SCHEME OF WORK 2022/2023 : PHYSICS FOR SENIOR TWO

District: GASABO Academic year: 2022/2023

School: ……………………………..…………………………………………………

Teacher’s names: …………………………………………………………………….

FIRST TERM, 2022/2023

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| **WEEKS**  **& DATES** | **UNIT TITLE** | **LESSON TITLE**  **+EVALUATION** | **LEARNING OBJECTIVES + KEY UNIT COMPETENCE** | **TEACHING METHODS & TECHNIQUES**  **+EVALUATION PROCEDURES** | **RESOURC ES&REFE RENCES** | **OBSERV ATIONS** |
| ***WEEK 1***  29-30/09/2022 | **Unit 1**: Sources of errors in measureme nt of physical quantities | **Lesson title**  **1**.Types of errors (random and systematic); estimating the uncertainty range (from first principle and from repeated  measurements). | **Knowledge and understanding:**  − State and explain types of errors in measurements.  − Distinguish between precision and accuracy.  − Explain the concept of significant figures.  − Explain the error propagation in derived physical quantities.  − Explain rounding off numbers.  − Explain fundamental quantities and their dimensions.  − State the fundamental and the derivate quantities and determine their dimensions. **Skills:**  − Distinguish random and systematic errors.  − Choose appropriate measuring instruments.  − Report measured physical quantities accurately.  − Reduce random and systematic errors while | − Group discussion on types of errors in experiment data.  − Presentation of types of errors.  Learners work in groups to determine compound errors in single measured physical quantities such as surface area, volume, force etc.  − Discuss in groups and report systematic errors found in measuring instruments.  − Demonstrate and experiment determination of | Abott, A. (1989).  Ordinary Level Physics. Chicago: Heinman Educational Publisher.  -NCDC, R.  (2006).  Ordinary Level Science Curriculum. Kigali: NCDC. |  |
| ***WEEK 2***  ***3-7/10/2022*** | **Lesson titles**   1. Significant figures. 2. Comparing uncertainty in measurements. |  |
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| ***WEEK 3***  10-14/10/2022 | **Lesson titles**   1. Percentage errors. 2. Compound errors in simple equations. |

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|  |  | **6**. Rounding off of numbers. | performing experiments.  − State correct significant figures of given measurements considering precision required.  − Estimate errors on derived physical quantities.  − Use dimension analysis to verify equations in physics.  **Attitudes and values:**  − Appreciate accurate measurements in data reporting.  − Develop analytical skills for manipulating measurement to minimize errors.  − Be aware of uncertainties when using instruments to get data.  − Suggest ways to reduce random errors and  minimize systematic errors. | coefficient of friction force (static and dynamic)  − Learner to work in pairs to solve problems related to friction force. |  |  |
| ***WEEK 4***  ***17-21/10/2022*** |  | **Lesson titles**   1. Fundamental quantities and their dimensions 2. Dimension analysis for given simple equations. |  |
| **Summative Evaluation I** | **KEY UNIT COMPETENCE:** By the end of this unit, learners should be able to explain the importance of physics, measure physical quantities and express findings in appropriate  units. | **Written Test** |  |
| ***WEEK 5***  24-28/10/2022 | **Unit 2:** Quantitativ e analysis of linear motion | **Lesson Titles**   1. Definition of linear motion. 2. Types of linear motion. 3. Kinematic equations of linear motion | **Knowledge and understanding:**  − Define linear motion.  − State examples of linear motions.  − Explain the difference between instantaneous and average values of speed, velocity and acceleration.  − Derive equations of linear motion.  − Describe the acceleration of a free falling body near the earth’s surface.  − Recall the kinematic equations of rectilinear motions.  − Explain effects of air resistance on moving objects.  **Skills:**  − Derive equations of linear motion.  − State conditions applicable to equations of | − Observe and discuss linear motion and report.  − Discuss linear motion in groups, share ideas and make presentations.  − Work in groups interprets and equations of free fall.  − Carry out experiment to determine acceleration due to gravity”.  − Solve problems related to linear motion.  − Search Internet for | -Abott, A.  (1989).  Ordinary Level Physics. Chicago: Heinman Educational Publisher.  -NCDC, R.  (2006).  Ordinary Level Science Curriculum.  Kigali: |  |
| ***WEEK 6***  ***31/10-4/11/2022*** | **Lesson Titles**   1. Acceleration due to free fall. 2. Simple pendulum experiment to determine “g” for a particular location. |  |

