2023

SENIOR TWO

SCHEME OF WORK

S2 students will be doing a project in Physics during Term 2. Please indicate in this Scheme of Work which weeks this will take place.

Subject: Physics **Class:** S.2 **Term:** ONE **Teacher's Name:**
Time allocation: 3 single periods

When it comes to planning your lessons use the structure: starter, I do, we do, you do, plenary. The starter is a written task that reviews previous learning. Ensure your lessons provide regular and extended opportunities for independent practice.

YPR:
Y= yes, I taught the lesson
P= I partially taught it e.g. I didn't get through all the content.
R= I taught the lesson, but I think students would benefit from a review

WEEK/ SUB-TOPICS	**LEARNING OUTCOME**	**METHODOLOGY**	**TEACHING AND LEARNING RESOURCES**	**Y P R**
Theme: Mechanics and properties of matter **Topic:** Work, Energy and power **Competency:** Understand and use the relationship between energy, work done, force and power in the operation of simple machines.				
1.1 **Work**	Understand work and how to determine it.	• Teacher gives scenarios and illustrations related to the work. • In groups, the teacher guide learners on how to define work and determine wok done. • A teacher tasks a learner to relate force and distance to deduce the formula for work done. I.e. work done=force x distance moved in the direction of the force.	Daily life activities that explain work done e.g. pushing a loaded wheel barrow. Etc. Rectangle wooden block Spring balance to measure force of rectangular wooden block. Thread	

			Metre rule to measure distance moved by the wooden block. Longman secondary physics learners' book. Pg. 2 Teachers' guide. Pg. 2	
1.2 **Work**	Use the formula for work done to solve numerical problems involving work	• Teacher writes down the formula and the numerical problem and demonstrates the steps followed to solve. • The steps followed to solves different numerical problems under teacher's guidance. • Teacher gives a numerical problem and asks each learner to solve and present the findings.	Calculator Textbook with different numerical problems e.g. Longhorn Secondary Physical learners' book senior 2. Pg. 3-4.	
1.3 **Energy**	Know that the sun is our major source of energy and the different forms of energy.	• Teacher give real life situations, scenarios and illustrations related to energy. • In pairs/ groups, the teacher guide learners to discuss how the sun is the source of energy, and identify different forms of energy and make presentations. • Teacher tasks each learner to outline real life situations where different forms of energy are applied.	Real life situations that require using energy e.g. lifting jerry cans full of water, burning wood, domestic lighting systems etc. The sun Flame to provide heat energy. Electric power supply and bulb to provide light. Bell or drum to produce sound energy etc.	

2.1 **Source of energy and solar energy.**	Identifying sources of energy.	• Teacher mention different activities the use energy including those that require the use of machines. • In groups, learners discuss the sources of energy for various activities that naturally occur and activities done by different machines like, vehicles, windmills, dams etc. and identify common effects of solar energy under the guidance of the teacher. • Teacher task learners to categorise energy sources into renewable and non-renewable energy sources.	Access to dam, wind mill, biogas digester, vehicles etc. Video clips of dams, wind mills, biogas digesters, moving vehicles. Electric power supply's coal Charcoal for heat energy. Photos of dam biogas digester, windmills. Petrol (Fuel) Sun (solar) Solar panels (Domestic solar system) Longhorn secondary physics learners' book 2. Pg. 5-6.	
2. 2 **Potential and kinetic energy**	Understanding potential and kinetic energy, derive formulas for potential energy, and relate them to mechanical energy	• Teacher demonstrates how a body is in a state of possession of potential energy and kinetic energy. • In pairs/ groups, teacher guide learners in understanding potential and kinetic energy by setting various identical bodies into motion at different positions above the ground, discuss the formulas for potential energy, kinetic energy and make presentations.	Identical inflated balls to act as bodies. Flat horizontal surface. Bobs Metre rule Weighing scale etc.	

		• Teacher tasks each learner to derive the formula for the total energy (Mechanical energy)		
2.3 **Potential, kinetic and mechanical energy**	Use the formulae to solve numerical problems	• Teacher solves a numerical problem. • In groups, teacher guide learners and give more numerical problems to discuss and present their findings. • Teacher task each learner to attempt more numerical problems.	Calculator Text book with numerical problems. Longhorn secondary physical learners' book senior 2. Pg. 9.	
3. 1 **Energy transformations**	How to determine energy transformation	• Teacher narrates real life situations that involves transformation of energy. • In pairs or groups or individual learners set the pendulum bob to swing and discuss together with teacher the possible energy changes or transformations. • Learners are tasked to state the law of conservation of energy.	Natural occurrences that involve transformation of energy e.g. domestic electric systems, children playing on a swing etc. Retort stand Thread Pendulum bob	
3.2 **Power**	Deduce mathematical formula for power developed. Determine power developed mathematically	• Teacher mentions real life situations that involve doing work in reference to the time taken for that work to be done. • In groups or pairs, teacher guide learners to discuss the definition and mathematical expression for power. • Learners are tasked, to determine power developed by a person climbing upstairs and solve some numerical problems.	Daily life situations that involve developing power e.g. climbing upstairs, etc. Stop clock Buildings with stairs. Weighting scale Metre rules/ tape measure.	

