

INTRODUCTION

The Physics syllabus has been designed to provide learners with a sound knowledge of the fundamental concepts in Physics. It assumes a conceptual approach that focuses on enabling learners to acquire an understanding of scientific phenomena, facts, concepts, theories, laws and principles. Ample scope for laboratory and practical work which is essential for learners to develop the critical scientific skills needed in the successful study and application of Physics.

The General objectives for Grades 10 – 12 Physics:

1. Demonstrate comprehension of the basic principles and applications of Physics.
2. Exhibit scientific skills, competencies and attitudes which are necessary for the advancement of Physics.
3. Recognize the usefulness as well as limitations of the scientific method.

A learner-centered approach is emphasized in this curriculum. This is based on the firm belief that learning becomes more permanent, meaningful and exciting when learners themselves take ownership of the learning process. Instructors are therefore urged to contrive those classroom strategies that engage learners actively in the teaching and learning process.

SEMESTER ONE

GRADE: 10

PERIOD: I

TOPIC: INTRODUCTION TO PHYSICS AND PROPERTIES OF MATTER.

OUTCOMES	SPECIFIC OBJECTIVES:	CONTENTS	ACTIVITIES	MATERIALS/RESOURCES	COMPETENCIES ASSESSMENTS
<p>Learners are able to:</p> <ul style="list-style-type: none"> Appreciate the importance of Physics in everyday life and the importance of making accurate measurement of physical quantities and their applications in science and technology. 	<p>Upon completion of this topic students will be able to:</p> <ol style="list-style-type: none"> Discuss the importance of Physics; Identify scalar and vector quantities; Identify some basic Mathematical Concepts (scientific notation, significant figures). Distinguish between fundamental and derived physical quantities and their units. Analyze dimensional Analysis in terms of the relationship between fundamental and derived quantities. Measure with various measuring instruments. 	<p>1. Development of physics:</p> <ol style="list-style-type: none"> Branches of Physics Basic mathematical concepts. Measurement <ol style="list-style-type: none"> Systems of Measurement Fundamental Quantities and Units Derived Quantities and Units Metric Prefixes and Conversion Significant Figures Accuracy and Precision-Errors in Measurement 	<p>Inclusive and Differentiated Learning</p> <p>Individual seat works or work in mixed groups according to gender, abilities, learning styles.</p> <ol style="list-style-type: none"> Assignments/exercise Calculation and deriving of units. Group Assignments exercises: <ol style="list-style-type: none"> Discuss the importance of the study of Physics. Discuss the branches of Physics. Discuss some basic mathematical concepts, eg, scientific notation, Significant figures, conversion of units, etc. 	<p>Primary Text Brian Arnold, Steve Wolley & Penny Johnson, Edexcel IGCSE Physics (Pearson, 2009).</p> <p>B. Secondary Text John Motey Addo & Barry Jackson, Senior High Physics (Longman, 2009)</p> <p>Peter Asiedu, Physics for Senior High Schools in West Africa- Aki-Ola Series- (Millennium Edition 4-2011)</p> <p>-meter-rule; -balances (beam and spring); -stop-watch; -thermometer; -hydrometer; -density bottle; -beakers; -graduated cylinders.</p> <p>C. Other Resources/Supplementary Readings Bob McDuell, Senior High Integrated Science (Pearson, 2009)</p>	<p>Expected Competencies</p> <ul style="list-style-type: none"> Effective Communication skills Research and Problem Solving Digital Skills Analytical Skills Creativity and Innovation Skills <p>Assessment strategies that can be used to check competencies: Select relevant options.</p> <ul style="list-style-type: none"> Presentations; Writing Assignments; Quizzes; Lab Reports; Class participation; Attendance;

	<p>7. Distinguish between density and relative density.</p>	<p>(d) Pressure in (i) Solids; (ii) Liquids; (iii) Gasses.</p> <p>e. Dimensional analysis and its use in physics.</p> <p>f. Measuring instruments: Meter rule, vernier caliper, Micro- meter screw gauge, beam balance, spring balance, stop watches, (digital) electronic balance, thermometer.</p> <p>2. Scalar and vector quantities. (a) Definitions of Scalars and Vectors (b) Classification of Quantities as Scalars and Vectors Scientific notation and Units conversion</p>	<p>d. Discuss the fundamental and derived quantities and their corresponding S.I. units.</p> <p>3. Individual Assignments exercises</p> <p>a. Use dimensional analysis to derive the relationship between quantities.</p> <p>b. Distinguish scalar and vector quantities.</p>	<p>Links: www.dictionary.com www.khanacademy.com www.reviewgamezone.com www.commonsense.org www.reedit.com www.study.com www.physicsworldm.com</p>	<ul style="list-style-type: none"> • Test.
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SEMESTER ONE

GRADE: 10

PERIOD: II

TOPIC: VELOCITY AND ACCELERATION

OUTCOMES	SPECIFIC OBJECTIVES:	CONTENTS	ACTIVITIES	MATERIALS/RESOURCES	COMPETENCIES ASSESSMENTS
<p>Learners are able to:</p> <p>Recognize the various types of motion, their applications and the various forms in which forces affect the state of a body</p>	<p>Upon completion of this topic students will be able to:</p> <ol style="list-style-type: none"> 1. analyze motion (Uniformly accelerated) 2. apply the basic equations of motion (Interpret the motion graph); 3. use the Newton's laws of motion and analyze the effect of gravity on falling bodies; and 4. discuss the force of gravitation between objects. 	<p>Nature and types of motion.</p> <ol style="list-style-type: none"> a. Elements of Motion <ol style="list-style-type: none"> i. Distance and Displacement ii. Speed, Velocity and Acceleration b. Uniformly accelerated motion <ol style="list-style-type: none"> i. Uniform acceleration ii. Equations of Uniform Linear Motion c. Graphical Analysis of Uniform Motion(Using Standard Graph Sheets) <ol style="list-style-type: none"> i. Position Time Graphs ii. Displacement Time Graphs iii. Velocity Time Graphs d. Freely falling bodies (gravity). <p>2. Newton's Laws of motion and Newton's Law of Universal Gravitation.</p>	<p><u>Inclusive and Differentiated Learning</u></p> <p>Individual seat works or work in mixed groups according to gender, abilities, learning styles.</p> <ol style="list-style-type: none"> 1. Assignments/exercises Calculation and deriving of units. 2. Group Discussion: Assignments /exercises: (Small mixed groups according to gender). <ol style="list-style-type: none"> a. Discuss using appropriate examples to distinguish distance, displacement, speed, velocity, acceleration, uniform velocity, instantaneous velocity and average velocity b. Calculate displacement, and acceleration of a moving object respect to time. c. Derive equation of uniformly accelerated motion to solve its problems. 	<p>A. Primary Text Brian Arnold, Steve Wolley & Penny Johnson, Edexcel IGCSE Physics (Pearson, 2009).</p> <p>B. Secondary Text John Motey Addo & Barry Jackson, Senior High Physics (Longman, 2009)</p> <p>M. W. Anyakoha, New School Physics for Senior Secondary Schools(2016 Edition)</p> <p>C. Other Resources/Supplementary Readings Bob McDuell, Senior High Integrated Science (Pearson, 2009)</p> <p>--Simple pendulum -meter stick -Stop watch/clock -Graph papers -Rubber band, balloon, -cart, -rubber or glass tube, -cork</p> <p>Links:</p>	<p><u>Expected Competencies</u></p> <ul style="list-style-type: none"> • Effective Communication skills • Research and Problems • Solving • Digital Skills • Analytical Skills • Creativity and Innovation • Skills <p><u>Assessment Strategies that can be used to check competencies; Select relevant options.</u></p> <ul style="list-style-type: none"> • Presentations • Writing Assignment • Quizzes • Lab Report • Class participation • Attendance • Test