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|  |  |  | uniformly accelerated motion.  − Distinguish linear motion from other motions.  − Describe t the motion of free falling body.  − Solve problems related to linear motion.  **Attitudes and values:**  − Appreciate the scientific techniques applied for bodies to move against gravitational acceleration (in sports, airplanes).  − Appreciate the importance of acceleration due to gravity.  − Appreciate cooperative skills in solving linear motion problems.  − Appreciate sketching of graphs for bodies in  motion | simulations on linear motion.  − Demonstrate and experiment determination of coefficient of friction force (static and dynamic)  − Learner to work in pairs to solve problems related to friction force. | NCDC.  -Abott, A.  (1989).  Ordinary Level Physics. Chicago: Heinman Educational Publisher. |  |
|  | **Summative Evaluation II** | **KEY UNIT COMPETENCE:** By the end of the unit the learner should be able to analyze and solve problems related to linear motion. | **Written Test** |  |
| ***WEEK 7***  7-11/11/2022 | **Unit 3: Friction Force** | **Lesson Titles**   1. Review genera**l** forces between contact surfaces. 2. Effects of forces between surfaces enable walking, lighting of match box etc. 3. Friction force: change of position (change of position and friction, Coefficient of friction force. 4. Factors affecting friction force (adhesion, smoothness and roughness). 5. Types of friction force (static and kinetic/dynamic friction). | **Knowledge and understanding:**  − State and explain nature of friction force.  − Describe types of friction forces.  − Explain effects of friction force.  − Discuss advantages and disadvantages of friction forces.  − Determine coefficient of friction.  − Describe technological applications of friction force.  **Skills:**  − Convey the nature of friction force.  − Measure static and dynamic friction.  − Identify factors affecting friction force.  − Methods of reducing friction force.  − Solve problems on friction force. | − Perform group experiments to illustrate types of friction forces.  − Discuss in groups factors affecting it and report to class | -NCDC, R.  (2006).  Ordinary Level Science Curriculum. Kigali: NCDC.  -Peter Hughes, N.J. Mason, (2001): -  Richard, O. (2009). |  |

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| ***WEEK 8***  14-18/11/2022 |  | **Lesson Titles**   1. Effects of friction force. 2. Advantages and disadvantages of friction force). 3. Change position or shape of body. 4. Other resistance forces 5. Experiment to determine coefficient of friction (μd and μs) | **Attitudes and values:**  − Appreciate benefits of friction force and its inconveniencies.  − Develop scientific attitudes as regards the effects of friction force.  − Recognize the importance of friction force on the motion of body.  − Be aware of the importance of ones and others safety while walking on frictionless force surfaces.  - Importance of ones and others safety while walking on frictionless force surfaces. |  | -Abott, A.  (1989).  Ordinary Level Physics. Chicago: Heinman Educational Publisher. Physics for Rwanda Secondary School.  Kigali, Rwanda. |  |
| **Summative Evaluation III** | **KEY UNIT COMPETENCE:** By the end of this unit the learner should be able to explain the effects of a force and its  importance in life. | **Written Test** |  |
| ***WEEK 9***  21-25/11/2022 | **UNIT 4**:  Density and Pressure in Solids and Fluids | **Lesson Titles**   1. Force acting on a surface 2. Definition of pressure and its   S.I. units   1. Pressure in solid = (force acting normally or perpendicular to surface) 2. Pressure in fluids liquids and gases (density) | **Knowledge and understanding:**  − Outline common observations of pressure (ducks web legs, camel’s/elephant’s wide pads, heavy lorries have many tyres).  − Define and explain the pressure as a relationship of force acting on a surface area.  − Identify force and area as factors affecting pressure in solids.  − Give the relationship between force, pressure and area.  − Explain how pressure varies with force and area of contact  − Describe liquid (mercury) in glass barometer.  − Explain floating and sinking phenomena using density.  **Skills:**  − Describe the pressure in terms of force and area, and do calculations using the equation  − Pressure = force/area and P = ρgh  − Solve problems using P = ρgh. | * Carry out experiments in   groups to determine the pressure exerted on surface area and report.   * A can/ plastic bottle crushing experiment (deformation) experiment.   -Calculate relative density of different bodies  − Perform in experiment in groups to demonstrate that pressure in fluid depends on the height/ column not on the shape of the vessels.  − Make group demonstration of the | -Abott, A.  (1989).  Ordinary Level Physics. Chicago: Heinman Educational Publisher.  -NCDC, R.  (2006).  Ordinary Level Science Curriculum. Kigali: NCDC.  -Peter |  |
| ***WEEK 10***  28/11- 2/12/2022 | **Lesson Titles**   1. Relative density, and relationship between density and pressure, Hydrostatic pressure p = ρgh. 2. Archimedes principles, sinking and floating. 3. Atmospheric pressure and height/altitude above sea level. |  |