			Calculators.	
3.3 **Simple machines**	Categorise simple machines, determine how they simplify work and the main principle behind them.	• Teacher displays various machines to the learners. • In groups/ pairs, learners are guided to categorise the simple machines provided into levers, screws, inclined planes, gears, pulleys or wedges and later on make presentations. • Learners are tasked to determine how some machines simplify work and the principle behind each machine.	Wheel barrow Chisel Axle Knife Sprockets Pulleys Pair of scissors Bottle opener Pair of tongs Pliers Claw hammer Wood Nails Screwdriver Spanners Nail cutters etc.	
4. 1 **Work input and work output of a machine.**	Determine work input and work output of a machine	• Illustrates using any of the machines the work that's put into the machine and its output. • In groups/ pairs, learners use different machines to simplify work under the necessary guidance and compare the work that's put into the machine that comes out, and make reports. • Tasked to determine work input and output, mathematically.	Wheelbarrow Claw hammer Nails Screwdriver Axle Knives Pair of scissors Spanners etc.	
4. 2 **Levers**	Demonstrate how levers simplify work and identify classes of levers	• Samples the levers showing their turning points and the positions of efforts and load.	Nail cutters, Pair of scissors Bottle opener, Claw hammer Nail, Wheel barrow Human arm	

		• In groups, discuss how each lever simplify work as guided by the teacher. • Individually, categorise the levers and classify according to classes.	Pair of togs Plier etc.	
4. 3 **Pulleys**	Find out how pulleys simplify work, identify the types of pulleys and determine efficiency of a pulley system.	• Shows all the types of pulley systems. • In groups/ pairs, learners use the pulleys to simplify work i.e. lifting various loads, identify the types as they are guided and make presentations. • Tasked to determine how efficient the pulley system is (efficiency of the pulley system and make reports.	Different pulley systems. Access to pulley at the construction sites or access to the video clip of working pulleys at the construction sites. Access to the pulley on the poles of flags. Retort stands. Clamps Spring balances Various loads Threads etc.	
5. 1 **Pulleys**	State the variation of mechanical advantage and efficiency with load.	• Explains concept of mechanical advantage and efficiency and how the two relate. • In groups, learners use the provided pulley systems and materials to illustrate the variation of M.A and efficiency with load as the procedures are clearly simplified for them. • Learners are tasked to record their finding in the table and draw graphs, and make conclusions.	Block and tackle pulley systems of identical velocity ratio. Retort stands. Load pans Slotted masses Strings Graps papers.	

5. 2 **Pulleys (Project)**	Make a pulley system using locally available materials	• Instructs learners about the project. • In groups/ pairs, learners do their projects as guided. • Learners present their project with reports.	Locally available materials e.g. banana stems, wood, claw hammer, nails, knives, pangas, strings etc.	
5. 3 **Inclined planes**	Demonstrate how inclined planes simplify work and solve about inclined planes.	• Makes a simple inclined plane and illustrates how it moves the load from low attitude to a higher attitude. • In groups, learners are guided to make their simple inclined planes and demonstrate how they simplify work and share their experience with others. • Learners are tasked to determine the velocity ratio of the incline plane and solve numerical problems.	Bricks Bag of sand/ soil Strong wooden planes to make an incline. Wheel barrow Desks or verandas to support the inclined plane. Metre rules/ tape measures. Strong strings, etc.	
6. 1 **Wedges and wheel and axle**	Demonstrate how wedges, wheel and axle simplify work.	• Teacher narrates real life situations that involve application of wedges and wheel and axles. • In groups, teacher guide learners as they discuss how wedge, wheel and axle machines simplify work basing on the experience they go through when using them in class and at home. • Learners are tasked to make a report about their findings basing on what they discuss.	Real life situations like splitting logs of wood, getting water from a deep depression, etc. Wooden wheel and axle Locally made Chisel Axe Knives Access to steering wheels.	
6. 2 **Wheel and axle machine**	Find the efficiency of a wheel and machine.	• Explains procedures for finding the efficiency of a pulley system. • In groups, learners follow the guidance given, to obtain V.R of a wheel and axle	Locally made wheel and axle machines. Calculators	

		of provided and share their results/ findings. • Learners are tasked to determine the efficiency of a wheel and axle in the numerical problem.	Text books with numerical problem or any other source. Longhorn secondary physics Learnings' book senior 2. Pg. 28-30.	
6. 3 **Gears**	Understand how gears simplify work and determine their velocity ratio	• Illustrates how gears engage each other using sprockets of different diameter or any other toothed wheels. • Inn groups/pairs, teacher guide learners as they use toothed wheels to engage and how the motion of the other affect the other to simplify work. i.e. lifting the load or affecting motion for the case of bicycles, motorcycles etc. • Learners are tasked to find out how the velocity ratio of a gear system is determined.	Locally made gear systems e.g. plastic toother wheels. Sprockets of different diameters. Mountains climbing bikes to show how gears engage. Gears on axles etc.	
7. 1 **Screws**	Know daily applications of screws and how to get their velocity ratio	• Teacher demonstrate how screws simplify work using some available screws. • In groups, learners discuss various applications of screws in our daily life and present their findings. • Learners are tasked to find out how the velocity ratio of screws is obtained.	Wood screws G-clamp Screw jack from garages. Brace used by carpenters to bore woods. Access to video clip of how a brace bores if can't be accessed etc.	
7. 2 **Activity of integration**	Use of knowledge of energy, work, force, power in operation of machines to solves real life situations.	• Teacher guides • Learner (s) present the findings.		