			<p>3. Class Exercises: (individual)</p> <p>Draw and interpret graphs to illustrate uniformly accelerated motion.</p> <p>4. Group Practical(LAB): Learners are placed into small mixed groups according to gender and learning styles.</p> <p>(a) Demonstrate motion of freely falling bodies due to gravity;</p> <p>(b) Newton's Laws of Motion;</p> <p>(c) Newton's Universal Law of Gravitation;</p> <p>Hammering nails to demonstrate Newton's Third Law of Motion</p>	<p>www.dictionary.com</p> <p>www.khanacademy.com</p> <p>www.reviewgamezone.com</p> <p>www.commonsense.org</p> <p>www.redit.com</p> <p>www.study.com</p> <p>www.physicsworldm.com</p>	
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SEMESTER: ONE

GRADE: 10
PERIOD: III
TOPIC: WORK, ENERGY AND POWER

OUTCOMES	SPECIFIC OBJECTIVES:	CONTENTS	ACTIVITIES	MATERIALS/RESOURCES	COMPETENCIES ASSESSMENTS
<p>Learners are able to:</p> <p>1. Appreciate the works of machines in life and the interrelationship between</p> <p>(a) Matter and energy.</p> <p>(b) work and energy</p> <p>(c) work/energy and Power</p> <p>do simple calculations on Work, Energy and Power</p>	<p>Upon completion of this topic students will be able to:</p> <p>1. Identify the characteristics of work, energy and power and their S.I units;</p> <p>2. Solve simple problems involving work, energy(potential and kinetic) and power</p> <p>3. Distinguish the types of simple machines</p> <p>4. Distinguish between work input and workoutput</p> <p>5. Compute potential and kinetic energies problems.</p> <p>6. Demonstrate the law of conservation of mechanical energy and its application.</p>	<p>1. Work, Energy and Power.</p> <p>(a) Kinds of Energy(potential and kinetic)</p> <p>(b) Conservation of Energy (transformation)</p> <p>2. Machines</p> <p>(a) Kinds of simple machines</p> <p>Mechanical advantage, velocity ratios and efficiency of machines Universal Gravitation.</p>	<p><u>Inclusive and Differentiated Learning</u></p> <p>Individual seat works or work in mixed groups according to gender, abilities, learning styles.</p> <p>Calculation and LAB.</p> <p>Group Assignments exercise (Small mixed groups according to gender and ability to:</p> <p>a. Examine characteristics of Work, energy, and power.</p> <p>b. Analyze the system of pulleys and inclined plane.</p> <p>2. Group Demonstration: LAB (Small mixed groups according to gender and learning styles):</p> <p>a. to discover some simple machines at home and in school</p> <p>b. Display Hooke’s law in relationship to Young’s modulus.</p>	<p><u>A. Primary Text</u> Brian Arnold, Steve Wolley & Penny Johnson, Edexcel IGCSE Physics (Pearson, 2009).</p> <p><u>B. Secondary Text</u> John Motey Addo & Barry Jackson, Senior High Physics (Longman, 2009).</p> <p>Peter Asiedu, Physics for Senior High Schools in West Africa- Aki-Ola Series- (Millennium Edition 4-2011)</p> <p>M. Melkon, Principles of Physics, (8th Edition) -standard graph sheets; -strings/springs</p> <p><u>C. Other Resources/Supplementary Readings</u> ☐ Bob McDuell, Senior High Integrated Science (Pearson, 2009)</p> <p>Set of simple machines, Meter rule, Stop clock, coil spring, assorted masses</p>	<p><u>Expected Competencies</u></p> <ul style="list-style-type: none"> • Effective Communication skills • Research and • Problems Solving • Digital Skills • Analytical Skills <p><u>Assessment</u></p> <p><u>Strategies that can be used to check competencies; Select relevant options.</u></p> <ul style="list-style-type: none"> • Presentations • Writing Assignment • Quizzes • Lab Report • Class participation • Attendance • Test

			<p>3. <u>Individual Assignments</u> <u>/exercise:</u> a. Analyze potential and kinetic energies.</p> <p>Discuss the Law of Conservation of mechanical energy and relate it to the changes energy undergoes.</p>	<p>Links: www.dictionary.com www.khanacademy.com www.reviewgamezone.com www.commonsense.org www.redit.com www.study.com www.physicsworldm.com</p>	
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SEMESTER TWO

GRADE: 10
PERIOD: IV
TOPIC: THERMAL PHYSICS

OUTCOMES	SPECIFIC OBJECTIVES:	CONTENTS	ACTIVITIES	MATERIALS/RESOURCES	COMPETENCIES ASSESSMENTS
<p>Learners are able to:</p> <p>Elaborate the concept of heat, its relationship with temperature and its effects on substances in accordance with the Gas Laws.</p>	<p>Upon completion of this topic students will be able to:</p> <ol style="list-style-type: none"> Distinguish between Temperature and Heat Outline the steps and principles involved in the measurement of temperature Describe the features and use of different types of thermometers. Identify fundamental intervals of thermometers. Solve simple thermometry problems. Demonstrate Charles, Boyle's, Combined gas laws, 	<p>Temperature and heat.</p> <p>(a) Difference between temperature and heat</p> <p>(b) Temperature scales (Fahrenheit, Celsius, and Kelvin-conversions)</p> <p>(c) Thermometry</p> <p>(i) Types of thermometers and their properties.</p> <p>(ii) Calibrations of thermometers.</p> <p>Expansion: Linear, area, and volume.</p> <p>Charles, Boyle's, Combined gas and Pressure Laws.</p>	<p><u>Inclusive and Differentiated Learning</u></p> <p>Individual seat works or work in mixed groups according to gender, abilities, learning styles.</p> <ol style="list-style-type: none"> Assignments/exercise Calculation and Lab. Individual Assignments/exercise: <ol style="list-style-type: none"> to bring out the concept of heat and temperature Distinguishing between heat and temperature, Thermometric property and associated characteristics with calculations. Group assignments/exercise small mixed Groups according to gender, and learning styles to discuss: <ol style="list-style-type: none"> the Celsius; Fahrenheit; and Kelvin scales of temperature and their relationship. 	<p>A. Primary Text Brian Arnold, Steve Wolley & Penny Johnson, <i>Edexcel IGCSE Physics</i> (Pearson, 2009).</p> <p>B. Secondary Text John Motey Addo & Barry Jackson, <i>Senior High Physics</i> (Longman, 2009)</p> <p>Peter Asiedu, <i>Physics for Senior High Schools in West Africa- Aki-Ola Series-</i> (Millennium Edition 4-2011)</p> <p>M. Melkon, <i>Principles of Physics</i>, (8th Edition)</p> <p>Paul Attakorah, <i>Atta Kay Physics</i> (Vol. 1, 2012 Edition)</p> <p>M. W. Anyakoha, <i>New School Physics for Senior Secondary Schools</i>(2016 Edition)</p> <p>-thermometers (Liquid-in-glass)</p>	<p><u>Expected Competencies</u></p> <p>Effective</p> <ul style="list-style-type: none"> Communication skills Research and Problems Solving Digital Skills Analytical Skills <p><u>Assessment Strategies That can be used to check competencies:</u></p> <p>Select relevant options.</p> <ul style="list-style-type: none"> 1. Presentations 2. Writing Assignment 3. Quizzes 4. Lab Report Class participation 6. Attendance 7. Test

			<p>3. Individual Assignments /exercises: to solve problems associated with Charles, Boyle's, Combined gas, and Pressure Laws.</p> <p>4. Group Demonstration (Lab): Small mixed groups (according to ability and learning styles) Use syringes to demonstrate pressure laws. Charles, Boyle's, Combined gas, and Pressure Laws.</p>	<p>C. Other Resources/Supplementary Readings Bob McDuell, <i>Senior High Integrated Science</i> (Pearson, 2009)</p> <p>Linear expansion apparatus Metal rods, weight meter stick Heat engine apparatus Rubber tubing Thermo flask Source of heat</p> <p>Links: www.dictionary.com www.khanacademy.com www.reviewgamezone.com www.commonsense.org www.redit.com www.study.com www.physicsworldm.com</p>	
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SEMESTER: TWO