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|  |  |  | − Explain change in pressure by reducing or increasing area of contact and vice versa.  − Measure pressure air using simple manometer.  − Measure atmospheric pressure using barometer.  **Attitudes and values:**  − Appreciate achieving desired pressure by varying parameters of area and force.  − Recognize variation atmospheric pressure with altitude.  − Appreciate that a big force applied a small area of contact produces higher pressure. | existence of atmospheric pressure. | Hughes, N.J. Mason, (2001):  -NCDC, R.  (2006).  Ordinary Level Science Curriculum. Kigali: NCDC. |  |
| **Summative Evaluation IV** | **KEY UNIT COMPETENCE:** By the end of this unit the learner should be able to define pressure and explain factors affecting it | **Written Test** |  |
| ***WEEK 11***  ***5-9/12/2022*** |  | Revision period | | |  |  |
| ***WEEK 12***  12-16/12/2022 |  | Summative evaluation (Exams) | | |  |  |
| ***WEEK 13***  19-23/12/2022 |  | Writing school reports & proclamation | | |  |  |

SECOND TERM, 2022-2023

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| **WEEKS**  **& DATES** | **UNIT TITLE** | **LESSON TITLE**  **+EVALUATION** | **LEARNING OBJECTIVES + KEY UNIT COMPETENCE** | **TEACHING METHODS &**  **TECHNIQUES +EVALUATION PROCEDURES** | **RESOURC**  **ES&REFE RENCES** | **OBSERV ATIONS** |
| ***WEEK 1***  9-13/01/2023 | **Unit 5:** Measuring liquid Pressure with Manometer | **Lesson Titles**   1. Definition of hydrostatic Pressure. 2. Description of equilibrium of a liquid at rest in container. 3. Description of equilibrium of a liquid in communicating   container. irregular). | **Knowledge and understanding:**  − Describe a manometer.  − Explain the principle of a manometer.  − Explain hydrostatic pressure and atmospheric. pressure and their measurement.  − Explain equilibrium of a liquid at rest in a vessel and communicating container.  **Skills:**  − Explain why a liquid surface is an isobar and state its application.  − Analyze the equilibrium of non- miscible liquids in a container and in communicating container.  − Solving problems on a manometer.  **Attitudes and values:**  − Appreciate the benefits of pressure measurement.  − Recognize the application of same level of liquid in communicating vessels.  − Appreciate the results of measurement of liquid pressure using a manometer.  − Realize the use of pressure in everyday activities (aviation, automobile, sports). | * Perform in experiment in groups to demonstrate that pressure in fluid depends on the height/ column not on the shape of the vessels. * Make group demonstration of the existence of pressure in a fluid at rest in a container. * Working in small groups and do an experiment to determine pressure using a manometer. | -Abott, A.  (1989).  Ordinary Level Physics. Chicago: Heinman Educational Publisher.  -NCDC, R.  (2006).  Ordinary Level Science Curriculum. Kigali: NCDC.  -Peter Hughes, N.J. Mason, (2001): |  |
| ***WEEK 2***  16-20/01/2023 | **Lesson Titles**   1. Hydrostatic paradox in communicating vessels. 2. Equilibrium of non- miscible liquids in a container and in communicating vessels. 3. Hare`s apparatus. 4. Measuring pressure using a Manometer. 5. Problem solving on a manometer. |  |
|  | **Summative Evaluation I** | **KEY UNIT COMPETENCE:** By the end of this unit the learner should be able to explain the working principle of manometer use to measure the pressure in fluids. | **Written test** |  |
| ***WEEK 3***  23-27/01/2023 | **Unit 6:** Pascal’s Principle and its Application s | **Lesson Titles**   1. Static pressure in fluids at rest 2. Transmission of pressure in fluids. (Pascal’s principle) reaction). 3. Applications: hydraulic press, hydraulic brakes, hydraulic lift pump, Water | **Knowledge and understanding:**  − Explain static pressure of fluids at rest.  - Describe transmission of pressure in static fluids.  − Explain Pascal’s principle.  − State applications of Pascal’s principle. (Hydraulic press, Hydraulic brake, Water Towers, Hydraulic jack.)  **Skills:** | − Discus how pressure is transmitted in fluids.  − Demonstrate Pascal’s principle using enclosed fluid.  − Devise experiment to illustrate the functioning of hydraulic brakes.  − Discuss in groups the functioning of hydraulic car jack. | -Abott, A.  (1989).  Ordinary Level Physics. Chicago: Heinman |  |