Theme: Mechanics and properties of matter **Topic:** Topics effect of forces, centre of gravity and stability **Competency:** The learner should be able to investigate the relation between turning effect of forces and stability of bodies.				
7. 3 **Turning effect of a force**	Understand the turning effect of force, moment of force and determine the moment of force.	• Introduces the topic by demonstrating the turning effects by giving the classroom door shutter or window a slight push to either close or open it. • In groups, learners are instructed to apply force on the windows or door shutters at different positions i.e. at the edge, in the middle and near the hinges, to either open or close, discuss the moment of force and how to determine it. • A learner is tasked to state the possible factors that affect the turning effect of force.	Door shutters Windows Metre rules Knife rules Stand and slotted masses Knitting thread Access to the tap knob Access to the steering wheels Spanners to unturn and turn and turn the bolts.	
8. 1 **Principles of moments**	Verify the principle of moments	• Narrates daily life situations that require application of the principle of moments. • In groups. Learners discuss the principle of moments and guided to verify it and present their finding. • A teacher is tasked to identify more real life situations that require application of the principle.	Some of real life situations like children playing on a see saw and balances off etc. Metre rules Knife edges Slotted masses Access to a see saw Triple beam balance etc.	
8. 2 **Application of principle of**	Determine mass of a body using the principle of moments and	• Explains and illustrates how mass is obtained from the principle of moments. • In group/ pairs, learners are guided how to get the mass of an object (e.g. stone)	Uniform metre rule. Stone to act as an object. Threads Slotted masses	

moments and turning effects of forces/	identify application of turning effect of forces.	using the principle of moments and present the results. • Individually, a learner is tasked to identify applications of turning effects of forces.	Knife edges.	
8. 3 **Numerical application of principle of moments**	Use the concept of the principle of moments to solve numerical problems.	• Illustrates the numerical problem. • In groups/ pairs, teacher guides learners to attempt more numerical problems and share the findings and later on deduce their findings. • Individually, learners are tasked to attempt numerical problems.	Textbooks or any other sources with various numerical problems concerning application of the principle of moments. Calculators. Etc	
9.1 **Centre of gravity**	Understand the centre of gravity of a body and locate the centre of gravity of regularly shaped bodies	• Mentions scenarios of bodies or objects that do not balance at other points but only balances at a single point. • In groups/ pairs, learners are guided to locate the centre of gravity of different regularly shaped solids or objects • Individually, learners are tasked to give the definitions of centre of gravity.	Uniform metre rule Knife edge Rectangular sheet of card boards. Squared sheet of cardboard. Circular cardboard.	
9. 2 **Centre of gravity**	Locate the centre of gravity of irregularly shaped solids	• Illustrates and demonstrates how the centre of gravity of irregular objects are located. • In pairs, learners are guided as they locate the centre of gravity of irregular objects like irregular card boards, box papers, etc. • Learners are tasked to make their irregular objects from cardboards and box papers and locate their v=centres of gravity.	Retort stands Clamps Pendulum bobs Threads Optical pins/ nails. Marker pens etc.	

9. 3 **Determination of the mass and weight.**	Determine the mass and weight of a meter rule.	• Illustrate and demonstrates obtaining the mass and weight of a meter rule. • In groups, learners are instructed to determining mass and weight of various metre rules and present their results. • Learners are tasked to numerically calculate the mass and weight of the metre rules and other beams.	Metre rule Slotted masses Knife edge Uniform and non-uniform beams Threads.	
10.1 **Equilibrium**	Identify conditions necessary for a body to be in equilibrium and investigate the states of equilibrium.	• Narrates scenarios in everyday life where equilibrium is observed. • In groups/ pairs, learners are guided to identify the conditions for a body to be in equilibrium and write reports basing on the practical experience. • Learners are tasked to write about the states of equilibrium investigated.	Metre rule Slotted masses Filter funnel (plastic) Flat/ horizontal surface Inflated ball Spherical ball/ marble Concave like bowl pan	
10.2 **Numerical problems involving two different supports on a loaded beam**	Solve numerical problem of a loaded beam supported by two different supports (i.e. knife edge and a string)	• Illustrates working out numerical problem. • In groups/ pairs, learners are guided to solve more numerical problems and share the work with the whole class. • Individually, learners are tasked to solve numerical problems.	Textbook or other sources with numerical tasks e.g. longhorn secondary physics learners' book. Pg. 49 Calculator	
10. 3 **Numerical problems involving two different**	Solve numerical problem of a loaded beam supported by two different supports (i.e. knife edge and a string)	• Illustrate how to work out numerical problem. • In groups/ pairs, learners are guided to solve numerical problems of different supports and share their results with the whole class.	Textbook or other sources with numerical tasks e.g. longhorn secondary physics learners' book. Pg. 49	

supports on a loaded beam		• Individually, learners are tasked to solve numerical problems.		
11.1 **Stability**	Explore stability of different bodies.	• Narrates real life situations that involve stability like location of the boots (cabins) of buses, wider base of racing cars etc. • In groups/ pairs, learners are guided on checking stability of some bodies and share their experience with the whole class. • Teacher task learners, to deduce possible factors that affect stability of bodies	Mineral water bottles Plastic filter funnels Triangular knife edges Bunsen burners Water etc.	
11.2 **Stability (Application of stability)**	Identity everyday life examples where stability is applied	• Teachers samples and explains some applications in our daily life. • In pairs, learners are instructed to discuss scenarios that need application of stability and make reports. • Learners are tasked to explain what aid the stability of the applications stated.	Access to racing cars of video clips of racing cars in motion. Access to tall buildings or picture. Access to a mask or picture. Traffic cone etc.	
11. 3 **Activity of integration**	To relate turning of forces and stability of bodies.	• Instructs learners • Learners present their findings.		
12	Week 12 should be used for reviewing, preparing, and/or marking exams.			

SCHEME OF WORK

Subject: Physics **Class:** S.1 **Term:** TWO **Teacher's Name:**
Time allocation: 3 periods a week

When it comes to planning your lessons use the structure: starter, I do, we do, you do, plenary. The starter is a written task that reviews previous learning. Ensure your lessons provide regular and extended opportunities for independent practice.