GRADE: 10
PERIOD: V
TOPIC: ELECTROSTATICS

OUTCOMES	SPECIFIC OBJECTIVES:	CONTENTS	ACTIVITIES	MATERIALS/RESOURCES	COMPETENCIES ASSESSMENTS
<p>Learners are able to recognize:</p> <ol style="list-style-type: none"> An electric charge produces an electric field. The methods of detecting an electric charge. The importance of capacitors in electrical and electronic devices 	<p>Upon completion of this topic students will be able to:</p> <ol style="list-style-type: none"> Identify the two kinds of electric charges. Distinguish between conductors and insulators. State the Basic dan Coulomb's Laws of Electrostatics. Illustrate lines of force relative to electric charges. Explain/Discuss the methods of charging a body. Solve problems on Coulomb's Law, electric field intensity and work done in an electric field. Identify/Describe the types of capacitors and their uses. 	<ol style="list-style-type: none"> Concept of electric charge. Basic law of Electrostatics. Coulombs law of Electrostatics Electric fields and Potential difference Electric field intensity(strength) Capacitors and Capacitance. Network of capacitors. <ol style="list-style-type: none"> Series; Parallel; Series-Parallel. 	<p><u>Inclusive and Differentiated Learning</u></p> <p>Individual seat works or work in mixed groups according to gender, abilities, learning styles.</p> <p>Assignments/exercise Calculation and Lab.</p> <p>1. Individual Assignments exercises:</p> <p>The two charges of electrostatic in an electric field.</p> <p>2. Group Demonstration (Lab Small groups of mixed gender and learning styles) to: examine electrification using silk and glass rod.</p> <p>3. Group: Assignments/exercises Small mixed groups according to gender and learning styles: to</p> <ol style="list-style-type: none"> Calculate applying the equation of Coulomb's Law; Experiments involving charge and discharge of capacitors; 	<p>A. Primary Text Brian Arnold, Steve Wolley & Penny Johnson, Edexcel IGCSE Physics (Pearson, 2009).</p> <p>B. Secondary Text John Motey Addo & Barry Jackson, Senior High Physics (Longman, 2009)</p> <p>Peter Asiedu, Physics for Senior High Schools in West Africa- Aki-Ola Series- (Millennium Edition 4-2011)</p> <p>M. Melkon, Principles of Physics, (8th Edition)</p> <p>Paul Attakorah, Atta Kay Physics (Vol. 1, 2012 Edition)</p> <p>M. W. Anyakoha, New School Physics for Senior Secondary Schools(2016 Edition) -thermometers (Liquid-in-glass)</p>	<p>Expected Competencies</p> <ul style="list-style-type: none"> Effective Communication skills Research and Problems Solving Digital Skills Analytical Skills Creativity and Innovation Skills <p><u>Assessment Strategies that can be used to check competencies:</u></p> <ul style="list-style-type: none"> Presentations Writing Assignment Quizzes Lab Report Class participation Attendance Test

	<p>8. Discuss the relationship between potential difference and capacitance.</p> <p>9. Solve problems on networks of capacitors.</p>		<p>(c) Calculation involving electric field intensity, potential difference and gradients;</p> <p>(d) Design the structure of capacitors.</p>	<p>C. Other Resources/Supplementary Readings</p> <p>Bob McDuell, Senior High Integrated Science(Pearson, 2009)</p> <p>Links: www.dictionary.com www.khanacademy.com www.reviewgamezone.com www.commonsence.org www.reedit.com www.study.com www.physicsworldm.com</p>	
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SEMESTER: TWO

GRADE: 10
PERIOD: VI
TOPIC: PROPERTIES OF MATTER

OUTCOMES	SPECIFIC OBJECTIVES:	CONTENTS	ACTIVITIES	MATERIALS/RESOURCES	COMPETENCIES ASSESSMENTS
<p>Learners are able to:</p> <p>Recognize the structure of matter and determine the effect of applied force due to Hooke's Law.</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> 1. Distinguish between atoms and molecules 2. Examine the kinetic theory of matter 3. Distinguish between cohesion and adhesion 4. Analyze Hooke's law and apply Young's modulus in solving problems. 	<ol style="list-style-type: none"> 1. The states of matter. 2. The structure of matter. 3. Kinetic theory. 4. Forces between molecules. 5. Elasticity and Hooke's Law (Young's/Elastic modulus) <ul style="list-style-type: none"> • Graphical representation of elasticity. 6. Surface tension 7. Viscosity, Diffusion, and Elastic strings 	<p><u>Inclusive and Differentiated Learning Individual seat works or work in mixed groups according to gender, abilities and learning styles.</u></p> <ol style="list-style-type: none"> 1. Calculation and Lab. Group Assignments/exercise: Small mixed groups (according to gender, ability and learning styles). <ol style="list-style-type: none"> a. To distinguish between atom and molecules. b. The properties of matter. c. Viscosity and diffusion in solid, liquid and gas. work done in d. Springs and elastic strings. e. The Phases of matter. 2. Group Demonstration (LAB): Small mixed groups 	<p>A. Primary Text Brian Arnold, Steve Wolley & Penny Johnson, Edexcel IGCSE Physics (Pearson, 2009).</p> <p>B. Secondary Text John Motey Addo & Barry Jackson, Senior High Physics (Longman, 2009)</p> <p>Peter Asiedu, Physics for Senior High Schools in West Africa- Aki-Ola Series- (Millennium Edition 4-2011)</p> <p>M. Melkon, Principles of Physics, (8th Edition)</p> <p>Paul Attakorah, Atta Kay Physics (Vol. 1, 2012 Edition)</p> <p>M. W. Anyakoha, New School Physics for Senior Secondary Schools(2016 Edition)</p>	<p><u>Expected Competencies</u></p> <ul style="list-style-type: none"> • Effective Communication skills • Research and Problems Solving • Digital Skills • Analytical Skills • Creativity and Innovation Skills <p><u>Assessment Strategies That can be used to check competencies; Select relevant option.</u></p> <ul style="list-style-type: none"> • Presentations • Writing Assignment • Quizzes • Lab Report • Class participation • Attendance • Test

			<p>(according to gender and learning styles):</p> <p>a. Experiment using test tube hydrometer.</p> <p>b. Demonstrating with</p> <ul style="list-style-type: none"> (i) inner tube; (ii) force siphons; (iii) life pumps; (iv) hydrometer; <p>3. Demonstrating cohesion and adhesion.</p>	<p><u>C. Other Resources/Supplementary Readings</u></p> <p>Bob McDuell, <i>Senior High Integrated Science</i> (Pearson, 2009)</p> <p>U-tubes, liquids □ Hares apparatus Gravity bottle hydrometer, test tubes, force siphons, life pump crystal samples balloons</p> <p>Links:</p> <p>www.dictionary.com</p> <p>www.khanacademy.com</p> <p>www.reviewgamezone.com</p> <p>www.commonsense.org</p> <p>www.redit.com</p> <p>www.study.com</p> <p>www.physicsworldm.com</p>	
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SEMESTER ONE