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|  |  | Towers, hydraulic jack. | − Illustrate Pascal’s principle.  − Explain transmission of pressure in fluid at rest.  − Explain Pascal’s principle.  − Explain the functioning of hydraulic jack. Lift and dump it truck and car brakes.  **Attitudes and values:**  − Appreciate pressure exerted on an enclosed fluid is equally transmitted in all directions.  − Appreciate that pressure transmitted in a fluid produces a large force when a small force is  applied to it. |  | Educational Publisher.  -NCDC, R.  (2006).  Ordinary Level Science Curriculum. Kigali: |  |
| **Summative Evaluation II** | **KEY UNIT COMPETENCE:** By the end of the unit the learner should be able to explain transmission of pressure in fluids at rest and describe its applications. | **Written test** |  |
| ***WEEK 4***  30/01/- 3/02/2023 | **Unit 7**: Archimede s principle and atmospheri c pressure | **Lesson Titles**   1. Existence of atmospheric pressure 2. S.I. units of atmospheric pressure. 3. Instruments for measuring atmospheric pressure. 4. Applications of atmospheric pressure. 5. Archimedes principle in fluids: up thrust, factors affecting up thrust,   state principle and formula. | **Knowledge and Understanding:**  − Explain atmospheric pressure and state its units.  − Explain applications of atmospheric pressure.  − Illustrate Archimedes principle in air.  − Explain buoyant/up thrust force and Archimedes principle in liquid.  − Realize the applications of Archimedes principle in air.  − Appreciate applications of atmospheric pressure.  − Develop positive attitude of curiosity and respect for evidence atmospheric pressure.  − Appreciate that fluids can support bodies  **Skills:**  − Existence of atmospheric pressure  − S.I. units of atmospheric pressure.  − Instruments for measuring atmospheric pressure.  − Applications of Atmospheric pressure.  − Archimedes principle in fluids: up thrust, factors affecting up thrust, state principle and formula.  − Application of Archimedes principle: floating and sinking.  − Archimedes principle in air  − Applications of Archimedes principle in air. (Aerostat, Baroscope)  − Solve problems on Archimedes’ principle.  **Attitudes and Values:** | Investigate operation of Barometer and use it to measure atmospheric pressure.  Make group discussion and presentation on Torricelli’s experiment on a barometer.  In groups discuss why sink object or float in fluids.  Carry out an experiment to verify Archimedes principle and write a report. | -Abott, A.  (1989).  Ordinary Level Physics. Chicago: Heinman Educational Publisher.  -NCDC, R.  (2006).  Ordinary Level Science Curriculum. Kigali: NCDC.  -Peter Hughes, N.J. Mason, (2001):  Introduction |  |
| ***WEEK 5***  6-10/02/2023 | **Lesson Titles**   1. Application of Archimedes principle:   floating and sinking.   1. Archimedes principle in air 2. Applications of Archimedes principle in air. (Aerostat, Baroscope) 3. Solve problems on Archimedes’ principle |  |