YPR:
Y= yes, I taught the lesson
P= I partially taught it e.g. I didn't get through all the content.
R= I taught the lesson, but I think students would benefit from a review

WEEK SUBTOPIC	**LEARNING OUTCOMES (By the end of the lesson a learner should be able to;**	**METHODOLOGY**	**TEACHING /LEARNING RESOURCES**	**Y P R**
Theme: Mechanics and properties of matter **Topic:** Pressure in solids and fluids. **Competency:** The learner should be able to explain pressure in solids and fluids and identify their applications in everyday life.				
1.1 **Pressure in solids**	Understand that pressure is the result of force applied over an area Determine pressure in solids practically.	• A teacher explains the daily life situation that involves in pressure. • In pairs learners use blocks of different surface area and plasticine to investigate the relationship of force and surface area. • A learner compares the results and account for them.	Laboratory apparatus I.e. brick, rectangular block of wood, metre rule, weighing scale. Longhorn secondary physics learners' book 2. Pg. 57	
1.2 **Pressure in solids**	Investigate minimum and maximum pressure exerted by solids.	• A teacher uses the available resources to demonstrate to learners on how minimum and maximum pressure is investigated.	Locally available materials like: wooden block or brick, sponge. Working table metre rule	

	Know applications of minimum and maximum pressure exerted by different bodies.	• Through discussions in groups learners carry out experiment to investigate minimum and maximum pressure is investigated. • Through discussion in groups learners carry out experiment to investigate minimum and maximum pressure. • A learner is tasked to present the findings after investigation	Longhorn physics teachers' guide and learners' book 2. Pg. 73 – 58 respectively.	
1. 3 **Pressure in solids.**	Solve numerical problems involving the use of formula for pressure in solids; Pressure = $\frac{Force}{Areas}$	• A teacher derive the formula and write the questions and explain how the formula i.e. applied. • In groups learners follow teacher's steps to find pressure in solids using the formula. • A learner is given an exercise and asked to present the work for checking.	The use of calculator big/ small digits/ values. Text books like Longhorn secondary Physics book 2. Teachers' guide and learner's book pg. 75 and 59 respectively.	
2. 1 **Pressure in fluids**	Understand the effect of depth and density on the pressure in a fluid and its application.	• A teacher demonstrates the steps taken to discover factors which affect pressure in fluids. • Learners follow teacher's steps and discovers factors which affect pressure in fluids. • A learner is asked to share the work with the class.	Locally available materials like; 2 tins or water bottles, water, plasticine, hammer, nail, oil and a ruler. Textbooks like, Longhorn secondary physics book 2, teachers' guide page 76. Learners' guide page 61.	
2.2 **Pressure in fluids**	Describe the formula Pressure = h$\int$g where h – depth $\int$ - density	• A teacher demonstrates the steps taken to derive the formula.	Use of elaborators Guiding textbooks i.e. Longhorn secondary physics book 2.	

	g – acc due to Gravity and apply it to solve numerical problems.	• In pairs learners follow the steps to derive the formula and use it to solve numerical problems. • A learner is given a task to use the formula and find pressure in fluids and given a report.	Teachers' guide. Pg. 78 Learners' guide. Pg. 63	
2. 3 **Transmission of pressure in liquids.**	Illustrate transmission of pressure in liquids. Understand Pascal's principle and its application	• A teacher illustrates transmission of pressure in water. • In groups, learners follow the teacher's illustration to investigate transmission of pressure in water. • A learner is tasked to give daily application of Pascal's principle.	Locally available materials like; Water, balloon or transparent polythene bag and a pin. Textbooks Longhorn secondary Physics book 2. Teachers' learners' guide page 65 and 80 respectively.	
3.1 **Pascal' principle**	Make a project of constructing a simple hydraulic press.	• A teacher tells learners to get the resources to use. • In the groups, learners use the available materials and construct a hydraulic pressure under teacher's guidance. • A learner gives report of the project findings.	Locally available laboratory materials like; 2 retort stands, glue, water, beaker, stone (small size), card boards, dye or ink, syringes (12 ml of 25ml) rubber tube (80cm long)	
3. 2 **Pascal's principle**	Solve numerical problems using Pascal's principle	• A teacher demonstrates how to use Pascal's principle and solve problems using a formula • Learners through teacher's demonstration follow the steps and solve a problems given to them.	Calculators Textbook to act as sources of numerical problem.	

		• A teacher tasks a learner to solve a numerical problem and submit the findings.		
3. 3 **Atmospheric pressure**	Understand the nature of the atmosphere and investigate the existence of atmospheric pressure	• A teacher explains the nature of the atmosphere • In pairs, learners carry out experiment to investigate the existence of atmospheric pressure. • A learner is tasked to state and explain his / her observation.	Locally available materials that demonstrate the crushing can. Textbooks as sources of information like Longhorn secondary Physics book 2. Learners' guide. Pg. 70	
4. 1 **Atmospheric pressure**	Measure atmospheric pressure. Understand how to construct a liquid in glass barometer Explore the application of atmospheric pressure.	• A teacher explains the ways how atmospheric pressure is measured. • A teacher guided learners to construct a liquid in glass barometer. • A learner is asked to give the application of atmospheric pressure.	Laboratory materials used while constructing a barometer like metre rule, beaker, mercury. Nose mask, a dry thick-walled glass tube (100cm) gloves.	
4. 2 **Bernoulli's effect.**	Demonstrate Bernoulli's effect	• A teacher demonstrates the steps on how Bernoulli's effect can be investigated. • In groups, learners use teacher's guidance and demonstrate Bernoulli's effect. • A learner is asked to state his observation through presentation.	Locally available materials like; Duplicating paper size A4, mouth, ruler, ink or dye and a beaker Textbooks showing the steps taken while demonstrating like Longhorn Secondary physics book 2. Learners' guide. Pg. 74.	

