guide learners in groups tosolve problems on centripetal acceleration. (iv) Teacher should monitor and facilitate learners in solving problems on centripetal acceleration. (v) Learners to present their responses for classdiscussion. (vi) Teacher should give feedback and use learners' responses as feedback to support learners in performing the tasks mentioned in (i-iii).		4. Is learner ableto solve problemson centrifugal forces? 5. Is learner able to cite examples of centrifugal forces and where they are applied? On completion of the topic, teacher should assess learners using written quiz on the following; - Definition of centripetal acceleration - Example of centrifugal acceleration application. - Analytic problem on centrifugal acceleration.
Torque	Learners will be able to: a) Explain the meaning of the term torque and state its SI units. b) Describe the equation of thework done by torque. c) Explain the SI units of work doneby torque. d) Solve problems on torque. e) Identify the applications oftorque.	(i) Teacher to use questions toguide learners to: - Explain the meaning of theterm torque and state its SIunits. - State the unit of torque. (ii) Teacher guide learners in to: - Describe the equation ofwork done by torque. - Explain the SI units of work done by torque. - Identify the applications of torque.	• Wheel and axle • Bolt • Claw hammer • Spanner • Nail	1. Is learner ableto define the term centrifugal force? 2. Is learner ableto solve problemson centrifugal forces? 3. Is learner able to cite examples of centrifugal forces and where they are applied? On completion of the

		- Show how to solve problems on torque. (iii) Teacher to create activities and guide learners in groups to: - Give the SI units of workdone by torque. - Solve problems on torque. (iv) Teacher should monitor and facilitate learners in performing the tasks given in (iii). (v) Learners to present their responses for classdiscussion. (vi) Teacher should give learners feedback and use the learners' responses as feedback to support learners on explaining term torque andsolving problem on torque.		topic, teacher should assess learners using written quiz on the following; - Definition of torque - Example of the application of torque - Analytic problem on torque.
Topic: Periodic motion				
Concept of Periodic Motion	Learners will be able to: a. Explain the meaning of theterm periodic motion. b. Name examples of periodic motion. c. Identify the instruments and methods for measuring periodic motion.	(i) Teacher to use brainstorming question to guidelearners to explain the meaningof the term periodic motion. (ii) Teacher to use questions to guide learners to: - Give the examples ofperiodic motion. - Identify the instruments and methods for measuring periodic motion. (iii) Teacher should give feedback and use the learners'responses as feedback to support learners in performingthe tasks given on (i) and (ii).	• Pendulum • Timer	1. Is learner ableto define the term centrifugal force? 2. Is learner ableto solve problemson centrifugal forces? 3. Is learner able to cite examples of centrifugal forces and where they are applied? On completion of the topic, teacher should assess learners using written quiz on the following: - Definition of

				periodic motion - Example of periodic motion activities - Relationship between periodic motion and frequency
Oscillations	Learners will be able to: a) Define the term oscillation. b) Identify measuresof oscillations. c) Explain the usesof oscillations. d) Measure oscillations motion. e) Explain functionsof oscillations.	(i) Teacher to use brainstorming questions to guide learners to define theterm oscillation. (ii) Teacher guide learners to: - Identify measures of oscillations. - Explain the uses of oscillations. - Describe the processes of measuring oscillationmotion. (iii) Teacher to create activities and guide learners in groups to measure oscillations motion. (iv) Teacher should monitor and facilitate learners in performing the tasks given in(iii). (v) Learners to present their responses for class discussion. (vi) Teacher should give learners feedback and usethe learners' responses as feedback to support learners inperforming the tasks given in (i-iii).	• Pendulum • Timer	1. Is learner able to define theterm oscillation (vibration)? 2. Is learner able to identifymeasures of oscillations? 3. Is learner ableto explain the usesof oscillations? 4. Is learner able to measure oscillations motion? 5. Is learner able to explainfunctions of oscillations? On completion of the topic, teacher should assess learners using written quiz on the following: - Definition of oscillation - Example of oscillation activities - Uses of oscillation

Topic: Projectile Motion				
Concept of Projectile Motion	Learners will be able to: a) Define the term projectile motion. b) List examples of projectile motion. c) Illustrate graphically the drawing of projectile motion. d) State the force that acts on a projectile motion.	(i) Teacher to use brainstorming questions to guide learners to: - Define the term projectile motion. - List the examples of projectile motion. (ii) Teacher to organise learners in groups and guide them to state the force that acts on a projectile motion. (iii) Teacher to create activities for learners to illustrate the drawing of projectile motion graphically. (iv) Teacher should monitor and facilitate learners in performing the tasks given in (iii). (v) Teacher should give learners feedback and use the learners' responses as feedback to support learners in performing the tasks given in (i-iii).	• A kicked football • A thrown ball	1. Is learner able to define projectile motion? 2. Is learner able to list examples of projectile motion? 3. Is learner able to illustrate the drawing of projectile motion graphically? 4. Is learner able to state the force that acts on a projectile motion? On completion of the topic, teacher should assess learners using written quiz on the following; - Definition of projectile motion - Example of the application projectile motion - Forces acting on a projectile.
Projectile Range and Height	Learners will be able to: a) Explain range of projectile. b) Explain height of projectile. c) Derive the equation of the range of projectile.	(i) Teacher to use questions to guide learners to: - Explain range of projectile. - Explain height of projectile (ii) Teacher guide learners to: - Derive the equation of the range and height of projectile.	• A kicked football • A thrown ball	1. Is learner able to define range of projectile? 2. Is learner able to derive the equation of the range? 3. Is learner able to

	d) Derive the equation of theheight of the projectile. e) Analyse the equations of the height and rangeof the projectile. f) Solve problems on projectile motion.	- Analyze the equations of the height and range of the projectile. (iii) Teacher to create activitiesfor learners to solve problemson projectile motions. (iv) Teacher should monitor and facilitate learners in performing the tasks given inpart (iii). (v) Learners to present their responses for class discussion. (vi) Teacher should give learners feedback and use the learners' responses as feedbackto support learners to explain height, range and equation of projectile.		define height of projectile? 4. Is learner able to derive the equations ofthe height of the projectile? 5. Is learner able to analyze the equation of the height and range of the projectile? 6. Is learner ableto solve problemson projectile motions? On completion of the topic, teacher should assess learners using written quiz on projectile motion analysis.
Time of Flight	Learners will be able to: a) Define the termtime of flight. b) Derive the equation of thetime of flight. c) Solve problems onthe time of flight.	(i) Teacher to use questions to guide learners to define theterm time of flight. (ii) Teacher guide learners to derive the equation ofthe time of flight (iii) Teacher to create activities and guide learners in practice solving problems on the time of flight. (iv) Learners to present their responses for class discussion. (v) Teacher should give learners feedback and use the learners' responses as feedbackto support learners to derive equation and solve problems onthe time of flight.	• Ball • Stones • Stop watch • Measuring tape	1. Is learner ableto define the termtime of flight? 2. Is learner able to derive theequation of the time of flight? 3. Is learner ableto solve problemson the time of flight? On completion of the topic, teacher should assess learners using written quiz on projectile motion