GRADE: 11

PERIOD: I

TOPIC: MOTION IN TWO DIMENSIONS

OUTCOMES	SPECIFIC OBJECTIVES:	CONTENTS	ACTIVITIES	MATERIALS/RESOURCES	COMPETENCIES ASSESSMENTS
<p>Learners are able to:</p> <p>Appreciate the use force in motion and its impacts in everyday activity</p>	<p>Upon completion of this topic: learners will:</p> <ol style="list-style-type: none"> 1. Add and resolve vectors. 2. Solve problems on simple harmonic motion. 3. Use the equations of motion in solving (One and Two dimensions) problems. 4. Distinguish the types of motion (Projectile, rotational, Circular, Simple Harmonic and oscillatory) and their applications 	<ol style="list-style-type: none"> 1. Vectors <ol style="list-style-type: none"> (a) Addition/Composition (b) Resolution 2. Projectile motion 3. Circular motion 4. Rotary/Rotational motion 5. Simple harmonic/oscillatory motion 	<p><u>Inclusive and Differentiated Learning</u> Individual seat works or work in mixed groups according to gender, abilities and learning styles.</p> <p>Assignments/exercises: Calculation.</p> <ol style="list-style-type: none"> 1. Group analyzing vectors in: <ol style="list-style-type: none"> a. one and two dimension b. Two dimension c. Motion and types. 2. Calculate the dimension of vectors in one and two dimensions. <ol style="list-style-type: none"> a. Examine the equations of motion to solve exercises. b. demonstrate the types of motion(solving problems): <ol style="list-style-type: none"> i. Projectile ii. Rotational iii. Circular 	<p><u>A Primary Text</u> Brian Arnold, Steve Wolley & Penny Johnson, Edexcel IGCSE Physics (Pearson, 2009).</p> <p><u>B. Secondary Text</u> John Motey Addo & Barry Jackson, Senior High Physics (Longman, 2009)</p> <p>Peter Asiedu, Physics for Senior High Schools in West Africa- Aki-Ola Series- (Millennium Edition 4-2011)</p> <p>M. Melkon, Principles of Physics, (8th Edition)</p> <p>Paul Attakorah, Atta Kay Physics (Vol. 1, 2012 Edition)</p> <p>M. W. Anyakoha, New School Physics for Senior Secondary Schools(2016 Edition)</p>	<p><u>Expected Competencies</u></p> <ul style="list-style-type: none"> • Effective Communication skills • Research and • Problems Solving • Digital Skills • Analytical Skills • Creativity and Innovation Skills <p><u>Assessment Strategies That can be used to check competencies:</u></p> <ul style="list-style-type: none"> • Presentations • Writing Assignment • Quizzes • Lab Report • Class participation

			iv. Simple harmonic v. oscillatory	<p><u>C. Other Resources/Supplementary Readings</u></p> <p>Bob McDuell, Senior High Integrated Science (Pearson, 2009)</p> <p>U-tubes, liquids □ Hares apparatus Gravity bottle hydrometer, test tubes, force siphons, life pump crystal samples balloons</p> <p>Links:</p> <p>www.dictionary.com</p> <p>www.khanacademy.com</p> <p>www.reviewgamezone.com</p> <p>www.commonsence.org</p> <p>www.redit.com</p> <p>www.study.com</p> <p>www.physicsworldm.com</p>	<ul style="list-style-type: none"> • Attendance • Test
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SEMESTER: ONE

GRADE: 11

PERIOD: II

TOPIC: COMPOSITION AND RESOLUTION OF FORCES

OUTCOMES	SPECIFIC OBJECTIVES:	CONTENTS	ACTIVITIES	MATERIALS/RESOURCES	COMPETENCIES ASSESSMENTS
<p>Learners are able to</p> <p>1. Recognize the</p> <p>a. Various types of forces and the conditions that bring them to the state of equilibrium.</p> <p>b. advantages and disadvantages of friction</p> <p>c. Conditions for equilibrium of parallel forces.</p> <p>2. Demonstrate the types of equilibrium.</p>	<p>Upon completion of this topic, learners will:</p> <p>1. Combine force vectors to produce resultant force.</p> <p>2. Use the cosine and sine laws in the resolution of force.</p> <p>3. Distinguish between resultant and equilibrant force.</p> <p>4. Demonstrate the two conditions for equilibrium.</p> <p>5. Distinguish the types of Friction and calculate its coefficient.</p> <p>Distinguish between center of gravity and center of mass.</p>	<p>1. Composition and equilibrium of forces.</p> <p>2. Composition and Resolution of forces</p> <p>3. Parallel forces and Moments (torque) Center of gravity.</p> <p>Friction</p>	<p><u>Inclusive and Differentiated Learning</u> Individual seat works or work in mixed groups according to gender, abilities and learning styles.</p> <p>Calculation.</p> <p>1. Group Demonstrations:</p> <p>a. Construct Vectors with magnitudes in:</p> <p>i. the same direction</p> <p>ii. the opposite direction, to find the resultant.</p> <p>b. Construct a vector with a magnitude and direction in a plane and compute its components</p> <p>c. Demonstrate (gravity and equilibrium) experiment using force table. demonstrate composition and resolution of forces using the force table</p>	<p>A. Primary Text Brian Arnold, Steve Wolley & Penny Johnson, Edexcel IGCSE Physics (Pearson, 2009).</p> <p>B. Secondary Text John Motey Addo & Barry Jackson, Senior High Physics (Longman, 2009)</p> <p>Peter Asiedu, Physics for Senior High Schools in West Africa- Aki-Ola Series- (Millennium Edition 4-2011)</p> <p>M. Melkon, Principles of Physics, (8th Edition)</p> <p>Paul Attakorah, Atta Kay Physics (Vol. 1, 2012 Edition)</p> <p>M. W. Anyakoha, New School Physics for Senior Secondary Schools(2016 Edition)</p> <p>-meter rule; -assorted -masses/weights</p>	<p><u>Expected Competencies</u></p> <ul style="list-style-type: none"> • Effective Communication skills • Research and Problems • Solving • Digital Skills • Analytical Skills • Creativity and Innovation Skills <p><u>Assessment Strategies that can be used to check competencies; Select relevant options.</u></p> <ul style="list-style-type: none"> • Presentations • Writing Assignment • Quizzes • Lab Report • Class participation • Attendance • Test

			<p>2. Group Assignments/exercises to discuss the:</p> <ul style="list-style-type: none"> a. Co-efficient of kinetic and static frictions on the inclined plan. b. The methods of reducing friction. <p>3. Group Demonstrations:</p> <ul style="list-style-type: none"> a. Calculation involving forces b. Using the pencils as roller to overcome the friction of block wood or matchbox to practice how to overcome friction 	<p>C. Other Resources/Supplementary Readings</p> <p>Bob McDuell, Senior High Integrated Science (Pearson, 2009)</p> <p>Weights Pulleys, force table Air track and accessories Hard board Inclined plane wooden blocks.</p> <p>Links:</p> <p>www.dictionary.com www.khanacademy.com www.reviewgamezone.com www.commonsense.org www.redit.com www.study.com www.physicsworldm.com</p>	
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SEMESTER: ONE

GRADE: 11

PERIOD: III

TOPIC: MOMENTUM AND ITS CONSERVATION

OUTCOMES	SPECIFIC OBJECTIVES:	CONTENTS	ACTIVITIES	MATERIALS/RESOURCES	COMPETENCIES ASSESSMENTS
<p>Learners are able to</p> <p>Recognize the dangers in the collision of moving objects and take measure in avoiding it.</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> 1. Analyze the nature and the effect of momentum. 2. Differential between impulse and momentum. 3. Distinguish between elastic and inelastic collisions. 4. Distinguish between the laws of conservation of linear and angular momentum and their applications. 	<ol style="list-style-type: none"> 1. Nature of Linear momentum and Impulse. 2. Elastic and inelastic collisions. 3. Conservation of Momentum 4. Angular Momentum and its conservation 	<p><u>Inclusive and Differentiated Learning Individual seat works or work in mixed groups according to gender, abilities and learning styles.</u></p> <p>Calculation.</p> <p>1. Group Assignments /exercise: to discuss the nature and effect of:</p> <ol style="list-style-type: none"> a. Momentum. b. Impulse. <p>2. Group Demonstrations:</p> <ol style="list-style-type: none"> a. Construct an experiment verifying conservation of momentum by using pendulum. b. Construct the steps (equations) involving the calculations of elastic and inelastic collision. c. Design a momentum carts to displace conservation of 	<p>A. <u>Primary Text</u> Brian Arnold, Steve Wolley & Penny Johnson, Edexcel IGCS Physics (Pearson, 2009).</p> <p>B. <u>Secondary Text</u> John Motey Addo & Barry Jackson, Senior High Physics (Longman, 2009)</p> <p>Peter Asiedu, Physics for Senior High Schools in West Africa- Aki-Ola Series- (Millennium Edition 4-2011)</p> <p>M. Melkon, Principles of Physics, (8th Edition)</p> <p>Paul Attakorah, Atta Kay Physics (Vol. 1, 2012 Edition)</p> <p>M. W. Anyakoha, New School Physics for Senior Secondary Schools(2016 Edition)</p> <p>C. <u>Other Resources/Supplementa ry Readings</u> Bob McDuell, Senior High Integrated Science (Pearson, 2009)</p>	<p><u>Expected Competencies</u></p> <ul style="list-style-type: none"> • Effective Communication skills • Research and Problems Solving • Digital Skills • Analytical Skills • Creativity and Innovation Skills <p><u>Assessment Strategies that can be used to check competencies: Select relevant Options.</u></p> <ul style="list-style-type: none"> • Presentations • Writing Assignment • Quizzes • Lab Report • Class participation • Attendance • 7. Test