4. 3 **Bernoulli's principle**	Demonstrate Bernoulli's effect in aerofoils.	• A teacher explain the daily life activities that apply Bernoulli's principle. • In pairs, learners demonstrate Bernoulli's effect in aerofoils with guidance from teacher and give reports about their findings. • A learner applies the knowledge of Bernoulli's principle to explain why some objects have similar shapes.	Longhorn secondary Physics book 2. Learners' guide. Pg. 76	
5. 1 **Sinking and floatation (Up throat)**	Understand the concept of sinking and floatation in terms of forces acting on a body submerged in a fluid. Measure up thrust on an object.	• A teacher explain the concept of sinking and floatation in terms of up thrust force. • In groups, learners determine up thrust force of an object experiment tally and discuss the findings with other groups. • A teacher tasks learner to measure up thrust mathematically using the formula.	Laboratory apparatus like; Spring balance Displacement can 2 beakers of 500ml each Thread and a top pan balance Textbooks that give the steps to follow; longhorn see physics book 2. Learnings' guide. Pg. 78.	
5. 2 **Floatation**	Determine the weight of a fluid displaced by a floating body. Understand the application of Archimedes principle.	• A teacher demonstrates the steps followed to determine the weight of a fluid displaced. • Teacher guides learners to follow the same steps to determine the weight of a fluid displaced and give their findings. • A learners is tasked to relate the floatation knowledge acquired to give applications of Archimedes principle.	Daily life objects like; Ship Hydrometer Hot air balloon Use of internet Text books	

			Charts.	
5. 3 **Archimedes principle**	Solve numerical problems applying the knowledge of floatation and Archimedes' principle.	• A teacher explains the steps followed while solving a numerical problems. • A teacher works with learners and solve a numerical problem using the steps given to them. • A learner is given a question and asked to solve it and hand in the results for marking/ checking.	Calculators (Scientific) Textbooks that provide a wide range of numerical problems like; Longhorn secondary physics book 2. Learnings' guide. Pg. 80	
6. 1 **Activity of integration.**	Explain the effect of depth on pressure in fluids.	• Teacher guides learners on how to do the activity. • Learners do the work (Activity individually) and submit their work for marking.	Any material used in marking the activity of integration be effectively done.	
Theme: Mechanics and properties of matter **Topic:** Mechanical properties of materials; Hooke's law **Competency:** The learner should investigate and understand how the mechanical properties of different materials are related to their applications.				
6. 2 **Materials**	Understand how the mechanical properties of common materials can be utilised in Physical structures. Demonstrate stiffness in materials.	• A teacher explains to learners the nature of common materials and how they can be utilised in physical structures. • In pairs, learners observe different materials given to them and give their exploration. • A learner is tasked to give other local materials according to their stiffness.	Available materials like, Wooden rod, steel bar, of the same size.	
6. 3 **Ductility and brittleness**	Examine ductility and brittleness in different materials.	• A teacher gives materials to learners and ask them to touch and tell if they are familiar with them.	Bicycle spoke, charcoal core stone, nail (6 inches) copper wire and a claw hammer.	

		• Learners in their discussions examine the brittleness and ductility by following the teacher's explanation. • A learner is tasked to separate brittle materials from ductile materials.	A chart displaying the steps a learner should undergo to realise brittle/ ductile materials.	
7. 1 **Elasticity**	Understand elasticity in materials	• A teacher explains how elastic materials behave. • Through discussion learners go through by the steps as instructed by the teacher to examine the behaviour of elastic materials and present their findings. • A learner is tasked to give more materials under elasticity.	Piece of rubber band Helical spring Metre rule, five 100g slotted masses on a mass hanger. Charts displaying the steps to go through in understanding elastic materials.	
7. 2 **Plasticity**	Understand plasticity in materials.	• A teacher explains how plastic materials behave. • In pairs, learners discuss the steps and go through them to examine the behaviour of plastic materials and present their findings. • A learner is asked to give other materials that belong to plasticity.	Wooden pieces. Helical spring, retort stand, fifteen 100g slotted masses with hangers and a half metre rule. Charts displaying the steps to be taken.	
7. 3 **Relationship between force and extension of a body.**	Investigate the relationship between force applied on a body and extension.	• A teacher explains the meaning of the terms force and extension. • Through groups, learners perform the experiment to investigate the relationship between force applied on a body and extension and present their findings to the class members.	Helical spring (Nuffield type), optical pin, one half metre rule, one 100g mass hanger, three 100g slotted masses. One 50g mass, stand with two clamps, graph paper for scale drawing, 2 pieces of wood.	

		• A learner is asked to draw a graph and explain the nature of it.	Charts showing the steps to be followed.	
8.1 **Hooke's law**	State Hooke's law. Derive the formula using Hooke's law and use it to solve numerical problems.	• A teacher explains how Hooke's law is stated and steps taken to derive the mathematical formula. • In pairs, learners follow teacher's steps and derive the formula and use it to solve numerical problems hence present their results. • A learner is tasked to attempt a question given to him/ her and present the results.	Calculators Charts displaying numerical problems. Textbooks as source of numerical. Problems like Longhorn secondary Physics Learnings' book 2. Pg. 93	
8.2 **Behaviour of ductile materials when subjected to loads.**	Explore the behaviour of a copper wire when stretched with an increasing force.	• A teacher demonstrates the steps followed to explore the behaviour. • In groups, learners follow teacher's guidelines and do the experiment exposing the behaviour of a copper wire when stretched with an increasing force. • A learner plots the graph and explain its nature.	Two small pieces of wood, copper wire, retort stand, metre rule, a 100g mass hanger and five 100g slotted masses. Text book showing the steps to be taken (Longhorn secondary Physics learners' book 2. Pg. 92)	
8. 3 **Strength of materials**	Compare the strength of different materials. Understand stress and strain.	• A teacher uses two different materials and compare their strength practically. • Through observation learners tell the difference between the materials being stretched. • A learner is tasked to apply the knowledge acquired to explain stress and strain of materials.	Sewing thread of copper wire or any other available thread like materials. 2 retort stands Table Two 50g slotted masses.	