				analysis.
Topic: Heat				
Measurement of heat	Learners will be able to: a) Define the termheat capacity. b) State the SI unitsof heat capacity. c) State the SI unitsof Specific heat capacity. d) Define the termheat capacity. e) State the SI unitsof latent heat. f) Perform an experiment to determine the specific heat capacity of a solid. g) Perform an experiment to determine thespecific heat capacity of a substance by a method of mixture based onthe principle of mixture. h) Solve problems on heat capacity and latent heat	(i) Teacher to use questions to guide learners to: - Brainstorm the term heat capacity. - State the units of heat capacity. - State the SI units of specific heat capacity. (ii) Teacher to use questions to guide learners to: - Brainstorm the term latent heat. - State the SI units of latent heat. (iii) Teacher guidelearners to: - Describe how to conduct an experiment to determinethe specific heat capacity ofsolid. - Describe how to conduct an experiment to determinethe specific heat capacity of a substance by a methodof mixture based on the principle of mixture. (iv) Teacher to create activities and guide learners to: - Perform an experiment to determine the specific heat capacity of a solid. - Perform an experiment to determine the specific heat capacity of a substance by amethod of mixture based	• Heater • Thermometer • Beaker • Water • Copper rod • Iron rod • Solid material • Source of heat (i.e., charcoal, firewood, gas, electricity)	1. Is learner able to define the termheat capacity? 2. Is learner able to state the SI unitsof heat capacity? 3. Is learner able to state the SI unitsof specific heat capacity? 4. Is learner able to state the SI unitsof specific heat capacity? 5. Is learner able to perform an experiment to determine the specific heat capacity of a solid? 6. Is learner able to perform an experiment to determine specificheat capacity by the method of mixture based on principle of mixture? 7. Is learner ableto solve problems on heat capacity and latent heat On completion of the

		onthe principle of mixture. (v) Teacher should monitor and facilitate learners in performing the tasks given in (iii). (vi) Teacher to create activities and guide learners in practice solving problems on heat capacity and latent heat. (vii) Learners to present their responses for class discussion. (viii) Teacher should give learners feedback and use the learners' responses as feedbackto support learners to describe state and test measurement of heat.		topic, teacher should assess learners using written quiz on the following: - Definition of heat capacity, specific heat capacity and latent heat - Units for heat capacity, specific heat capacity and latent heat - Analytic problem on heat capacity and latent heat
Change of State	Learners will be able to: a) Explain the kinetictheory of matter. b) Name and explainthe three states of matter in relation to the kinetic theory of matter. c) Plot and interpretthe heating and cooling curves.	(i) Teacher to use questions to guide learners to: - Explain the kinetic theory of matter. - Name and explain the three states of matter in relation to the kinetic theory of matter. (ii) Teacher showlearners how to plot and interpret the heating andcooling curves. (iii) Teacher to create activities and guide learners toplot and interpret the heating and cooling curves. (iv) Teacher should monitor and facilitate learners in performing the tasks given in(iii). (v) Teacher to give learners	• Source of heat(i.e., charcoal, firewood, gas, electricity) • Cooking pot • Water	1. Is learner ableto explain the kinetic theory of matter? 2. Is learner able to name andexplain the threestates of matter in relation to thekinetic theory ofmatter? 3. Is learner able to plot and interpret the heating and cooling curves? On completion of the topic, teacher should assess learners using written quiz on the following:

		feedback and use the learners' responses as feedback to support learners to explain, state, and practice theories of matter.		- Concept of kinetic theory of matter. - Interpretation of the heating and cooling curve
Topic: Thermodynamics				
First Law of Thermodynamics	Learners will be able to: a) State the First law of thermodynamics. b) State the limitations of the first law of thermodynamics. c) Define reversible and irreversible processes. d) Derive the equation of the work done by the system. e) Solve problems on the work done by the system	(i) Teacher to use questions to guide learners to: - Explain the First law of thermodynamics. - Explain the limitations of the First law of thermodynamics. (ii) Teacher guide learners to define reversible and irreversible processes. (iii) Teacher to create activities and guide learners in performing processes that are reversible and irreversible. (iv) Teacher should monitor and facilitate learners in performing the tasks given in(iii). (v) Teacher guide learners to derive the equation ofthe work done by the system. (vii)Teacher to create activities and guide learners in practice solving problems on the work done by the system. (viii) Teacher to create activities and guide learners in practice solving problems on the work done by the system. (ix) Learners to present their responses for class discussion. (x) Teacher should give learners feedback and use the learners'		1. Is learner able to state the first law of thermodynamics? 2. Is learner able to state limitations of the first law of thermodynamics? 3. Is learner able to identify reversible and irreversible process? 4. Is learner able to derive equation of the work done by a system? 5. Is learner able to solve simple problems on the work done by a system? On completion of the topic, teacher should assess learners using written quiz on the following: - First law of thermodynamics - Limitations of the First law of thermodynamics - Examples of

		responses as feedbackto support learners to derive equation and solve problems on the work done by the system.		reversible and irreversible processes - Solve problems on the work done by the system
Thermodynamic processes	Learners will be able to: a) Explain the term heat engine. b) State the four thermodynamics processes. c) Describe the processes of a simple heat engine. d) Plot the pressure-volume curves for the four processes of a heat engine.	(i) Teacher to use questions to guide learners to explain the meaning of the word heat engine. (ii) Teacher to create activities and guide learners to: - Name the four thermodynamics processes. - Describe the four thermodynamics processes. (iii) Teacher shows learners how to plot and interpret the processes of a heat engine on a P-V curve. (vi) Teacher to create activities and guide learners toplot and interpret the processes of a heat engine on a P-V curve. (v) Teacher should monitor and facilitate learners in performing the tasks given in (iv). (vi) Learners to present their responses for classdiscussion. (vii) Teacher should give learners feedback and use the learners' responses as feedbackto support learners to interpret the processes of a heat engine on a P-V curve.		1) Is learner able to explain the term heat engine? 2) Is learner able to explain the four thermodynamics processes? 3) Is learner able to describe the processes of a simple heat engine? 4) Is learner able to plot the pressure-volume curves for the four processes of a heat engine? On completion of the topic, teacher should assess learners using written quiz on the following: - Describe the processes of a heat engine. - Plot the curve of a heat engine.

Year 2 Term 3

Sub-topics	Specific Objectives	Teaching and Learning Strategies	Teaching and Learning Resources	Assessment
Simple Machines				
Law of Machine	Learners will be able to: a) State the law of a machine. b) Derive the law ofa machine. c) Solve problems onlaw of machines	(i) Teacher guide learners to: - State the law of amachine. - Derive the law of a machine. (ii) Teacher to create activitiesand guide learners in groups to solve problems on law of machines. (iii) Teacher should monitor and facilitate learners in performing the tasks given inpart (ii). (iv) Teacher should give learners feedback and use the learners' responses as feedbackto support learners to state and derive the law of machine.	• Levers • Pulleys • Lifting jack • Screw jack • Wheel and axle	1. Is the learner able to state the law of a machine? 2. Is the learner able to derive the law of a machine? 3. Is the learnerable to solve problems on law of machines? On completion of the topic, teacher should assess learners using written quiz on the following: - Explanation on the law of machine. - Solve problems relating to the laws of machine.
Gear drive	Learners will be able to: a) Explain the meaning of gear. b) Identify types ofgear drive. c) Name examples ofthe applications ofgear drive. d) Explain the term gear ratio. e) Solve problems ongear drive.	(i) Teacher to use questions to guide learners to explain the meaning of the word gear. (ii) Teacher to organize learnersin groups and guide them to: - Identify types of gear drives. - Name examples of the applications of gear drives. (iii) Teacher to create activitiesfor learners to solve problemson gear drive.	• Bike/ bicycle Gear system	1. Is learner ableto explain the meaning of gear? 2. Is learner able to identify types of gear drive? 3. Is learner ableto name examplesof the applicationsof gear drive? 4. Is learner ableto Explain the term

		(iv) Teacher should monitor and facilitate learners in performing the tasks given in (iii). (v) Teacher should give learners feedback and usethe learners' responses as feedback to support learners inexplaining the meaning, types of gear drive and solve problem ongear drive.		gear ratio 5. Is learner ableto solve gear drive problems? On completion of the topic, teacher should assess learners using written quiz on the following: - Definition of gear drive and gear ratio - Application of gear drive - Analytic problems on gear drive
Belt drive	Learners will be able to: a) Explain the meaning of belt drive. b) Identify threekinds of belts and pulleys in common use. c) Describe threekinds of belts and pulleys in common use. d) Identify the applications of belt drives. e) Solve problems onbelt drive.	(i) Teacher to use questions to guide learner to: - Explain the meaning of belt drive. - Identify three kinds of belts and pulleys in common use. (ii) Teacher to guide learner to: -Identify the applications ofbelt drives. -Explain how to solve problems on belt drive. -Identify the applications ofbelt drives. -Solve problems onbelt drive. (iii) Teacher to create activitiesand guide learners to solve problems on belt drive. (iv) Teacher should give learners feedback and use the learners'	• Machine with belt drive • Belts • Pulleys	1. Is learner ableto explain the meaning of belt drive? 2. Is learner able to identify three kinds of belts and pulleys in commonuse? 3. Is learner able to describe three kinds of belts and pulleys in common use? 4. Is learner able to identify the applications of belt drives? 5. Is learner ableto solve problemson belt drive?