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|  |  |  | − Equations relating work and power.  − Work: Definition, formula and its SI units. W= F.d  − Power: Definition, formula and its SI units.  − Energy: Definition, formula and its SI units. Ep= mgh;  − Relationship between work and power.  − Relationship between power and energy.  − Relationship between work and energy.  − Measurement of personal power. |  | to Environmen tal Physics: Planet Earth, Life and Climate.  Physics for Rwanda secondary learners’ book 2 |  |
| **Summative Evaluation III** | **KEY UNIT COMPETENCE:** By the end of the unit the learner should be able to be able to determine atmospheric pressure using barometer | **Written test** |  |
| ***WEEK 6***  13-17/02/2023 | **Unit 8:** Work, Power and Energy. (II) | **Lesson titles:**   1. Equations relating work and power. 2. Work: Definition, formula and its SI units. W= F.d 3. Power: Definition, formula and its SI units. 4. Energy: Definition, formula and its SI units. Ep= mgh; 5. Relationship between work and power. 6. Relationship between power and energy. 7. Relationship between work and energy. 8. Measurement of personal power. | **Knowledge and understanding:**  − Recall the knowledge on energy, work and power.  − Explain the terms work, power and energy.  − Describe notations/symbols used in relating work, power and energy.  − Explain the relationship between work, power and energy.  **Skills:**  − Derive the equations relating work and power.  − Analyze relationship between work and power.  − Relate power and energy.  **Attitudes and values:**  − Appreciate the importance of energy and power for efficiency working of machines.  − Show concern of work as a product of distance and energy.  − Be aware of the social, economic, environmental and technological implications of studying work  energy and power. | − Discuss in groups and make presentation on the relation between work, power, and energy.  − Solve in groups problems on work, power and energy.  − Search Internet for simulations on machines performing work.  − In groups estimate personal power, discuss and present results. | -Abott, A.  (1989).  Ordinary Level Physics. Chicago: Heinman Educational Publisher.  -NCDC, R.  (2006).  Ordinary Level Science Curriculum. Kigali: NCDC. |  |
| **Summative Evaluation IV** | **KEY UNIT COMPETENCE:** By the end of unit the learner should to be able to relate work, power  and energy. | **Written test** |  |

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| ***WEEK 7***  20-24/02/2023 | **Unit 9:** Conservati on of mechanical energy in isolated systems. | **Lesson Titles**   1. Isolated and open systems. 2. Kinetic and potential energy of a system. 3. Types of potential energy. 4. Convert potential energy into kinetic energy and vice versa | **Knowledge and understanding:**  − Define terms associated with isolated system and open system.  − Describe an isolated and open system.  − State different forms of mechanical energy.  − Differentiate kinetic and potential energy.  − Explain conversion of kinetic energy into potential energy and vice versa.  − State principle of conservation of energy.  **Skills:**  − Identify different forms of mechanical energy  − Apply the principle of conservation of mechanical energy in solving problems.  − Discuss applications of principle of conservation of mechanical energy to isolated system.  **Attitudes and values:**  − Appreciate the application of the principle of conservation of mechanical energy.  − Realize that kinetic energy can be converted into potential energy and vice versa.  − Predict consequences of law of conservation of mechanical energy on an isolated system. | − Working in groups carry out experiments demonstrate to conservation of mechanical energy and report.  − Discuss in groups energy conservation and make presentations.  − Perform experiments on energy | -Abott, A.  (1989).  Ordinary Level Physics. Chicago: Heinman Educational Publisher.  -NCDC, R.  (2006).  Ordinary Level Science Curriculum. Kigali: NCDC. |  |
| ***WEEK 8***  27/02/-03/03/2023 | **Lesson Titles**   1. Conservation of mechanical energy law. 2. Applications of law of conservation of mechanical energy. |  |
| **Summative Evaluation V** | **KEY UNIT COMPETENCE:** By the end of this unit the learner should be able to apply the  principle of conservation of mechanical energy for isolated system. | **Written Test** |  |
|  | **Unit 10:** Gas laws’ experiment s | **Lesson Titles**   1. Gas laws (pressure, volume and temperature). 2. Boyle’s law (Compressibility of gas) 3. Charles’ s law and Pressure law. 4. Ideal gas /Perfect gas equation. | **Knowledge and understanding:**  − State and explain the behavior and properties of an ideal gas.  − Discuss equation of perfect gas. (Ideal gas).  − Define Boyle’s law, Charles`s law, pressure law, and Dalton`s law.  − Recall the gas law equations.  **Skills:**  − Design experiment to verify Boyle’s law, Charles’s law and pressure law.  − Explain equations of perfect gas. (Ideal gas)  − Discuss the gas laws.  − Interpret experiments for gas laws.  − Evaluate experiment to verify Dalton’s law of partial pressure. | − Perform experiments to verify Boyle’s law, Charles’s law and Pressure law and report results.  − Perform experiment to verify Dalton’s law of partial pressure and report.  − Solve problems on gas laws.  − Search internet for simulations on gas laws. | -Abott, A.  (1989).  Ordinary Level Physics. Chicago: Heinman Educational Publisher.  -NCDC, R.  (2006).  Ordinary Level |  |
| ***WEEK 9***  6-10/03/2023 | **Lesson Titles**   1. Dalton’s law of partial pressure. 2. Density of gases. 3. Boyle`s law |  |