			Charts displaying the diagrams how the apparatus are arranged.	
9.1 **Building materials**	Understand how to make concrete and how it can be reinforced.	• A teacher explains about the materials used in building. • In pairs, a teacher guides learners on how to make concrete and what is added to it to become reinforced. • A learner is tasked to give other materials used in building.	Locally available materials used to make a concrete like, sand, water, trowel, weighing scale. Text books used to give steps on how to make concrete (Longhorn book 2 Learnings' guide. Pg. 98)	
9.2 **Structures and beams.**	Determine a stronger structural shape. Find out the behaviour of beams under loading.	• A teacher explains the shapes stronger structures should be put, and explains how the behaviour of beams under loading is found out. • In pairs, learners discuss about shapes that give stronger structures and behaviour of beams under loading. • A learner is tasked to make a research and give a report on different materials behaviours.	Small straight sticks (30cm long) Threads, books, rubber bands and a weighing scale. Longhorn secondary Physics. Learnings' book 2 Page 100 or other text book with relevant information.	
9.3 **Girders**	Identify struts and ties.	• A teacher explains about ties and struts. (their meanings) • In groups, learners a simple structure and identify ties and struts. • A learner is asked to give more material girders under tensional and compressional forces	6 thumbs pins, 7 drinking straws, 1 piece of knitting thread (12.0cm long), a 40g mass on a mass hanger, A wooden block (10.00cm by 10.00cm by 20.00cm), 6 pieces of masking tapes and a pair of scissors.	
10. 1	Understand that the tensile strength of the	• A teacher guides learners on how to do the activity.	Necessary materials used to do the activity.	

Activity of integration	materials is determined by the properties of substances they are composed of.	• Each learner does the activity and hands in for marking.		
Theme: Light **Topic:** Reflection of light by curved surfaces. **Competency:** The learner should understand how concave and convex mirrors form images, and also be able to describe the uses of these mirrors in everyday life.				
10.2 **Curved mirrors**	Identify the types of curved mirrors. Understand the terms applied curved mirrors.	• A teacher introduces the chapter by displaying curved mirrors and explain their categories • Learners observe the curved mirrors and tell their types using teacher's explanation. • A learner is tasked to define the term used in curved mirrors.	Plane mirror (5.0cm by 12.0cm) Convex mirror Concave mirror White screen Table Mirror holder	
10.3 **Spherical mirrors.**	Identify, real and virtual images. Using ray diagrams	• A teacher demonstrates the steps taken to locate images practically. • In groups, learners use curves mirrors to locate images and account for the difference in the nature of images. • A learner is tasked to tell virtual and real images basing on differences above.	Plane mirror (5.0cm by 12.0cm) Convex mirror Concave mirror White screen Table Mirror holder	

SCHEME OF WORK

11.1 **Formation of images by scale drawing.**	Locate images formed by curved mirrors by scale drawing.	• Demonstrates the steps followed to locate the image on a square board. • In pairs, learners follow teacher's explanation and locate image on a graph paper. • A learner gives the nature of the image formed.	Square board	
11.2 **Application of curved mirrors**	Identify application of curved mirrors	• A teacher explains some of the areas where the curved mirrors are used/ applied. • Learners in groups are given some/ different curved mirrors and asked to categorise them into concave and convex mirrors. • A learner is asked to give more daily places where curved mirrors are applied.	Real life examples of the objects or places where curved mirrors are applied like; Car head lamps Side mirror Satellite dish Torches Rear mirrors Microscope	
11.3 **Activity of integration**	Understand reflection of light and the formation of images by curved mirrors.	• A teacher gives guidelines on how to do the activity. • Learners follow the guidelines and do activity individually.	Necessary resources that can make the activity be done successfully.	
12	Week 12 should be used for reviewing, preparing, and/or marking exams.			

SCHEME OF WORK

Subject: Physics **Class:** S.1 **Term:** THREE **Teacher's Name:**

Time allocation: 3 periods a week

When it comes to planning your lessons use the structure: starter, I do, we do, you do, plenary. The starter is a written task that reviews previous learning. Ensure your lessons provide regular and extended opportunities for independent practice.

YPR:
Y= yes, I taught the lesson
P= I partially taught it e.g. I didn't get through all the content.
R= I taught the lesson, but I think students would benefit from a review

WEEK SUBTOPICS	LEARNING OUTCOME	METHODOLOGY	TEACHING/LEARNING RESOURCES	Y P R
Theme: Magnetism **Topic:** Magnets and magnetic field **Competency:** The learner should be able to investigate and understand the properties of magnets and explain how the earth behaves as a magnet.				
1.1 **Magnets and properties of magnets**	Identify magnetic and non-magnetic materials, and explore the properties of magnets.	• Teacher narrates scenarios where magnets are extensively used. • In groups/ pairs, learners are guided and instructed through the discussion of magnetic and non-magnetic material, and the properties of magnets as they make presentations. • Learners are tasked to state the law of magnetism.	Bar magnet u-shaped magnet Ring magnet House shoe magnet Nails rubber Plastic pen Wood, pin razor blade, coin Aluminium foil Iron fillings Retort stand Cotton thread, etc.	