		responses as feedback to support learners in performing the tasks in (i-iii).		On completion of the topic, teacher should assess learners using written quiz on the following: - Definition of belt drive - Names of the types of belts and pulleys commonly used - Analytic problems on belts and pulleys
Chain drives	Learners will be able to: a) Explain the meaning of chaindrives. b) Identify examplesof the applicationsof chain drives. c) Describe threekinds of chains and pulleys in common use. d) Identify the applications of belt drives. e) Solve problems onchain drives.	(i) Teacher to use questions toguide learners to explain the meaning of chain drives. (ii) Teacher guide learners to give examples of theapplications of chain drives. (iii) Teacher to create activitiesand guide learners to solve problems on chain drives. (iv) Teacher should monitor and facilitate learners in performing the tasks given inpart (iii). (v) Learners to present their responses for classdiscussion. (vi) Teacher should give learners feedback and use the learners' responses as feedbackto support learners to explain the meaning and application of chain drives.	• Chain drives • Chain • Machine with chain drives	1. Is learner ableto explain the meaning of chain drives? 2. Can learner give examples of the applications of chain drives? 3. Is learner ableto solve problemson chain drives? On completion of the topic, teacher should assess learners using written quiz on the following: - Definition of chain drive - Names of the types of chain and pulleys commonly used - Analytic problems

				on chain and pulleys
Topic: Strengths and Properties of Materials				
Mechanical Properties of Materials	Learners will be able to: a) Explain the meaning of thestrength of a material. b) Define the termtenacity. c) Give examples oftenacity. d) Describe an experiment whichillustrates tenacity. e) Test a material and state if it has properties of tenacity.	(i) Teacher to use questions toguide learners to: - Brainstorm on the meaningof the term strength of material. - Define the term tenacity. - Give examples of tenacity (ii) Teacher guide learners to describe an experiment which illustrates tenacity. (iii) Teacher to create activitiesand guide learners to test a material and state if it has properties of tenacity. (iv) Teacher should monitor and facilitate learners in performing the tasks given in(iii). (v) Learners to present their responses for classdiscussion. (vi) Teacher should give feedback and use the learners'responses as feedback to support learners to test and state the properties of tenacity.	• Cast iron • Carbon • Copper • Steel • Engineering science Texts books	1. Is learner able to explainthe meaning ofstrength of a material? 2. Is learner able to define the term tenacity? 3. Is learner ableto give examples of tenacity? 4. Is learner able to describe an experiment which illustrates tenacity? 5. Is learner ableto test a material and state if it has properties of tenacity?

Brittleness	Learners will be able to: a) Explain the meaning of brittleness. b) Give examples of brittle materials. c) State the use of brittleness materials. d) Describe an experiment which illustrates brittleness. e) Test a material and state if it has properties of brittleness.	(i) Teacher to use questions to guide learners to: - Brainstorm on the meaning of the term brittleness. - Give examples of brittle materials. (ii) Teacher guide learners to: - State the use of Brittleness materials. - Describe an experiment which illustrates brittleness. (iii) Teacher to create activities and guide learners in groups to test a material and state if it has properties of brittleness. (iv) Teacher should monitor and facilitate learners in performing the tasks given in (iii). (v) Learners to present their responses for class discussion. (vi) Teacher should give learners feedback and use the learners' responses as feedback to support learners in testing and stating the properties of brittleness.	• Cast iron • Carbon • Copper • Steel • Glass	1. Is learner able to explain the meaning of brittleness? 2. Is learner able to give examples of brittle materials? 3. Is learner able to state the use of Brittleness materials? 4. Is learner able to describe an experiment which illustrates brittleness? 5. Is learner able to test a material and state if it has properties of brittleness?

Ductility	Learners will be able to: a) Explain themeaning of ductility. b) Give examples ofductile materials. c) State the useof ductility materials. d) Describe an experiment which illustratesductility. e) Test a material and state if it has properties ofductility.	(i) Teacher to use questions toguide learners to: - Brainstorm on the meaningof the term ductility. - Give examples of ductile materials. (ii) Teacher guide learners to: - State the use of ductility materials. - Describe an experiment which illustrates ductility. (iii) Teacher to create activitiesand guide learners in groups to test a material and state if ithas properties of ductility. (iv) Teacher should monitor and facilitate learners in performing the tasks given in (iii). (v) Learners to present their responses for class discussion. (vi) Teacher should give learners feedback and use the learners' responses as feedback to support learnersin testing and stating the properties of ductility.	• Aluminum • Copper • Alloy • Cast iron • Steel • Carbon	1. Is learner able to explainthe meaning ofductility? 2. Is learnerable to give examples of ductilematerials? 3. Is learner able to state the use of Ductilitymaterials? 4. Is learner able to describe an experiment which illustratesductility? 5. Is learner ableto test a material and state if it has properties of ductility?
Elasticity	Learners will be able to: a) Explain themeaning of elasticity. b) Give examples ofelastic materials. c) State the useof elasticity materials. d) Describe an experiment which illustrateselasticity. e) Test a material and state if it has properties of	(i) Teacher to use questions toguide learners to: - Brainstorm on the meaningof the term elasticity. - Give examples of elastic materials. (ii) Teacher guide learners to: - State the use of elasticity materials. - Describe an experiment which illustrates elasticity.	• Aluminum • Copper • Alloy • Cast iron • Steel • Carbon	1. Is learner able to explainthe meaning of elasticity? 2. Is learnerable to give examples of elasticmaterials? 3. Is learner able to state the use of elasticitymaterials? 4. Is learner able to describe an experiment which

	dasticity.	(iii) Teacher to create activities and guide learners in groups to test a material and state if it has properties of elasticity. (iv) Teacher should monitor and facilitate learners in performing the tasks given in (iii). (v) Learners to present their responses for class discussion. (vi) Teacher should give learners feedback and use the learners' responses as feedback to support learners in testing and stating the properties of elasticity.		illustrates dasticity? 5. Is learner able to test a material and state if it has properties of dasticity?
Plasticity and Elongation	Learners will be able to: a) Explain the meaning of Plasticity and Elongation. b) Give examples of Plasticity and Elongation materials. c) State the use of Plasticity and Elongation materials. d) Describe an experiment which illustrates Plasticity and Elongation. e) Test a material and state if it has properties of Plasticity and Elongation.	(i) Teacher to use questions to guide learners to: - Brainstorm on the meaning of the term Plasticity and Elongation. - Give examples of Plasticity and Elongation materials. (ii) Teacher guide learners to: - State the use of Plasticity and Elongation materials. - Describe an experiment which illustrates Plasticity and Elongation. (iii) Teacher to create activities and guide learners in groups to test a material and state if it has properties of Plasticity and Elongation. (iv) Teacher should monitor and facilitate learners in performing the tasks given in (iii).		1. Is the learner able to explain the meaning of Plasticity and Elongation? 2. Is the learner able to give examples of Plasticity and Elongation materials? 3. Is the learner able to state the use of Plasticity and Elongation materials? 4. Is the learner able to describe an experiment which illustrates Plasticity and Elongation? 5. Is the learner able to test a material and state if it has properties of