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|  |  | P v = Constant | − Solve and interpret problems using gas law equations.  **Attitudes and values:**  − Appreciate applications of gas laws.  − Appreciate; think logically and systematically when relating gas laws.  − Adapt scientific method apply in solving gas problems  − Adapt scientific methods in analyzing, modeling and establishing the dimensions of gas laws. |  | Science Curriculum. Kigali: NCDC.  -Peter Hughes, N.J. Mason, (2001): |  |
| **Summative Evaluation VI** | **KEY UNIT COMPETENCE:** By the end of the unit the learner should be able to describe and analyze gas laws experiments. | **Written test** |  |
| ***WEEK10***  13-17/03/2023 |  | Revision period | | |  |  |
| ***WEEK 11***  20-24/03/2023 |  | Summative evaluation (Exams) | | |  |  |
| ***WEEK 12***  27-31/03/2023 |  | Writing school reports & proclamation | | |  |  |

THIRD TERM, 2022-2023

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| **WEEKS**  **& DATES** | **UNIT TITLE** | **LESSON TITLE +EVALUATION** | **LEARNING OBJECTIVES + KEY UNIT COMPETENCE** | **TEACHING METHODS &**  **TECHNIQUES +EVALUATION PROCEDURES** | **RESOURC**  **ES&REFE RENCES** | **OBSERV ATIONS** |
| ***WEEK 1***  17-21/04/2023 | **Unit 11:** Magnetizat ion and Demagneti zation | **Lesson Titles**   1. Structure of an atom. 2. Magnetic domains. 3. Methods of magnetization (stroking, electrical and earth’s magnetic field) and demagnetization (Heating, hammering, AC current). 4. Methods of demagnetization. 5. Magnetic Keepers. 6. Magnetic shielding. | **Knowledge and understanding:**  − Review previous knowledge of magnets.  − Describe the magnetic properties of iron and steel.  − Describe the methods of magnetizing and demagnetizing of materials.  − Explain use of keepers in storing magnets.  − Explain magnetic shielding.  **Skills:**  − Explain magnetization using the domain theory.  − Create a temporary and permanent magnet.  − Describe methods demagnetizing magnets.  − Explain demagnetization using the domain theory.  − Discuss methods of storing magnets.  **Attitudes and values:**  − Appreciate the applications of magnets.  − Be aware of the social, economic, and technological implications of using magnets.  − Recognize the role of electromagnets in making electrical devices. | − Discuss in groups magnetization of ferromagnetic materials and report.  − Group discussion and presentations on demagnetization.  − Create sculpture from magnets and suggest how other materials that can be used.  − Search Internet for additional information on magnetization and demagnetization of magnets. |  |  |
| **Summative Evaluation I** | **KEY UNIT COMPETENCE:**  By the end of this unit the learner should be able to describe methods of magnetization and demagnetization. | **Written Test** |  |