1.2 **Testing polarity of magnets**	Determine polarity of a magnet	• Illustrates and demonstrates polarity of magnets • In groups/ pairs, teacher guide learners through discussion of determining polarity of magnets. • Learners are tasked the poles and mark them.	Bar magnet of known polarity. Bar magnet of unknown polarity. Nail, Cotton thread Retort stand Wooden rod, etc.	
1. 3 **Magnetisation**	Magnetism an iron nail using different methods.	• A teacher explains magnetisation and he gives illustrations. • In groups/ pairs, learners are guided to magnetise an iron nail using electrical method, induction method and stroking method, and later on make presentations. • Learners are tasked to examine the magnetic properties of the magnetised nail (magnet)	Iron fillings Sandpaper (Sail type 120) Connecting wires. Bar magnets Campus needle.	
2.1 **Demagnetisation**	Understand how a magnet can lose its magnetism	• Teacher explains scenarios where magnets have lost their magnetic properties. • In groups/ pairs, learners are instructed and guided through the discussion and demonstration of how magnets lose their magnetic properties and write reports about their findings. • Learners are tasked to identify ways of preventing magnets from losing their magnetic properties.	Alternating current source Iron keepers Hard surface Hammer Source of heat etc.	
2. 2 **Magnetic fields**	Draw magnetic field line and around magnets	• Teacher illustrates the magnetic field lines around a magnet.	Iron fillings Cardboard paper Bar magnet Ring magnet	

		• In groups/ pairs, learners are guided to draw magnetic field lines of various magnets as instructed and display them on charts. • Learners are tasked to locate the neutral point.	Horseshoe magnet Plotting compass Pencil/ pen etc.	
2. 3 **Earth as a magnet**	Understand the earth's magnetic field.	• Explains why earth is referred to as a magnet. • In groups/ pairs, learners are guided to search on internet about earth's magnetic field or using textbooks and make reports. • Learners are tasked to explain the terms involved e.g. geographical meridian etc.	Internet Computer Projector Text books or any other source with information about the earth as a magnet e.g. Longhorn secondary physics learners' book senior 2. Pg. 131-132.	

3.1 **Magnetic compass and finding direction using magnetic compass**	Construct a magnetic compass and find directions using a magnetic compass	• Teacher explains the theory of magnetic compass. • In groups/ pairs, teacher guide learners on how to construct locally and later on find how it can show directions, and make presentations. • Learners are tasked to explain the possible ways where a magnetic compass can be inaccurate.	Optical pin Water Styrofoam Cutter Bar magnet Beaker Magnetic compass etc.	
3. 2 **Activity of integration**	Understand the properties of magnets and explain how the earth behaves as a magnet.	• Teacher give instructions • Learners present the findings.		
Theme: Electricity				

Topic: electrostatics **Competency:** The learner should understand electrostatics and use it to explain lighting and other phenomena.				
3. 3 **Concept of electrostatics**	Explore existence of electrostatics and identify conductors and insulators.	• Teachers narrates real life situations that involves knowledge of electrostatics. • In groups/ pairs, teacher guide and instruct learners through existence of electrostatics, conductors and insulators, and make presentations. • Learners are tasked to explain or describe the nature of atoms in conductors and insulators.	Paper, plastic ruler, balloons PVC pipe, cotton threads, Hair, dry woollen cloth, Metallic can Graphic (Pencil lid) Plastic pen, dry cells, bulb Copper wire, iron nail, sticks cell holder, connecting wires.	
4. 1 **Charging materials in electrostatics**	Charge a materials by friction and induction.	• Illustrates charging by friction and induction. • In groups/ pairs, teacher guide learners as the use • the given material to charge by friction, induction and share the findings with others. • Learners are tasked the possible precautions during charging basing on the experience gone through.	Plastic pen, transparent ruler, Small pieces of paper, hair or fur or wool, can , balloon Piece of wood, wooden supports Retort stand, thread etc.	
4. 2 **The gold leaf electroscope (GLE)**	Make a simple gold leaf electroscope	• Teacher narrates the origin of a gold leaf electroscope and displays it. • In groups/ pairs, teacher guide learners as they make a simple gold leaf electroscope and present it to the whole class. • Learners are tasked to test their locally made electroscopes and suggest the names of some parts.	Plastic bottle, aluminium foul straw. Iron nail (at least 4 inch) Pair of scissors, copper wire of 1m long) Plastic pen, transparent ruler	
4. 3	Charge the GLE positively and negatively by induction.	• Teacher demonstrates how charging by induction is done. • In groups, teacher guide learners to charge the GLE positively and share their experience with others.	Gold leaf electroscope on an insulating stand. Plastic ruler Woollen cloth, wooden table	

Charging a gold leaf electroscope		• Learners are tasked to charge the gold leaf electroscope negatively.	Glass rod etc.	
5. 1 **Uses of gold leaf electroscope.**	Understand the uses of GLE i.e. i) Test presence of charge on a body. ii) Test sign of charge on a body.	• Demonstrates how the GLE test presence of charge and sign of charge on a body. • In groups, teacher guide learners as they test different bodies and make reports. • Learners are tasked to test more bodies individually.	GLE, dry hair or woollen cloth or plastic ruler Glass rod, plastic ruler Balloon, wooden stick Wooden table etc.	
5. 2 **Uses of gold leaf electroscope.**	iii) Classify conductor and insulators iv) Test magnitude of charger on a body.	• Demonstrates how GLE can be used to classify conductors and insulators and test magnitude of charge. • In groups, teacher guide learners as they use the magnitude of charge on bodies. • Learners are tasked to classify and test more bodies.	GLE, glass rod, plastic ruler or balloon Wooden stick, Iron nail Copper wire, Aluminium foil Wooden table etc.	
5. 3 **Lightning**	Understand how lightning occurs	• Teachers tells a story related to a lightning and thunder storm that might have occurred. • In groups/ pairs, teacher guide learners as they search about the origin of lightning and make presentations. • Learners are tasked to suggest the possible precautions during thunder storms.	Internet Text books e.g. Longhorn secondary physics Learnings' book senior 2. Pg. 149-150. Video clips of a thunderstorm.	
6. 1 **Activity of integration**	Understand everyday effects of static electricity.	• Teacher give instructions • Learners present their findings.		
Theme: Earth and Space **Topic:** The solar system				