		(v) Learners to present their responses for class discussion. (vi) Teacher should give learners feedback and use the learners' responses as feedback to support learnersin testing and stating the properties of Plasticity and Elongation.		Plasticity and Elongation?
Hardness	Learners will be able to: a) Explain themeaning of hardness. b) Give examples ofhard materials. c) State the useof hardness materials. d) Describe an experiment which illustrateshardness. e) Test a material and state if it has properties of hardness.	(i) Teacher to use questions toguide learners to: - Brainstorm on the meaningof the term hardness. - Give examples of hard materials. (ii) Teacher guide learners to: - State the use of hardness materials. - Describe an experiment which illustrates hardness. (iii) Teacher to create activitiesand guide learners in groups to test a material and state if ithas properties of hardness. (iv) Teacher should monitor and facilitate learners in performing the tasks given in (iii). (v) Learners to present their responses for class discussion. (vi) Teacher should give learners feedback and use the learners' responses as feedback to support learnersin testing and stating the properties of hardness.		1. Is learner able to explainthe meaning ofhardness? 2. Is learnerable to give examples of hardmaterials? 3. Is learner able to state the use of hardnessmaterials? 4. Is learner able to describe an experiment which illustrateshardness? 5. Is learner ableto test a material and state if it has properties of hardness?
Softness	Learners will be able to:	(i) Teacher to use questions toguide learners to:	• Spongy • Bar soap	1. Is learner able to explainthe meaning

	a) Explain themeaning of Softness. b) Give examples of soft materials. c) State the useof softness materials. d) Describe an experiment which illustratessoftness. e) Test a material and state if it has properties of softness.	- Brainstorm on the meaningof the term softness. - Give examples of softmaterials. (ii) Teacher guide learners to: - State the use of softness materials. - Describe an experiment which illustrates softness. (iii) Teacher to create activitiesand guide learners in groups to test a material and state if ithas properties of softness. (iv) Teacher should monitor and facilitate learners in performing the tasks given in (iii). (v) Learners to present their responses for class discussion. (vi) Teacher should give learners feedback and use the learners' responses as feedback to support learnersin testing and stating the properties of Softness	• Soft wood • Hard wood	ofsoftness? 2. Is learnerable to give examples of softmaterials? 3. Is learner able to state the use of softnessmaterials? 4. Is learner able to describe an experiment which illustrates softness? 5. Is learner ableto test a material and state if it has properties of softness?

Malleability	Learners will be able to: a) Explain themeaning of Malleability. b) Give examples ofmalleable materials. c) State the useof malleability materials. d) Describe an experiment which illustrates Malleability. e) Test a material and state if it has properties of Malleability.	(i) Teacher to use questions toguide learner to: - Brainstorm on the meaningof the term malleability. - Give examples of malleable materials. (ii) Teacher guide learners to: - State the use of malleable materials. - Describe an experiment which illustrates malleable. (iii) Teacher to create activitiesand guide learners in groups to test a material and state if ithas properties of malleability. (iv) Teacher should monitor and facilitate learners in performing the tasks given in (iii). (v) Learners to present their responses for class discussion. (vi) Teacher should give learners feedback and use the learners' responses as feedback to support learnersin testing and stating the properties of Malleability.		1. Is learner able to explainthe meaning ofmalleability? 2. Is learnerable to give examples of malleablematerials? 3. Is learner able to state the use of malleability materials? 4. Is learner able to describe an experiment which illustrates malleability? 5. Is learner ableto test a material and state if it has properties of malleability?
Toughness	Learners will be able to: a) Explain the meaning of toughness. b) Give examples oftough materials. c) State the useof toughness materials. d) Describe an experiment which illustratestoughness.	(i) Teacher to use questions toguide learners to: - Brainstorm on the meaningof the term toughness. - Give examples of tough materials. (ii) Teacher guide learners to: - State the use of toughness materials.		1. Is learner able to explainthe meaning oftoughness? 2. Is learnerable to give examples of toughmaterials? 3. Is learner able to state the use of toughness materials?

	e) Test a material and state if it has properties of toughness.	- Describe an experiment which illustrates toughness. (iii) Teacher to create activities and guide learners to test a material and state if it has properties of toughness. (iv) Teacher should monitor and facilitate learners in performing the tasks given in (iii). (v) Learner to present their responses for class discussion. (vi) Teacher should give learner feedback and use the learners' responses as feedback to support learners in testing and stating the properties of toughness.		4. Is learner able to describe an experiment which illustrates toughness? 5. Is learner able to test a material and state if it has properties of toughness?
Flexibility	Learners will be able to: a) Explain the meaning of flexibility. b) Give examples of flexibility materials. c) State the use of flexibility materials. d) Describe an experiment which illustrates flexibility. e) Test a material and state if it has properties of flexibility.	(i) Teacher to use questions to guide learners to: - Brainstorm on the meaning of the term flexibility. - Give examples of flexibility materials. (ii) Teacher guide learners to: - State the use of flexibility materials. - Describe an experiment which illustrates flexibility. (iii) Teacher to create activities and guide learners to test a material and state if it has properties of flexibility. (iv) Teacher should monitor and facilitate learners in performing the tasks given in (iii).	• Electrical cables • Other flexible materials	1. Is learner able to explain the meaning of flexibility? 2. Is learner able to give examples of flexibility materials? 3. Is learner able to state the use of flexibility materials? 4. Is learner able to describe an experiment which illustrates flexibility? 5. Is learner able to test a material and state if it has properties of flexibility?

		(v) Learners to present their responses for class discussion. (vi) Teacher should give learners feedback and use the learners' responses as feedback to support learnersin testing and stating the properties of Flexibility.		
Topic: Stress on Solid Material				
Forces Applied to Solid Materials	Learners will be able to: a) Describe the effects of tensileforces on a material. b) Define tensile stress and tensilestrain. c) Explain Young's modulus. d) State the SI unitsof tensile stress and tensile strain. e) Describe theeffects of compressiveforces on a material. f) State Hooke's law. g) Sketch a graph which shows howthe extension varies with the applied load. h) Solve problems involving stress, strain and Young's modulus.	(i) Teacher to use questions toguide learner to: - Define tensile stress andtensile strain. - State the SI units of tensile stress and tensile strain. - Explain Young's modulus. (ii) Teacher guide learners to: - Describe the effects of compressive forces on a material. - Describe the effects of tensile forces on a material. (iii) Teacher to use questions toguide learners to state Hooke'slaw. (iv) Teacher to create activities and organize learners to: - Sketch a graph which shows the relationship between extension and applied load. (v) Teacher to create activitiesand guide learners to solve problems involving stress, strain and Young's modulus	• Leaf spring • Coil spring • Wire • Catapult	1. Is learner ableto describe effect of tensile force ona material? 2. Is learner ableto define tensile stress and tensile strain? 3. Is learner able to state the SI unitsof tensile stress and tensile strain? 4. Is learner able to describethe effect of compressive forces on a material? 5. Is learner ableto state Hooke's law? 6. Is learner ableto sketch a graph which shows how the extension varies with the applied load? 7. Is learner ableto solve problems involving stress, strain and Young's

				modulus? On completion of the topic, teacher should assess learners using written quiz on the following: - Define stress and stress. - Sketch a stress-strain curve. - Calculate stress, strain and Young's modulus.
Topic: Light (Curved mirrors)				
Curved Mirrors	Learners will be able to: a) State the meaning of curved mirrors. b) Identify the types of curved mirrors. c) Describe features of a curved mirror. d) Differentiate between concave and convex mirrors.	(i) Teacher to use questions toguide learners to: - State the meaning of curved mirrors. - Identify the types of curved mirrors. (ii) Teacher guide learners to: - Describe features of a curved mirror. - Differentiate between concave and convex mirrors. (iii) Learners to present their responses for classdiscussion. (iv) Teacher should give feedback and uses feedback tosupport learners in performingthe tasks given in (i) and (ii).	• Convex mirror • Concave mirror •	1. Is learner able to state the meaning of curved mirrors? 2. Is learner able to identify the types of curved mirrors? 3. Is learner able to describe features of a curved mirror? 4. Is learner able to differentiate between concave and convex mirrors? On completion of the topic, teacher should assess learners using written quiz on the feature the two kinds of curved mirrors.