			momentum elastic and inelastic.	Air track (set) Bump putty cars Links: www.dictionary.com www.khanacademy.com www.reviewgamezone.com www.commonsense.org www.redit.com www.study.com www.physicsworldm.com	
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SEMESTER: TWO

GRADE: 11
PERIOD: IV
TOPIC: HEAT

OUTCOMES	SPECIFIC OBJECTIVES:	CONTENTS	ACTIVITIES	MATERIALS/RESOURCES	COMPETENCIES ASSESSMENTS
<p>Learners are able to</p> <p>Recognize and appreciate the importance and effect of heat energy in our environment.</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> 1. Elaborate the concept and characteristics of heat. 2. Distinguish between specific heat and specific heat capacity. 3. Distinguish between the methods of heat transfer and the laws of heat exchange. 4. Discuss heat transfer in a vacuum flask. 	<ol style="list-style-type: none"> 1. Heat 2. Specific heat and specific capacity 3. Heat transfer and the laws of heat exchange. 4. Latent heat of fusion and vaporization 	<p><u>Inclusive and Differentiated Learning Individual seat works or work in mixed groups according to gender, abilities and learning styles.</u></p> <p>Calculation and Lab.</p> <ol style="list-style-type: none"> 1. Group Assignments /exercise: Discuss the characteristics of heat. 2. Group Demonstrations: <ol style="list-style-type: none"> a. Conduct Calorimeter heat experiments. b. Estimate and calculate specific heat and specific heat capacity of an object. c. Examine the equation, and calculate the latent heat of fusion and heat of vaporization. <p>Group Demonstration LAB: To demonstrate the principles of the combustion engines.</p>	<p><u>A. Primary Text</u> Brian Arnold, Steve Wolley & Penny Johnson, Edexcel IGCSE Physics (Pearson, 2009).</p> <p><u>B. Secondary Text</u> John Motey Addo & Barry Jackson, Senior High Physics (Longman, 2009)</p> <p>Peter Asiedu, Physics for Senior High Schools in West Africa- Aki-Ola Series- (Millennium Edition 4-2011)</p> <p>M. Melkon, Principles of Physics, (8th Edition)</p> <p>Paul Attakorah, Atta Kay Physics (Vol. 1, 2012 Edition)</p> <p>M. W. Anyakoha, New School Physics for Senior Secondary Schools(2016 Edition)</p> <p><u>C. Other Resources/Supplementary Readings</u> Bob McDuell, Senior High Integrated Science (Pearson, 2009)</p>	<p><u>Expected Competencies</u></p> <ul style="list-style-type: none"> • Effective Communication skills • Research and Problems Solving • Digital Skills • Analytical Skills • Creativity and Innovation Skills <p><u>Assessment Strategies that can be used to check competencies; Select relevant Options.</u></p> <ul style="list-style-type: none"> • Presentations • Writing Assignment • Quizzes • Lab Report • Class participation • Attendance • Test

				Air track (set) Bump putty cars Links: www.dictionary.com www.khanacademy.com www.reviewgamezone.com www.commonsense.org www.redit.com www.study.com www.physicsworldm.com	
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SEMESTER: TWO

GRADE: 11
PERIOD: V
TOPIC: WAVES

OUTCOMES	SPECIFIC OBJECTIVES:	CONTENTS	ACTIVITIES	MATERIALS/RESOURCES	COMPETENCIES ASSESSMENTS
<p>Learners are able to:</p> <p>Recognize and appreciate the importance of the nature of wave's characteristic s and components in daily activities.</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> 1. Analyze characteristics, concept and component of waves. 2. Elaborate on the properties and the categories of waves. 3. Design methods of production and transmission of sound wave and its application 4. Compute the speed of sound relative to its temperature 5. Analyze the Doppler Effect. 6. Distinguish between <ol style="list-style-type: none"> (a) loudness and intensity of sound; 	<ol style="list-style-type: none"> 1. Nature characteristics and properties of waves and 2. Types of waves 3. Sound waves <ol style="list-style-type: none"> (a) Production, characteristics and transmission. (b) Intensity and intensity level 2. Doppler effect 3. Vibrations in strings and tubes 4. Beats 	<p><u>Inclusive and Differentiated Learning Individual seat works or work in mixed groups according to gender, abilities and learning styles.</u></p> <p>Calculation.</p> <ol style="list-style-type: none"> 1. Group Assignments /exercise: 2. Discuss the nature of waves and its components. 3. Discuss the characteristics of waves (Reflection, Refraction, Diffraction, interference, Polarization) 4. Group Demonstrations: Examine the wave equations ($v=\lambda f$) relative to its: <ol style="list-style-type: none"> i. Velocity ii. Length iii. Frequency 	<p><u>A. Primary Text</u> Brian Arnold, Steve Wolley & Penny Johnson, Edexcel IGCSE Physics (Pearson, 2009).</p> <p><u>B. Secondary Text</u> John Motey Addo & Barry Jackson, Senior High Physics (Longman, 2009)</p> <p>Peter Asiedu, Physics for Senior High Schools in West Africa- Aki-Ola Series- (Millennium Edition 4-2011)</p> <p>M. Melkon, Principles of Physics, (8th Edition)</p> <p>Paul Attakorah, Atta Kay Physics (Vol. 1, 2012 Edition)</p> <p>M. W. Anyakoha, New School Physics for Senior Secondary Schools(2016 Edition)</p>	<p><u>Expected Competencies</u></p> <ul style="list-style-type: none"> • Effective Communication skills • Research and Problems Solving • Digital Skills • Analytical Skills • Creativity and Innovation Skills <p><u>Assessment Strategies that can be used to check competencies; Select relevant Options.</u></p> <ul style="list-style-type: none"> • Presentations • Writing Assignment • Quizzes • Lab Report • Class participation • Attendance • Test

	<p>(b) intensity and intensity level;</p> <p>(c) music and noise;</p> <p>(d) stringed and non-stringed music instruments.</p> <p>7. Analyze vibrations in strings and tubes (pipes).</p>		<p>5. Individual Assignments /exercises:</p> <p>a. Distinguish between transverse and longitudinal waves using a string and cool spring.</p> <p>Distinguish the classification of musical instruments relative to beat, noise, and echoes and demonstrate Doppler effect using turning forks</p> <p>6. Individual Demonstrate the nature of sound relative to its transmission and use percussion instruments (drum, bells, cymbal, horn, guitar, flute, and sassa) to produce different sounds to illustrate methods of sound transmission.</p> <p>7. Group Demonstration(lab) Production and transmission of sound in tubes (closed and open).</p>	<p>C. Other Resources/Supplementary Readings</p> <p>Bob McDuell, Senior High Integrated Science (Pearson, 2009)</p> <p>Air track (set) Bump putty cars</p> <p>Links: www.dictionary.com www.khanacademy.com www.reviewgamezone.com www.commonsense.org www.redit.com www.study.com www.physicsworldm.com</p>	
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SEMESTER: TWO