Competency: The learner should understand the relative movement of the earth and moon in relation to the sun and explain the consequences for the earth.				
6. 2 **Components of the solar system**	Identify the components of solar system.	• A teacher introduces the topic by explaining about solar system and what it consists of. • In pairs, learners identify the components of solar system through guided discussions. • A learner is tasked to write a report on what has been discussed and present it for checking.	Library resources (Text books) Notebooks Internet Video clips etc.	
6. 3 **Planets**	Identify planets in the solar system.	• A teacher explains the meaning of a planet and identify planets. • In pairs, learners research about the names of the identified planets and arrange them in order. • A learner is asked to share his or her findings with the class.	Text books e.g. Longhorn secondary Physics teachers' guide book 2. Pg. 199. Internet	
7. 1 **Sun**	Know the main inner and outer characteristics of planet Venus, mercury, earth and Neptune	• A teacher takes learners outside the class and ask them to observe carefully the sun. • Learners in their ways and discuss the nature of the sun. • A learner is tasked to share the findings with the class.	Textbooks like; Longhorn Secondary Physics book 2. Teacher's guide. Pg. 200 Internet Notebooks.	
7. 2 **Planets**	Know the main inner and outer characteristics of planet Venus, Mercury, earth and Neptune.	• A teacher begins by demonstrating about the nature of planets. • In pairs, learners discuss and research more characteristics of the planet Venus, mercury, earth and Neptune. • A learner is asked to prepare a report and share the findings with the class.	Textbooks like; Longhorn Secondary Physics book 2. Teacher's guide. Pg. 201 Internet Notebooks.	
7. 3 **Planets**	Know the main inner and outer characteristics of	• A teacher explains the nature of the planets Jupiter, Saturn, Uranus and Neptune.	Text books like; Longhorn Secondary Physics book 2. Teacher's guide. Pg. 201	

	planet Jupiter, Saturn, Uranus and Neptune.	• In groups, learners discuss and research for more characteristics of the planets Jupiter, Saturn, Uranus and Neptune. • A teacher tasks a learner to share the findings with the class.	Internet Video clips.	
8. 1 **Size of the moon, earth and sun**	Compare the size of the moon earth and sun.	• A teacher begins by explaining to learners how the size of each is calculated and telling them the radius of each. • In pairs, learners use the radius and the formula for volume of spheres to find the volume of each of the sun, moon and earth. • A learner is tasked to find the volume of each of the three and give the sizes of them respectively.	Text books like; senior 2 Learnings' book, sphere supplies Ltd. Pg. 106 Calculators Notebooks.	
8. 2 **Distances between the moon, earth and the sun**	Investigate the relative distance between the moon, earth and the sun	• A teacher explain to learners on the practical, steps that shall/ can be taken to get relative distance between the moon, earth and the sun. • In groups, learners use the locally available materials and trace the distances using the scale as instructed by the teacher. • A learner is tasked to present the findings with the class.	Textbooks like Senior 2 learners' book, sphere supplies Ltd. Pg. 108. Calculators.	
8. 3 **Bright planets in the sky**	Explore the bright planets	• A teacher begins by explaining to learners that planets that can easily be seen by naked eyes are bright planets. • In groups discussions, learners research about bright planets in the sky using time frame and location. • A learner is tasked to share the findings with the entire class.	Library Internet	

9.1 **Motion of planets around the sun**	Understand the orbital motion of planets	• A teacher demonstrates using the locally available material to show how the planets rotate around the sun. • In pairs, learners follow teacher's guidelines and make objects rotate from the centre of rotation. • A teacher tasks learner to compare the motion of the object with the motion of the planets around the sun.	String used to suspend the object that acts as a planet. Spherical object to act as the planet.	
9.2 **Days and nights**	Demonstrate the formation of days and nights.	• A teacher begins by using a geographical globe and explain the occurrence of day and night. • In pairs, learners use the geographical globe and tell the difference between a day and night. • A learner is tasked to give reason why days and nights do not occur at the same time.	Geographical globe (to represent earth) Torch to represent the sun. Table Text book to guide a teacher and learner Longhorn Secondary physics. Book 2. Teacher/ learners guide. Page 206 and 157.	
9. 3 **Seasons on earth**	Identify the cause of seasons on earth.	• A teacher explains the seasons our country Uganda experience and seasons experienced by other countries. • In pairs, learners use the geographical globe and other given objects to identify the cause of seasons on earth. • A learner is tasked to share the finding with the class.	Geographical globe (to represent earth) White ball (football, volley ball or any other), marker, torch (to represent the sun)	

10. 1 **The moon**	Understand the motion of the moon about the earth.	• A teacher explains the motion of the moon about the earth using the motion of planets about the sun. • Learners discuss by comparing the motion of the moon about the sun. • A teacher tasks learner to prepare a report and share the findings with the class.	Internet Journals Textbooks like Longhorn Secondary Physics book 2. Learnings' guide. Pg. 161.	
10. 2 **Eclipse**	Understand hoe eclipse occur.	• A teacher demonstrates how eclipses occur. • In groups, learners experimentally demonstrate the occurrence of the eclipse by using the locally available objects act as sun, moon and earth placed in a straight line. • A learner is asked to state clearly his or her observation.	Two balls whose diameters are 4 and 1cm respectively and a source of light (flash light or a projector)	
10. 3 **Ocean tides**	Explore the cause of tides	• A teacher explains the meaning of ocean tides and places that experience a daily rise and fall of ocean waters along the shores. • In pairs, learners research and make notes about the causes, types of tides and number of times tides occur in a month. • A learner is asked to share his or her findings with the class.	Library, internet and a notebook. Text books like; Longhorn Secondary Physics book 2. Teacher's guide and learners' guide pages 164 and 212. Video clips.	
11. 1	Activity of integration and assessment			
12	Week 12 should be reserved for end of year assessment and marking			