Concave and Convex mirrors	Learners will be able to: a) Explain the term centre of curvature, principal axis, principal focus, radius of curvature and focal length. b) Differentiate between concave and convex mirrors. c) Describe the nature and size of images formed by concave and convex mirrors. d) Explain the cause of blurred images formed by convex mirrors.	(i) Teacher to use questions toguide learners to explain the terms optical centre, principal axis, principle focus, radius of curvature and focal length. (ii) Teacher to organize learners in groups and guide learners to: - Explain principal axis, principal focus, radius of curvature, centre of curvature and focal length. (iii) Describe the nature and size of images formed by concave and convex mirrors. (iv) Teacher to use questioning strategies (what, why and how questions) to guide learners to: - Differentiate between concave and convex mirrors. - Explain the cause of blurred images formed by convex mirrors. (v) Teacher should give feedback and uses feedback to support learners to describe the nature and size of images formed by concave and convex mirrors	• Convex mirror • Concave mirror • Ruler	1. Is learner able to explain the meaning of the terms centre of curvature, principal axis, principal focus, radius of curvature and focal length? 2. Is learner able to differentiate between concave and convex mirrors? 3. Is learner able to describe the nature and size of images formed by concave and convex mirrors? 4. Is learner able to explain the cause of blurred images formed by convex mirrors? On completion of the topic, teacher should assess learners using written test on the following: - Parts of a curved mirror. - Nature of image formed by a concave mirror. - Nature of image formed by a convex mirror. - Sketch the image formation on a concave mirror.

				- Sketch the image formation on a convex mirror. - Cause for blurred image on curved mirror.
Applications of Concave and Convex Mirrors	Learners will be able to: a) State the mirrorformula and itsapplications. b) Calculate the focallength, magnification, image distances and object distances, from concave and convex mirrors. c) Identify the uses of concave mirror.	(i) Teacher to use questioning strategies (what, why and how questions) to guide learners to: - Identify the mirror formulaand its application. - Identify the applications of concave mirror. (ii) Teacher to create activities and guide learners to calculate the focal length, magnification, image distancesand object distances from concave and convex mirrors. (iii) The teacher should monitor and facilitate learners in performingthe tasks given in (ii). (iv) Learners to present their responses for classdiscussion. (v) With the aid of prepare assessment guideline, the teacher should guide learners to assess the activities performed on part (ii). (vi) The teacher should give feedback and uses feedback to support learners in performingthe tasks given in (i) and (ii).	• Convex mirror • Concave mirror • Ruler	1. Is learner ableto state the mirror formula and its application? 2. Is learner able to calculate the focal length, magnification, image distances and objectdistances from concave and convexmirrors? 3. Is learner able to identify the uses of concave mirror? On completion of the topic, teacher should assess learners using written test on the following: - Solve for different variables of curved mirrors. - Uses of curved mirrors.
Optical Instruments	Learner shouldbe able to: a) Identify opticalinstruments. b) Describe how a periscope	(i) The teacher to use questions to guide learners to identify optical instruments. (ii) Teacher guide learners to:	• Concave mirror • Periscope • Convex mirror • Optical level	1. Is learner ableto identify optical instruments? 2. Is learner ableto

	works. c) Describe the principle of actionof an optical level.	- Describe the principle of action of an optical level. - Describe how a periscope works. (iii) Learners to present their responses for class discussion. (iv) Teacher should give feedback and uses feedback tosupport learners in performingthe tasks given in (i) and (ii).		describe how a periscope works? 3. Is learner able to describe the principle of action of an optical level? On completion of the topic, teacher should assess learners using written quiz on the following: - Structure of a periscope. - Principle of actionof an optical level
Topic: Electricity				
Electrical energy and Power	Learners will be able to: a) Explain the unitsof electrical energy and power. b) Calculate the heat dissipated by an electric current ina resistor. c) Identify domestic appliances whichuse the heating effects of an electric current. d) Explain the term electrical rating	(i) Teacher to organize learners in groups and guide them to: - Explain units of electricalenergy and power. - Identify domestic appliances which use the heating effectsof an electric current. (ii) Teacher to create activitiesand guide learners to - Calculate the heat dissipated by an electric current in a resistor. - Explain the term electrical rating. (iii) Teacher should monitor and facilitate learners in performingthe tasks given in part (ii). (iv) With the aid of prepared assessment guideline, the teacher guide learners toassess the	• Heater • Ammeter • Clock • Electric iron • Cooker • Electric kettle • Filament lamp • Oven	1. Is learner able to name and explain the SI units of electrical energy and power? 2. Is learner able to calculate the heat dissipated by an electric current in a resistor? 3. Is learner able to identify domestic appliances which use the heating effects of an electric current? 4. Is learner able to explain electrical rating? On completion of the

		activities performed on part (ii). (v) Learners to present their responses for classdiscussion. (vi) Teacher should give learners feedback and use the feedback to support learners to identify and describe electrical energy and power.		topic, teacher should assess learners using written quiz on the following: - Formula for electrical dissipated power. - Explain of electrical rating
Electricity Consumption	a) Learners will be able to: - Explain the SI units of electrical energy. b) Explain how electrical energy is converted into heat energy in an electric kettle, lamp filament, and electric cooker. c) Identify different applications of electricity.	(i) Teacher to use questions to guide learners to: - Explain the SI units of electrical energy. - State the SI units of electrical energy. (ii) Teacher guide learners to: - Explain how electrical energy is converted into heat energy in an electric iron, electric kettle, lamp filament, and electric cooker. - Analyze different applications of electricity. (iii) Learners to present their responses for class discussion. (iv) Teacher should give learners feedback and use the feedback to support learners in performing the tasks given in (i) and (ii).	• Power supply • Ammeter • Battery charger • $CUSO_4$ • Electric iron • Electric kettle • Electric heater • Electric cooker • Lamp filament • Source of power • Voltmeter	1. Is learner able to explain the SI units of electrical energy? 2. Is learner able to explain how electrical energy is converted into heat energy in an electric kettle, lamp filament and electric cooker? 3. Is learner able to mention different applications of electricity? On completion of the topic, teacher should assess learners using written quiz on how electricity is converted to heat.

Year 3/Term 1

Sub-topics	Specific Objectives	Teaching and Learning Strategies	Teaching and Learning Resources	Assessment
Topic: Magnetic field due to an electric current				
Magnetic field due to an electric current	Learners will be able to: a) Explain the meaning of a magnetic field. b) Describe the force set up on a current carrying conductor in a magnetic field. c) State and explain Fleming's right- and left-hand rules. d) Describe experiment which illustrate the magnetic field patterns due to current carrying straight wire and loop.	(i) Teacher to organize learners in pair and guide them to think and share on the meaning of a magnetic field. (ii) Teacher guide learners to: - Describe the force set up on a current carrying conductor in a magnetic field. - State and explain Fleming's right- and left-hand rules. - Describe experiments which illustrate the magnetic field patterns due to current carrying straight wire and loop. (iii) Teacher to design activities and guide learners to perform experiment which illustrates the magnetic field patterns due to current carrying straight wire and loop. (iv) Teacher should monitor and facilitate learners in performing the tasks given in (iii-v). (v) Learners to present their responses for class discussion. (vi) With the aid of prepared assessment guideline, the teacher should guide learnersto use the guideline to assess the activities performed on (iii). The teacher should give learners feedback and uses learners' responses	• Magnets • Iron fillings • Plane paper • Galvanometer • Straight wire • DC supply • Nail • A sketch to show Fleming's left hand rule	1. Is learner able to explain the meaning of magnetic field? 2. Is learner able to describe experiment which illustrates the magnetic field patterns due to current carrying straight wire and loop? 3. Is learner able to describe the force set up on a current carrying conductor in a magnetic field? 4. Is learner able to state and explain the Fleming's right- and left-hand rules? 5. Is the learner able to perform experiment which illustrate the magnetic field patterns due to current carrying straight wire and loop? On completion of the topic, teacher should assess learners using written quiz on the following: definition of magnetic field; Fleming's rules