GRADE: 11
PERIOD: VI
TOPIC: LIGHT

OUTCOMES	SPECIFIC OBJECTIVES:	CONTENTS	ACTIVITIES	MATERIALS/RESOURCES	COMPETENCIES ASSESSMENTS
<p>Learners are able to:</p> <p>Recognize the source of light and its effects on mirrors in producing images.</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> 1. Determine the sources and importance of radiant energy. 2. Construct the linear propagation of a light indicating shadows and eclipses. 3. Analyze the major regions of the electromagnetic spectrum, the photoelectric effect and a principle of a laser 4. Examine the effects of burning on the environment 5. Analyze and demonstrate the image formation using a mirror 	<ol style="list-style-type: none"> 1. Nature and Sources of light. 2. Properties of light 3. Propagation of light <ol style="list-style-type: none"> (a) Shadow and ellipse (b) Pin-hole camera 4. Reflection of light by plane and spherical mirrors. 5. Electromagnetic Spectrum 	<p><u>Inclusive and Differentiated Learning Individual seat works or work in mixed groups according to gender, abilities and learning styles.</u></p> <p>Calculation.</p> <ol style="list-style-type: none"> 1. Group Assignments /exercises: <ol style="list-style-type: none"> a. Discuss the sources of light and its production. b. Distinguish between shadow and ellipse 2. Group Demonstrations (lab) <ol style="list-style-type: none"> a. Using Torch light and copy book and Torch light and ball to demonstrate how shadow and ellipse are produced. b. Construct a ray box to indicate rectilinear propagation of light rays. 3. Individual Assignments /exercises: <ol style="list-style-type: none"> a. Discuss the properties of luminous and non-luminous objects. 	<p><u>A. Primary Text</u> Brian Arnold, Steve Wolley & Penny Johnson, Edexcel IGCSE Physics (Pearson, 2009).</p> <p><u>B. Secondary Text</u> John Motey Addo & Barry Jackson, Senior High Physics (Longman, 2009)</p> <p>Peter Asiedu, Physics for Senior High Schools in West Africa- Aki-Ola Series- (Millennium Edition 4-2011)</p> <p>M. Melkon, Principles of Physics, (8th Edition)</p> <p>Paul Attakorah, Atta Kay Physics (Vol. 1, 2012 Edition)</p> <p>M. W. Anyakoha, New School Physics for Senior Secondary Schools(2016 Edition)</p> <p>-standard graph sheets</p> <p><u>C. Other Resources/Supplementary Readings</u> Bob McDuell, Senior High Integrated Science (Pearson, 2009)</p>	<p><u>Expected Competencies</u></p> <ul style="list-style-type: none"> • Effective Communication skills • Research and Problems Solving • Digital Skills • Analytical Skills • Creativity and Innovation Skills <p><u>Assessment Strategies That can be used to check Competencies; select relevant options.</u></p> <ul style="list-style-type: none"> • Presentations • Writing Assignment • Quizzes • Lab Report • Class participation • Attendance • Test

			<p>b. Discuss the nature and types of mirrors.</p> <p>4. Individual Demonstration: Construct the rays diagram displaying image formation by mirror</p> <p>Examine the mirror equation and apply it in calculating mirror problems</p>	<p>Ray-box Pin-hole camera Plane and curve Mirrors Air track (set) Meter rule Posters Markers www.dictionary.com www.khanacademy.com www.reviewgamezone.com www.commonsense.org www.redit.com www.study.com www.physicsworldm.com</p>	
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SEMESTER: ONE

GRADE: 12

PERIOD: I

TOPIC: REFRACTION AND DISPERSION OF LIGHT

OUTCOMES	SPECIFIC OBJECTIVES:	CONTENTS	ACTIVITIES	MATERIALS/RESOURCES	COMPETENCIES ASSESSMENTS
<p>Learners are able to:</p> <p>Recognize the sources of colors in respect to producing others colors and identify the lenses and their uses in the correction of eye defects.</p>	<p>Upon completion of this topic, learner will:</p> <ol style="list-style-type: none"> Analyze and justify the laws of refraction. Calculate the refractive index of various materials. Apply the Snells law equation to compute the index of refraction. Distinguish between primary colors and primary pigments. Distinguish between total internal reflection and critical angle 	<ol style="list-style-type: none"> Refraction at plane interface <ul style="list-style-type: none"> Laws of refraction Refractive index <ol style="list-style-type: none"> Snell’s Law The speed of light; Real depth and apparent depth; Critical angle and total internal reflection. Critical angle and the total internal reflection. Lenses and eye defects. <p>Dispersion</p>	<p><u>Inclusive and Differentiated Learning</u> Individual seat works or work in mixed groups according to gender, abilities and learning styles.</p> <p>Calculation.</p> <ol style="list-style-type: none"> Group Assignments /exercise: <ol style="list-style-type: none"> Discuss the Law of refraction. Discuss optical instruments for description (Lens, Magnifying glass, Prism glass, torch light on water in plastic) Group Demonstration (Lab): Use glass block and prism to create the refractive index of material. Group Assignments /exercises: 	<p>A. Primary Text Brian Arnold, Steve Wolley & Penny Johnson, Edexcel IGCSE Physics (Pearson, 2009).</p> <p>B. Secondary Text John Motey Addo & Barry Jackson, Senior High Physics (Longman, 2009)</p> <p>Peter Asiedu, Physics for Senior High Schools in West Africa- Aki-Ola Series- (Millennium Edition 4-2011)</p> <p>M. Melkon, Principles of Physics, (8th Edition)</p> <p>Paul Attakorah, Atta Kay Physics (Vol. 1, 2012 Edition)</p> <p>M. W. Anyakoha, New School Physics for Senior Secondary Schools(2016 Edition)</p> <p>-standard graph sheets</p>	<p><u>Expected Competencies</u></p> <ul style="list-style-type: none"> Effective Communication skills Research and Problems Solving Digital Skills Analytical Skills Creativity and Innovation Skills <p><u>Assessment Strategies</u></p> <p><u>That can be used to check Competencies; select relevant options.</u></p> <ul style="list-style-type: none"> Presentations Writing Assignment Quizzes Lab Report Class participation Attendance

			<p>Analyze the way in which primary colors are used to produce secondary colors.</p> <ol style="list-style-type: none"> Discuss how light ray leaves water to create critical angle. Discuss eye defects and correction, the camera, projection, simple and compound microscopes and telescopes. <p>4. Individual demonstration Lab: Use bending pencil in the glass of water to practice refraction</p>	<p><u>C. Other Resources/Supplementary Readings</u></p> <p>Bob McDuell, Senior High Integrated Science (Pearson, 2009)</p> <p>Ray-box Pin-hole camera Plane and curve Mirrors Air track (set) Meter rule Posters Markers www.dictionary.com www.khanacademy.com www.reviewgamezone.com www.commonsense.org www.redit.com www.study.com www.physicsworldm.com</p>	<ul style="list-style-type: none"> • Test
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SEMESTER: ONE