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| ***WEEK 2***  24-28/04/2023 | **Unit 12:** Application s of Electrostati c | **Lesson Titles**   1. Electric field patterns. 2. Electric Potential, 3. Charge distribution (spherical, pear, cylindrical, and sharp pointed). | **Knowledge and understanding:**  − Explain and describe distribution electric charges metallic conductors.  − Explain electric force, electric field and electric potentials.  − Discuss applications of electrostatic.  **Skills:**  − Define electric field strength.  − Relate electric field patterns and charge distribution on conductors of different shapes.  − Evaluate applications of electrostatics in other fields (agriculture, environment, industry).  **Attitudes and values:**  − Appreciate the applications of electrostatics.  − Appreciate the need to find other applications of electrostatic.  − Realize possible hazards. | − Work in groups and make presentations on experiments illustrating electric force, electric field and electric potential.  − Discuss in groups ways of separating a mixture by applying an electric field.  − Discuss in pairs | -Abott, A.  (1989).  Ordinary Level Physics. Chicago: Heinman Educational Publisher.  -NCDC, R.  (2006).  Ordinary Level Science Curriculum. Kigali: NCDC. |  |
| ***WEEK 3***  1-5/05/2023 | **Lesson Titles**   1. Applications of electrostatics: point discharge (lightning). 2. Lightning Arrestors 3. Paint spraying, Photocopy Machines/Xerography and Laser Printers. 4. Van de Graff Generator, Electrostatic, Precipitator, (dust particle collection and separation). |  |
| **Summative Evaluation II** | **KEY UNIT COMPETENCE:** By the  end of the unit the learner should be able to explain charging of materials and  distribution of electric charges on conductors. | **Written Test** |  |
| ***WEEK 4***  8-12/05/2023 | **Unit 13:** Arrangeme nt of resistors in electric circuit. | **Lesson Titles**   1. Arrangement of resistors in simple electric circuit. 2. Electric potential and electric potential difference 3. Ohm’s law. | **Knowledge and understanding:**  − Arrange resistors in simple electric circuit.  − Explain the magnetic effect of electric current.  − Explain how grounding, fuses, and circuit breakers protect people against electrical shocks and short circuits.  − State and explain the effect of electric current.  **Skills:**  − Analyse arrangement of resistors in simple electric circuit.  − Construct simple electric circuit with resistors in series and parallel, ammeter and voltmeter. | − Construct simple electric circuit with resistors in series and parallel, ammeter and voltmeter.  − Discuss in groups the characteristics of a magnetic field produced by a current and make presentation.  − Perform experiment to investigate the heating and magnetic effect of an electric current and report.  − Carryout an investigation on chemical effect of current(Electrolysis). | -Abott, A.  (1989).  Ordinary Level Physics. Chicago: Heinman Educational Publisher.  -NCDC, R.  (2006).  Ordinary |  |
| ***WEEK 5***  15-19/05/2023 | **Lesson Titles**   1. Electrical energy and power. 2. Effects of electric current: Magnetic effects. 3. Heat Effects and Chemical effect of electricity 4. Electric bell, electromagnet |  |

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|  |  |  | − Illustrate the effect of electric current.  − Apply knowledge of safety to prevent circuits from overheating devices (fuses and circuit breakers).  − Predict what would happen in a house without a fuse or circuit breakers with overloaded electric circuit.  − Measure electric current and potential difference using ammeter and voltammeter.  **Attitudes and values:**  − Appreciate the importance of effects of electric current in our daily life.  − Recognize and avoid risks involved with the electrical circuit.  − Acquire ability to think  logically and systematically pursue a line of thoughts.  − Adapt scientific method of thinking.  − Acquire knowledge in analyzing and modeling physical processes. |  | Level Science Curriculum. Kigali: NCDC.  -Peter Hughes, N.J. Mason, (2001):  Introduction to Environmen tal Physics: Planet Earth, Life and Climate. |  |
| **Summative Evaluation III** | **KEY UNIT COMPETENCE:** By the  end of this unit the learner should be able to describe arrangement of resistors in a simple electric circuit | **Written Test** |  |
| ***WEEK 6***  22-26/05/2023 | **Unit 14:** Reflection of light in curved mirrors | **Lesson Titles**   1. Reflection of light at plane and curved reflecting surfaces. 2. Laws of reflection. 3. Terms used in curved mirrors (principal axis, principal focus, centre of curvature and other related terms). 4. Spherical mirrors (concave and convex). | **Knowledge and understanding:**  − Recall reflection of light in plane mirrors.  − Recall laws of reflection of light in plane mirrors.  − Discuss terms used in curved mirrors.  − Describe the formation of images by spherical mirrors.  − Give the applications of spherical mirrors.  **Skills:**  − Evaluate images formed by curved mirrors.  − Locate by construction images formed in curved mirrors and state their | − Perform an experiment to verify laws of reflection for plane mirrors  − Perform an experiment to determine the focal length of spherical mirrors.  − Discuss images formed by curved/spherical  mirrors.  − Work in groups make presentations on applications of curved mirrors.  − Design a project that investigates on the applications of reflection of light in | -Abott, A.  (1989).  Ordinary Level Physics. Chicago: Heinman Educational Publisher.  -NCDC, R.  (2006).  Ordinary Level Science |  |
| ***WEEK 7***  29/05- 02/06/2023 | **Lesson Titles**   1. Images in spherical mirrors 2. Applications of spherical/curved mirrors. 3. Locate images formed by curved mirrors by construction of ray diagrams |  |