		as feedback to support learnersin explaining magnetic fieldand electric current.		
Electromagnets	Learners will be able to: a) Explain the meaning of electro-magnets. b) Identify the use of electro-magnets. c) Describe the construction of a simple electric motor. d) Describe the mode of action ofelectric motors. e) Sketch of simple construction of electric motor. f) Describe a simple experiment whichillustrates an electro-magnet. g) Perform a simple experiment whichillustrates an electro-magnet.	(i) Teacher to use questions toguide learners to: - Give the meaning of electro-magnets. - Identify the uses of electro-magnets. (ii) Teacher guide learners to: - Describe the construction ofa simple electric motor. - Describe the mode of actionof electric motors. - Describe a simple experiment which illustrates an electro-magnet. (iii) Teacher to create activities and guide learners to: - Perform a simple experiment which illustrates an electromagnet. - Illustrate the construction of a simple electric motor. (iv) Teacher should monitor and facilitate learners in performing the tasks given in (iii). (v) Learners to present their responses for class discussion. (vi) With the aid of prepared assessment guideline, the teacher should guide learners to use the guideline to assess the activities performed on (iii). (vii) Teacher should give learners		1. Is learner able toexplain the meaningof electro-magnets? 2. Is learner able to describe a simple experiment which illustrates an electro-magnet? 3. Is learner able toidentify the uses of electro-magnets? 4. Is learner ableto describe the construction of a simple electricmotor? On completion of the topic, teacher should assess learners using written quiz on the following: - Definition of electromagnet - Features of an electric motor. - Mode of action of an electric motor.

		feedback and uses learners' responses as feedback to support learners in explaining the meaning and uses of electro magnets.		
Electromagnetic Induction	Learners will be able to: a) Explain the meaning of magnetic Flux density and induced electromotive force. b) State Faraday's and Lenz's laws of electromagnetic induction. c) Solve problems involving Faraday's laws Lenz's law d) Describe an experiment which illustrates induced electromotive force. e) Perform experiment which illustrates induced electromotive force. f) Describe an experiment which verifies Faraday's law of electromagnetic induction. g) Perform experiment which verifies Faraday's law of electromagnetic induction.	(i) Teacher to use questions to guide learners to: - Explain the meaning of magnetic flux density. - Explain the meaning of induced electromotive force (emf). - State Faraday's and Lenz's laws of electromagnetic induction. (ii) Teacher to create activities and guide learners to solve problems using Faraday's laws Lenz's law. (iii) Teacher guide learners to: - Describe an experiment which illustrates induced electromotive force. (iv) Teacher guide learners to: - Describe an experiment which illustrates induced electromotive force. - Describe an experiment which verifies Faraday's law of electromagnetic induction. (v) Teacher to create activities and guide learners to: - Perform experiment which illustrates induced electromotive force. - Perform an experiment which verifies Faraday's law of electromagnetic induction.	• Wire • Magnets • Galvanometer • Source of rotation • Coil • Bar magnet	1) Is learner able to explain the meaning of induced electromotive force? 2) Is learner able to explain the meaning of magnetic flux density? 3) Is learner able to state Faraday's and Lenz's laws of electromagnetic induction? 4) Is learner able to solve problems involving Faraday's laws Lenz's law? 5) Is learner able to perform experiment which illustrates induced electromotive force? 6) Is learner able to describe an experiment which verifies Faraday's law of electromagnetic induction? On completion of the topic, teacher should assess learners using written quiz on the following: - Definition of magnetic flux density - Definition of electromotive force.

		(vi) Teacher should monitor and facilitate learners in performing the tasks given in (iii). (vii) Learners to present their responses for class discussion. (viii) With the aid of prepared assessment guideline, the teacher should guide learners to use the guideline to assess the activities performed on (iii). (ix) Teacher should give learners feedback and uses learners' responses as feedback to support learners in performing the tasks given in (i-vi).		- Laws governing induced electromotive force (emf)
Induced Electromotive Force	Learners will be able to: a) State the factors that affect the induced electromotive force. b) Explain the concepts of self and mutual induction. c) Solve problems involving self and mutual inductance. d) Compare the flow of AC and DC from coil rotating in a magnetic field. e) Show the flow of AC and DC from a coil rotating in a magnetic field.	(i) Teacher guides learner to: - State the factors that affect electromotive force. - Discuss about the concept of self and mutual induction. - Compare the flow of AC and DC from coil rotating in a magnetic field. - Show the flow of AC and DC from a coil rotating in a magnetic field. (ii) Teacher to create activities and guide learners to solve problems involving self and mutual inductance. (iii) Learners to present their responses class discussion. (iv) Teacher should give learners feedback and uses learners' responses as feedback to support learners in performing the activities done on (i).	• Iron ring • Galvanometer • Coil • Source of electricity • Simple DC (Dynamo) • Simple AC (alternator)	1) Is learner able to state the factors that affect electromotive force? 2) Is learner able to explain the concept of self and mutual induction? 3) Is learner able to compare the flow of AC and DC from coil rotating in a magnetic field? 4) Is learner able to Solve problems involving self and mutual inductance? 4) Is learner able to show the flow of AC and DC from a coil rotating in a magnetic field? On completion of the topic, teacher should assess learners using written quiz on the following: - Factors affecting

				induced emf. - Difference between self and mutual induction. - Difference between rotating coils for ac and dc generator - Solve problems on self and mutual induction.
Transformers	Learners will be able to: a) Define a transformer. b) Describe the structure of a transformer. c) Explain the mode of action of a transformer. d) Describe the two kinds of transformer. e) State the factors that affect the performance of a transformer. f) Solve problems on transformers.	(i) Teacher to use questions to guide learners to: - State the meaning of a transformer. - Explain the mode of action of a transformer. - Describe structure of transformer (ii) Teacher to create activitiesand guide learners to: - Describe the two kinds of transformer (current and voltage transformer). - State the factors that affect the performance of a transformer. - Solve problems on transformers.	• Transformer • Mains supply • Voltmeter • Ammeter	1. Is learner able to provide the definition for a transformer? 2. Is learner able to describe the structure of a transformer? 3. Is learner able to explain the mode of action of a transformer? 4. Is learner able to describe the two kinds of transformer? 5. Is learner able to solve problems on transformers? 6. Is learner able to State the factors that affect the performance of a transformers? On completion of the topic, teacher should assess learners using written quiz on the following: - Mode of action - Causes for losses in performance Solve problems on transformer.

Topic: Light				
Lenses	Learners will be able to: a) Explain the meaning of lens. b) Identify the types of lenses. c) Draw diagrams which illustrate the action of lenses on beams of light. d) Explain the meaning of optical centre and principal axis. e) Describe the principal focus of the lenses. f) Describe the nature and size of images formed by convex and concave lenses. g) Locate the optical centre, principal axis and principal focus of the lenses. h) Describe experiments for determination of focal lengths of convex and concave lenses. i) Perform an experiment for determination of focal lengths in convex and concave lenses	(i) Teacher to use question to guide learners to: - Explain the meaning of a lens - Explain the meaning of optical centre and principal axis. - Identify the types of lenses. (ii) Teacher to organise learners in groups and guide them to: - Describe the principal focus of the lenses. - Describe the nature and size of images formed by convex and concave lenses. - Describe experiments for determination of focal lengths of convex and concave lenses. - Describe how to draw diagram which illustrates the action of lenses on a beam of light. (iii) Teacher to create activities for learners to: - Draw diagrams which illustrate the action of lenses on beam of light. - Locate the optical centre, principal axis and principal focus of the lenses. - Perform an experiment for determination of focal. - Lengths convex and concave lenses. (iv) Teacher should monitor and facilitate learners in performing the	• Convex lens • Concave lens • Stand for lens • Object (candle)	1. Is learner able toexplain the meaning of lens? 2. Is learner able toidentify the types of lenses? 3. Is learner able to draw diagrams which illustrate theaction of lenses on beams of light? 4. Is learner able toexplain the meaningof optical centre andprincipal axis? 5. Is learner ableto describe the principal focus ofthe lenses? 6. Is learner able todescribe the nature and size of images formed by convex and concave lenses? On completion of the topic, teacher should assess learners using written quiz on the following: - Definition of a lens - Types of lenses - Description of the principal focus - Nature of image generated by each type of lens - Image formation of each type of lens