GRADE: 12

PERIOD: II

TOPIC: DIRECT CURRENT ELECTRICITY

OUTCOMES	SPECIFIC OBJECTIVES:	CONTENTS	ACTIVITIES	MATERIALS/RESOURCES	COMPETENCIES ASSESSMENTS
<p>Learners are able to:</p> <ol style="list-style-type: none"> Construct and analyze electric circuit in determining the resistance, potential difference and the current in accordance with Ohm's and Kirchhoff's Laws. Identify factors affecting the resistance of a conductor. 	<p>Upon completion of this topic, learners will:</p> <ul style="list-style-type: none"> ➤ Identify sources of direct current. ➤ Distinguish and analyze series and parallel circuits. ➤ Analyze Ohm's law and its uses in circuit analysis. ➤ Formulate Kirchhoff's laws of electric energy and its application in circuit. ➤ Calculate internal resistance of cells/battery. 	<p>Sources of direct current</p> <ol style="list-style-type: none"> Primary and secondary cells; Fuel and solar cells. <p>2. Resistance and Resistivity</p> <ol style="list-style-type: none"> Ohm's Law; Factors affecting the resistance of the conductor. <p>3. DC Circuits</p> <ol style="list-style-type: none"> Series; Parallel; Series --Parallel. <p>4. Electromotive Force (EMF) and Internal Resistance</p> <p>5. Electrical Energy and Power</p> <ul style="list-style-type: none"> • Cost of electrical energy 	<p><u>Inclusive and Differentiated Learning</u> Individual seat works or work in mixed groups according to gender, abilities and learning styles.</p> <p>Calculation and Lab.</p> <ol style="list-style-type: none"> Group Assignments /exercises: Discuss the process in which direct currents are produced. Group Demonstration (Lab) to Construct and analyze: <ol style="list-style-type: none"> series circuits (three in parallel circuits Combination of series and parallel circuits, using lamps, and dry cell. 	<p>A. Primary Text Brian Arnold, Steve Wolley & Penny Johnson, Edexcel IGCSE Physics (Pearson, 2009).</p> <p>B. Secondary Text John Motey Addo & Barry Jackson, Senior High Physics (Longman 2009)</p> <p>Peter Asiedu, Physics for Senior High Schools in West Africa- Aki-Ola Series- (Millennium Edition 4-2011)</p> <p>M. Melkon, Principles of Physics, (8th Edition)</p> <p>Paul Attakorah, Atta Kay Physics (Vol. 2, 2012 Edition)</p> <p>M. W. Anyakoha, New School Physics for Senior Secondary Schools(2016 Edition)</p> <p>C. Other Resources/Supplementary Readings Bob McDuell, Senior High Integrated Science (Pearson, 2009)</p>	<p><u>Expected Competencies</u></p> <ul style="list-style-type: none"> • Effective Communication Skills • Research and Problems Solving • Digital Skills • Analytical Skills • Creativity and Innovation Skills <p><u>Assessment Strategies</u> <u>That can be used to check Competencies; select relevant options.</u></p> <ul style="list-style-type: none"> • Presentations • Writing Assignment • Quizzes • Lab Report • Class participation • Attendance • Test

		<p>6. Heating Effects and Electrolysis.</p> <p>7. Kirchhoff's Law of electric energy.</p>	<p>3. Group Demonstration (Lab) Verification of Ohm's Law</p> <p>4. Individual Demonstration: to Construct practical circuit diagram to apply ohms' law by calculate:</p> <p>a. Resistance</p> <p>b. potential difference</p> <p>Current</p> <p>Individual Assignments</p> <ul style="list-style-type: none"> • The importance of ammeter, volt meter, and ohms meter in circuit analysis. • Heating effect in circuits using cells and light bulb. 	<p>Sources of emf (cells)</p> <ul style="list-style-type: none"> • Electric meters; • Wheatstone bridge • Constantan wire (28 gauge) • Conduction wire; • Tungsten wires; • Photocell; • Resistance box; • Lamps (6 or 12 volt) <p>Links:</p> <p>www.dictionary.com</p> <p>www.khanacademy.com</p> <p>www.reviewgamezone.com</p> <p>www.commonsense.org</p> <p>www.redit.com</p> <p>www.study.com</p> <p>www.physicsworldm.com</p>	
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SEMESTER: ONE

GRADE: 12

PERIOD: III

TOPIC: MAGNETISM AND ELECTRO - MAGNETISM

OUTCOMES	SPECIFIC OBJECTIVES:	CONTENTS	ACTIVITIES	MATERIALS/RESOURCES	COMPETENCIES ASSESSMENTS
<p>Learners are able to:</p> <p>Recognize that it is magnetic effect that produces electricity.</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> 1. Analyze the origin of magnets. 2. Compare the relationship between electricity and magnetism. 3. Distinguish motor from generator. 4. Elaborate the principle of transformer and its function. 5. Distinguish between AC and DC motors. 	<p>MAGNETISM</p> <ol style="list-style-type: none"> 1. Magnets <ol style="list-style-type: none"> (a) Types and Properties; (b) Magnetic Materials; (c) Concept of Magnetic Fields; (d) Methods of Magnetizing and Demagnetizing Magnets. 2. Magnetic Fields <ol style="list-style-type: none"> (a) Types; (b) Magnetic Flux and Magnetic Flux Density; (c) Force in a Magnetic Field; (d) Moving Cord Galvanometer. 3. Electromagnetic Induction 	<p><u>Inclusive and Differentiated Learning Individual seat works or work in mixed groups according to gender, abilities and learning styles.</u></p> <p>Calculation and Lab.</p> <ol style="list-style-type: none"> 1. Group Assignments/exercises: <ol style="list-style-type: none"> i. The origin of magnets and its importance. ii. Distinguish the various types of magnets and it applications. iii. Discuss the relationship between electricity and magnetism iv. The effect of electricity on magnetism. v. Discuss the factors that differential motor and generator. 2. Group Demonstration: <ol style="list-style-type: none"> a. Construct a diagram showing the conversion 	<p>A. Primary Text Brian Arnold, Steve Wolley & Penny Johnson, Edexcel IGCSE Physics (Pearson, 2009).</p> <p>B. Secondary Text John Motey Addo & Barry Jackson, Senior High Physics (Longman, 2009)</p> <p>Peter Asiedu, Physics for Senior High Schools in West Africa- Aki-Ola Series- (Millennium Edition 4-2011)</p> <p>M. Melkon, Principles of Physics, (8th Edition)</p> <p>Paul Attakorah, Atta Kay Physics (Vol. 2, 2012 Edition)</p> <p>M. W. Anyakoha, New School Physics for Senior Secondary Schools(2016 Edition)</p>	<p><u>Expected Competencies</u></p> <ul style="list-style-type: none"> • Effective Communication skills • Research and Problems Solving • Digital Skills • Analytical Skills • Creativity and Innovation Skills <p><u>Assessment Strategies That can be used to check Competencies; select relevant options.</u></p> <ul style="list-style-type: none"> • Presentations • Writing Assignment • Quizzes • Lab Report • Class participation • Attendance • Test

		<p>(a) The Laws of Electromagnetic Induction;</p> <p>(b) Induced current and emf;</p> <p>(c) Inductors, generators, motors and transformers.</p>	<p>process between AC to DC motor.</p> <p>b. Construct and analyze the diagrams of:</p> <p>i. Motor</p> <p>ii. Generator</p> <p>c. Verify the equation transformer:</p> $\frac{V_p}{V_s} = \frac{n_p}{n_s}$ <p>to calculate the input or V_s n_s output of a transformer.</p>	<p>C. Other Resources/Supplementary Readings</p> <p>Bob McDuell, Senior High Integrated Science (Pearson, 2009)</p> <p>Magnets (Bar, U-shape and horse-shoe)</p> <p>Iron fillings</p> <p>Magnetometer</p> <p>Mapping compass Nails, galvanometer transformer</p> <p>Demonstration motor</p> <p>Ammeter and volt meter</p> <p>www.dictionary.com</p> <p>www.khanacademy.com</p> <p>www.reviewgamezone.com</p> <p>www.commonsense.org</p> <p>www.redit.com</p> <p>www.study.com</p> <p>www.physicsworldm.com</p>	
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SEMESTER: TWO