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|  |  |  | characteristics.  − Perform an experiment to determine the focal length of spherical mirrors.  − Evaluate images formed by curved mirrors.  − Discuss applications of curved mirrors.  − Solve problem related to curved mirrors.  **Attitudes and values:**  − Appreciate the applications of reflection of light in curved mirrors.  − Adapt scientific and critical thinking in performing experiments of curved mirrors.  − Recognize the applications of plane- curved mirrors. | curved mirrors.  − Use internet and computer simulations illustrate reflection at plane and curved surfaces.  − Solve problems requiring mirror | Curriculum. Kigali: NCDC.  -Peter Hughes, N.J. Mason, (2001):  Introduction to Environmen tal Physics: Planet Earth, Life and Climate. |  |
| **Summative Evaluation IV** | **KEY UNIT COMPETENCE:** By the  end this unit the learner should be able to analyze applications of reflected light. | **Written Test** |  |
| ***WEEK 8***  5-9/06/2023  ***WEEK 9***  12-16/06/2023 | **Unit 13:** Basic electronic component s | **Lesson Titles**   1. Definition of electronics. 2. Illustration of Standard symbols of some electronic components. 3. Electronic components on a Motherboard (Inductors, Resistors, Capacitors, Ordinary Diodes, Zener diode, Transistors). 4. Electronic components: Ordinary Diodes (definition, forwarding and reverse biasing, rectification), Zener diode (voltage regulator), Transistors (amplification of current). | **Knowledge and understanding:**  − Define an electronic device.  − Name symbols of electronic components.  − Identify different electronic component.  − Outline the working principle of basic electronic devices.  **Skills:**  − Identify electronic components on an electronic motherboard.  − Describe electronic component of a motherboard.  − Suggest possible importance of electronic devices in everyday life. **Attitudes and values:**  − Appreciate important role of electronic devices in life.  − Show the concern of electronics in | − Observe different electronic components on an electronic motherboard.  − Use computer simulations to demonstrate the operational principles of electronic devices.  − Discuss in groups about importance of electronic devices in everyday life.  − Suggest some electronic devices with different electronic components.  − Use Internet to search to on working principle of basic electronic devices. | -Abott, A.  (1989).  Ordinary Level Physics. Chicago: Heinman Educational Publisher.  -NCDC, R.  (2006).  Ordinary Level Science Curriculum. Kigali: NCDC. |  |
| ***WEEK 10***  19-23/06/2023 | **Lesson Titles**   1. Constituent of a motherboard of electronic devices. 2. Example of electronic devices (mobile phone, computers, watches). 3. Working principle of basic |  |

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|  |  | electronic devices. | various technological systems.  − Appreciate the need to use semiconductor devices in electronics devices.  − Acquire knowledge in analyzing and modeling physical processes. |  | -Richard, O. (2009).  Physics for Rwanda Secondary School.  Kigali: Fountain |  |
| **Summative Evaluation V** | **KEY UNIT COMPETENCE:** By the  end of this unit the learner should be able to explain the working principle of basic electronic devices. | **Written test** |  |
| ***WEEK 11***  26-30/06/2023 |  | Revision period | | |  |  |
| ***WEEK 12***  3-7/07/2023 |  | Summative evaluation (Exams) | | |  |  |
| ***WEEK 13***  10-14/07/2023 |  | Writing school reports & proclamation | | |  |  |