		tasks given in part (iii). (v) Learners to present their responses for sharing and discussion. (vi) Teacher should give feedback and use feedback to support learners to list and describe lenses.		
Refraction of light	Learners will be able to: a) Explain the meaning of refraction of light. b) Describe an experiment which illustrates the refraction of light. c) State Snell's laws of refraction. d) Solve problems involving Snell's law. e) Describe an experiment which verifies the laws of refraction. f) Conduct an experiment which illustrates the refraction of light. g) Conduct an experiment whichverifies the laws of refraction.	(i) Teacher to use questions to guide learner to: - Explain the meaning of refraction of light. - State Snell's laws of refraction. (ii) Teacher guide learners to: - Describe an experiment which illustrates the refraction of light. - Describe an experiment which verifies the laws of refraction. (iii) Teacher to create activities and guide learner to: - Conduct an experiment which illustrates the refraction of light. - Conduct an experiment which verifies the laws of refraction. (iv) Teacher should monitor and facilitate learners in performing the tasks given in (ii). (v) Learners to present their responses for classdiscussion. (vi) Teacher should give feedback and uses feedback to support learners to state the application of refraction of light.		1. Is learner able to explain the meaning of refraction of light? 2. Is learner able to describe an experiment which illustrates the refraction of light? 3. Is learner able to state Snell's law of refraction? 4. Is learner able to describe an experiment which verifies the laws of refractions? 5. Is learner able to conduct an experiment which illustrates the refraction of light? 6. Is learner able to conduct an experiment which verifies the laws of refractions?

Refractive Indices of Different Media	Learners will be able to: a) Define refractive index of a medium. b) Determine the refractive indices of transparent materials experimentally. c) Explain why total internal refraction occurs. d) Describe an experiment which illustrates total internal refraction. e) Conduct experiment which illustrates total internal refraction. .	(i) Teacher to use questions to guide learner to give the meaning of refractive index. (ii) Teacher guides learner to: - Determine the refractive indices of transparent materials experimentally. - Describe an experiment which illustrates total internal refraction. (iii) Teacher to create activities for learners to conduct experiment which illustrates total internal refraction. (iv) Teacher should monitor and facilitate learners in performing the tasks given inpart. (v) Learners to present their responses for class discussion. (vi) Teacher should give feedback and uses feedback to support learners to identify and state the refractive index of light on different media.	• Protractor • Glass block • Ruler • Source of light • Pencil • Optical pins • Plane papers • Drawing board • Prisms	1. Is learner able to define refraction index? 2. Is learner able to determine the refractive indices of transparent materials experimentally? 3. Is learner able to explain why total internal refraction occurs? 4. Is learner able to describe an experiment which illustrates total internal refraction? On completion of the topic, teacher should assess learners using written quiz on the following: - Definition of refraction - Definition of refractive index - Solve problems involving Snell's law - Conditions for total internal refraction
Critical Angle and Refractive Index	Learners will be able to: a) Explain the meaning of critical angle. b) Explain the relationship between critical angle and refractive index. c) Identify examples of total internal reflection.	(i) Teacher to use question to guide learners to: - Explain the meaning of critical angle. - List examples of total internal reflection. (ii) Teacher to use questioning strategies (what, why and how questions) to guide learners to state the relationship between critical angle and refractive index.	• Protractor • Glass block • Ruler • Source of light • Pencil • Optical pins • Plane papers • Drawing board • Prisms	1. Is learner able to explain the meaning of critical angle? 2. Is learner able to state the refraction between critical angle and refractive index? 3. Is learner able to list examples of total internal reflection?

		(iii) Teacher to give feedback and use feedback to support learner to explain and state the relationship between critical angle and refractive index.		On completion of the topic, teacher should assess learners using written quiz on the following: - Definition of critical angle - Relationship between critical angle and refractive index
Magnification of Lenses	Learners will be able to: a) Define the term magnification. b) State the units of power of a lens. c) State the thin lens formula. d) Determine the magnification of a convex lens experimentally. e) Apply the thin lens formula in calculating the image distance, focal length, and power of lens and magnification, object distance. e) Describe the construction and mode of action of optical instruments. f) Calculate image distance, focal length and power of a lens, magnification and object distance.	(i) Teacher to use questions toguide learner to: - Define the term magnification. - State the units of power of a lens. - State the thin lens formula. (ii) Teacher to guide learner to describe the construction and mode of action of optical instruments. (iii) Teacher to create activities and guide learners in groups to: - Determine the magnification of a convex lens experimentally. - Apply the thin lens formula in calculating the image distance, focal length, and power of lens magnification, object distance. - Calculate image distance, focal length and power of a lens, magnification and object distance. (iv) Teacher should monitor and facilitate learners in performing the tasks given in part (iii). (v) Learners to present their responses for classdiscussion. (vi) Teacher should give feedback and		1. Is learner ableto define the term magnification? 2. Is learner able to state the units ofpower of a lens? 3. Is learner able to state the thin lensformula? 4. Is learner ableto determine the magnification of a convex lens experimentally? 5. Is learner ableto apply the thin lens formula in calculating the image distance, focal length and power of lens, magnification andobject distance? 6. Is learner able to describe the construction and the mode of action of optical instruments? 7. Is learner able to calculate image distance, focal length and power of a lens, magnificationand object

		use the feedbackto support learners to define and state formula of lenses magnification.		distance? On completion of the topic, teacher should assess learners using written quiz on the following: - Unit of power of lens - Thin lens formula - Features of lens magnification - Solve problems on lens parameters
Topic: Chemistry				
3.1 Electrolysis	Learners will be able to: a) Explain the term electrolysis. b) State Faraday'slaws of electrolysis. c) Define electro-chemical equivalent. d) Describe an experiment fordetermination of an electro- chemical equivalents. e) Identify the applications ofelectrolysis. f) Solve problemsinvolving electrolysis.	(i) Teacher to use questions toguide learner to: Explain the term electrolysis. - State Faraday's Law ofelectrolysis. - Define electro- chemical equivalent. (ii) Teacher guides learners to: - Describe an experiment for determination of an electro-chemical equivalent. - Identify the application of electrolysis. (iii) Teacher to create activitiesfor learner to solve problemsinvolving electrolysis. (iv) Teacher should monitor and facilitate learner in performingthe tasks given in part (iii). (v) Learners to present their responses for class discussion.	• Battery charger • Lead acid accumulator Copper Sulphate (CU SO_4) • Electrodes • Power supply • Ammeter •	1. Is learner ableto define the termelectrolysis? 2. Is learner able to state Faraday's laws of electrolysis? 3. Is learner ableto define the termelectro-chemical equivalent? 4. Is learner able to describe an experiment fordetermination of electro-chemical equivalent? 5. Is learnerable to solve problems involving electrolysis? 6. Is learner ableto identify the applications of electrolysis? On completion of the topic, teacher should assess

		(vi) Teacher should give learner feedback and use the feedback to support learners to explain electrolysis and solve problems. involving electrolysis.		learners using written quiz on the following: - Definition of Electrolysis - Electrolysis laws - Solve problems
Application of electrolysis	Learners will be able to: a) Explain the process of electroplating and give example. b) Explain the process of electrolytic refinery and give example.	(i) Teacher describes the process of electroplating. (ii) Teacher describes the process of electrolytic refinery. (iii) Teacher describes the process of electrometallurgy.		1. Is learnerable to explain the process of electroplating and give example? 2. Is learnerable to explain the process of electrolytic refinery and give example?
	c) Explain the process of electrometallurgy and give example.	(iv) Teacher guide learner to: - Give examples of electroplating. - Give examples of electrolytic refinery. - Give examples of electrometallurgy.		3. Is the learnerable to explain the process of electrometallurgy and give example? On completion of the topic, teacher should assess learners using written quiz on the following: - Electroplating - Electrolytic refinery - Electrometallurgy
Topic: Fuel and its parameters				
Fuel and types	Learners will be able to: a) Define the term fuel. b) State the types of fuels.	(i) Teacher guides learner to: - Explain the term fuel. - State the types of fuel.	• Fuel • Paper • Wood • Gas • Match sticks	1. Is learner able to define fuel? 2. Is learner able to state the types of fuel?
CalorificValues	Learners will be able to: a) Define the calorific value ofa fuel. b) State the SI unit ofcalorific	(i) Teacher guides learners to: - Explain the calorific valueof fuel. - State the SI unit of calorific value.	• Fuels • A chart with a list calorific values of fuels	1. Is learner able to define the calorific value of afuel? 2. Is learner able to state the SI unitsof calorific

	value.			value?
Octane number	Learners will be able to: a) Define the octane number of fuel. b) Define the octane rating of fuel. c) Define knocking of fuel. d) State the SI unit ofoctane number.	(i) Teacher guides learners to: - Explain the octane number fuel. - Explain the octane ratingof fuel. - Explain the knockingof fuel. - State the SI unit of octane number.	• Fuels • A chart with a list calorific values of fuels	1. Is learner able to define the octane number offuel? 2. Is learner able to define the octane rating offuel? 3. Is learner able to define knocking of fuel? 4. Is learner able to state the SI units of octane number?

Year 3/Term 2

Sub-topics	Specific Objectives	Teaching and Learning Strategies	Teaching and Learning Resources	Assessment
Topic: Alternating current (AC) Circuit				
AC circuit parameters	Learners will be able to: a) Identify an alternating circuit. b) Define the following terms: - Impedance - Phase - Phase angle - Waveform - Form factor - Admittance - Susceptance - Reactance - Resonance - Average voltage - Peak-to-Peak voltage - Peak voltage - Root mean square voltage - Power factor - Amplitude c) Identify the measurements of a sinusoidal waveform signal. d) Calculate the following parameters: - Impedance - Phase angle - Form factor	(i) Teacher guides learner to identify the symbolic difference between a direct current circuit and alternating current circuit. (ii) Teacher guide learners to explain following: - Impedance - Phase - Phase angle - Waveform - Form factor - Admittance - Susceptance - Reactance - Resonance - Average voltage - Peak-to-Peak voltage - Peak voltage - Root mean square voltage - Power factor - Amplitude (iii) Teacher to create activities that guide learners in obtaining measurement from a sinusoidal waveform signal. (iv) Teacher guide learners in deriving the formula for calculating the following: - Impedance - Phase angle - Form factor - Admittance - Susceptance	• Oscilloscope • Signal/function generator • Ammeter • Volt meter • RLC circuit • Protractor • Ruler • Graph sheet • Pencil • Engineering science textbook	1. Is learner able to alternating current circuit? 2. Is learner able to define the following terms? - Impedance - Phase - Waveform - Form factor - Admittance - Susceptance - Reactance - Resonance - Average voltage - Peak-to-Peak voltage - Peak voltage - Root mean square voltage - Power factor 3. Is learner able to identify the measurements of a sinusoidal waveform signal? 4. Is learner able to calculate the following parameters: - Impedance - Phase angle - Form factor

	- Admittance - Susceptance - Reactance - Resonance - Average voltage - Root mean square voltage - Power factor d) Draw the phasor diagram of a RLC circuit.	- Reactance - Resonance - Average voltage - Root mean square voltage - Power factor (v) Teacher to create activities that guide learners drawing a RLC phasor diagram.		- Admittance - Susceptance - Reactance - Resonance - Average voltage - Root mean square voltage - Power factor 3. Is learner able to Draw the phasor diagram of a RLC circuit On completion of the topic, teacher should assess learners using written quiz on the following: - Definition RLC parameters - Solve problems on RLC circuit - Draw phasor diagram
Resistivity	Learners will be able to: a) Explain the term resistivity. b) Describe the experiment which illustrates resistivity. c) Calculate the resistivity formula.	(i) Teacher to use questions toguide learner to: - Explain the meaning of resistivity. - Explain the meaning of thermal resistance. (ii) Teacher to guide learner in to - Describe an experimentwhich illustrates resistivity. (iii) Teacher to create activities for	• Cable • Metre rule • Micro gauge • Multi-meter	1. Is learner able to define the term resistivity? 2. Is learner able to describe an experiment which illustratesresistivity? 3. Is learner able to calculate resistivity? On completion of the topic, teacher should

		learner to test material resistivity. (iv) Teacher should monitor and facilitate learner in performing the tasks given in (iii). (v) Learner to present their responses for classdiscussion. (vi) Teacher to guide learner in deriving the formula for calculating resistivity. (vii) Teacher should give learners feedback and use the learners' responses as feedbackto support learners to test of resistivity.		assess learners using written quiz on the following: - Definition of resistivity - Solve problems
Topic: Heat				
Thermal conductivity/ resistance	Learners will be able to: a) Explain the term thermal conductivity. b) Describe the experiment which illustrates thermal conductivity. c) Calculate the thermal conductivity formula.	(i) Teacher to use questions toguide learners to: - Explain the meaning of thermal conductivity. - Explain the meaning of thermal resistance. (ii) Teacher guides learner in to - Describe an experimentwhich illustrates thermal conductivity. (iii) Teacher to create activities for learnersto test material thermal conductivity. (iv) Teacher should monitor and facilitate learner in performing the tasks given in (iii). (v) Learner to present their responses for classdiscussion. (vi) Teacher guide learner in deriving the formula for calculating thermal conductivity.		1. Is learner able to define the term thermal conductivity? 2. Is learner able to describe an experiment which illustrates thermal conductivity? 3. Is learner able to calculate thermal conductivity? On completion of the topic, teacher should assess learners using written quiz on the following: - Definition thermal conductivity - Solve problems

		(vii) Teacher should give learner feedback and use the learners' responses as feedbackto support learners to test of thermal conductivity.		
Topic: Engines				
Types of Engine	Learners will be able to: a) Define the term engine. b) Identify the two types of combustion engine. c) Give advantages and disadvantages types of combustion engine. d) Explain mode of action two types of engines. e) Give examples of the use of two types engines. f) State the difference in mode of operation between the two types of combustion engines.	(i) Teacher to use questions toguide learner to: - Give meaning to the term engine. - Identify the two types of combustion engine. - Give examples of the two types of combustion engines. - Give the advantages and disadvantages of the two types of combustion engine. (ii) Teacher guide learners on the mode of operation of spark ignition engine: - Two stroke - Four stroke (iii) Teacher guide learners on the mode of operation of Compression ignition engine (iv) Give example of the use of the two types of petrol engines. Teacher to create activities to guide learnerson the difference between the mode of operation between the two types of combustion engines.	• Spark ignition engine Compression ignition engine	1. Is learner able to define an engine? 2. Is learner able to identify the two types of combustion engine? 3. Is learner able to give advantages and disadvantages types of combustion engine? 4. Is learner able to explain the mode of operation of two types of combustion engine? 5. Is learner able to give examples of the use of two types engines 6. Is learner able to the difference in mode of operation between the two types of combustion engines On completion of the topic, teacher should assess learners using written quiz on the

				following: Description of types of engine; Mode of action of the two types of engine
Combustion	Learners will be able to: a) Define the term combustion. b) State the conditions necessary for combustion. c) State the types of combustion.	(i) Teacher guides learner to explain the term combustion. (ii) Teacher guides learner in to describe the conditions necessary for combustion. (iii) Teacher to use questions toguide learner to describe the types of combustion.	• Fuel • Paper • Wood • Match sticks	1. Is learner able to define combustion? 2. Is learner able to state the conditions necessary for combustion? 3. Is learner able to the types of combustions?