GRADE: 12

PERIOD: IV

TOPIC: ALTERNATING CURRENT (AC) AND ELECTRONICS

OUTCOMES	SPECIFIC OBJECTIVES:	CONTENTS	ACTIVITIES	MATERIALS/RESOURCES	COMPETENCIES ASSESSMENTS
<p>Learners are able to:</p> <p>Recognize usage of alternating current and the application of transistors in a circuit.</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> 1. Identify electrical measuring instruments and state their uses. 2. Demonstrate the functions of alternating current. 3. Distinguish between resistance and impedance. 4. Analyze the R, C, L circuits and the phase diagram of the (R.C.L.) Circuits. <p>Analyze the principle of the cathode ray tube and applications of transistors and diodes.</p>	<ol style="list-style-type: none"> 1. AC <ol style="list-style-type: none"> (a) Measurements; (b) Function; (c) AC Circuits (RCL); 2. Resonance 3. Basic Electronics <ol style="list-style-type: none"> (a) Semi-Conductors <ol style="list-style-type: none"> (i) Doping; (ii) Intrinsic and Extrinsic Semi-Conductors (iii) P-type and N-type semi-conductors (iv) Band Theory (b) Semiconductor devices: <ul style="list-style-type: none"> -transistors; -thermistors; -diodes. 	<p><u>Inclusive and Differentiated Learning Individual seat works or work in mixed groups according to gender, abilities and learning styles.</u></p> <p>Calculation and Lab.</p> <ol style="list-style-type: none"> 1. Group Assignments /exercises: <ol style="list-style-type: none"> a. discuss electrical measuring instruments for verification b. discuss vacuum tubes 2. Group Demonstration (Lab): Perform experiment in circuits involving: inductor, capacitor, resistor 3. Individual Demonstration: demonstrating the uses of transistors and diodes in a circuit 	<p>A. Primary Text Brian Arnold, Steve Wolley & Penny Johnson, Edexcel IGCSE Physics (Pearson, 2009).</p> <p>B. Secondary Text John Motey Addo & Barry Jackson, Senior High Physics (Longman, 2009)</p> <p>Peter Asiedu, Physics for Senior High Schools in West Africa- Aki-Ola Series- (Millennium Edition 4-2011)</p> <p>M. Melkon, Principles of Physics, (8th Edition)</p> <p>Paul Attakorah, Atta Kay Physics (Vol. 2, 2012 Edition)</p> <p>M. W. Anyakoha, New School Physics for Senior Secondary Schools(2016 Edition)</p> <p>C. Other Resources/Supplementary Readings Bob McDuell, Senior High Integrated Science (Pearson, 2009)</p>	<p><u>EXPECTED Competencies</u></p> <ul style="list-style-type: none"> • Effective Communication skills • Research and Problems Solving • Digital Skills • Analytical Skills • Creativity and Innovation Skills <p><u>Assessment Strategies That can be used to Check Competencies; Select relevant options.</u></p> <ul style="list-style-type: none"> • Presentations • Writing Assignment • Quizzes written exercises Identification of Lab apparatus • Lab Report • Class participation • Attendance

				<p>Vacuum tubes Voltmeter, ammeter ohm meter Resistors, capacitors and inductors Diodes and transistors Conduction wires Power source</p> <p>Links:</p> <p>www.dictionary.com www.khanacademy.com www.reviewgamezone.com www.commonsense.org www.redit.com www.study.com www.physicsworldm.com</p>	<ul style="list-style-type: none">• Test
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SEMESTER: TWO

GRADE: 12

PERIOD: V

TOPIC: ATOMIC AND NUCLEAR PHYSICS

OUTCOMES	SPECIFIC OBJECTIVES:	CONTENTS	ACTIVITIES	MATERIALS/RESOURCES	COMPETENCIES ASSESSMENTS
<p>Learners are able to:</p> <p>Identify substances that can emit harmful particles and take appropriate precautions against the harm of long term exposure to radioactive substances.</p>	<p>Upon completion of this topic, learners will be able to:</p> <ol style="list-style-type: none"> 1. Examine the properties of an electron. 2. Analyze the effect of radioactivity substances on the human body. 3. Draw and analyze the typical atom and the applications of nuclear energy. 4. Distinguish between fission and fusion. 	<ol style="list-style-type: none"> 1. The nucleus and the electron 2. Types of nuclear reactions and the uses of nuclear energy 3. Radioactivity <ol style="list-style-type: none"> a. Types; b. Radioactive substances and their effects; c. Radioactive decay and half-life. 4. Nuclear fission and fusion 5. Thermionic and Photoelectric emissions <ul style="list-style-type: none"> • Cathode rays; • X-rays 	<p><u>Inclusive and Differentiated Learning Individual seat works or work in mixed groups according to gender, abilities and learning styles.</u></p> <p>Calculation.</p> <ol style="list-style-type: none"> 1. Group Assignments /exercises: to discuss: <ol style="list-style-type: none"> a. The existence and strength of radioactive detectors and radioactive substance. b. Fission and fusion reaction. (exp. U238 disintegration) c. Listing application of nuclear energy. 2. Group Demonstration: Drawing and displaying a Simple Performing tracer experiment. 3. Individual Assignments/exercises: 	<p>A. Primary Text Brian Arnold, Steve Wolley & Penny Johnson, Edexcel IGCSE Physics (Pearson, 2009).</p> <p>B. Secondary Text John Motey Addo & Barry Jackson, Senior High Physics (Longman, 2009)</p> <p>Peter Asiedu, Physics for Senior High Schools in West Africa- Aki-Ola Series- (Millennium Edition 4-2011)</p> <p>M. Melkon, Principles of Physics, (8th Edition)</p> <p>Paul Attakorah, Atta Kay Physics (Vol. 2, 2012 Edition)</p> <p>M. W. Anyakoha, New School Physics for Senior Secondary Schools(2016 Edition)</p> <p>C. Other <u>Resources/Supplementary Readings</u> Bob McDuell, Senior High Integrated Science (Pearson, 2009)</p>	<p><u>EXPECTED Competencies</u></p> <ul style="list-style-type: none"> • Effective Communication skills • Research and Problems Solving • Digital Skills • Analytical Skills • Creativity and Innovation Skills <p><u>Assessment Strategies That can be used to Check Competencies; Select relevant options.</u></p> <ul style="list-style-type: none"> • Presentations • Writing Assignment • Quizzes written exercises Identification of Lab apparatus • Lab Report • Class participation • Attendance

			<p>a. Stating and discussing effects of radioactive substances on lives.</p> <p>b. Explanation should include the cathode ray and x – rays, their nature, properties and characteristics</p>	<p>Vacuum tubes Voltmeter, ammeter ohm meter Resistors, capacitors and inductors Diodes and transistors Conduction wires Power source</p> <p>Links:</p> <p>www.dictionary.com www.khanacademy.com www.reviewgamezone.com www.commonsense.org www.redit.com www.study.com www.physicsworldm.com</p>	<ul style="list-style-type: none"> • Test Identification of Lab apparatus • Lab Report • Class participation • Attendance • Test
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SEMESTER: TWO

GRADE: 12

PERIOD: V

TOPIC: ATOMIC AND NUCLEAR PHYSICS

OUTCOMES	SPECIFIC OBJECTIVES:	CONTENTS	ACTIVITIES	MATERIALS/RESOURCES	COMPETENCIES ASSESSMENTS
<p>Learners are able to:</p> <p>Identify substances that can emit harmful particles and take appropriate precautions against the harm of long term exposure to radioactive substances.</p>	<p>Upon completion of this topic, learners will be able to:</p> <ol style="list-style-type: none"> 1. Examine the properties of an electron. 2. Analyze the effect of radioactivity substances on the human body. 3. Draw and analyze the typical atom and the applications of nuclear energy. 4. Distinguish between fission and fusion. 	<ol style="list-style-type: none"> 1. The nucleus and the electron 2. Types of nuclear reactions and the uses of nuclear energy 3. Radioactivity <ol style="list-style-type: none"> a. Types; b. Radioactive substances and their effects; c. Radioactive decay and half-life. 4. Nuclear fission and fusion 4Termionic and Photo electric emissions <ul style="list-style-type: none"> • Cathode rays; • X-rays 	<p><u>Inclusive and Differentiated Learning Individual seat works or work in mixed groups according to gender, abilities and learning styles.</u></p> <p>Calculation.</p> <p>1. Group Assignments /exercises: to discuss:</p> <ol style="list-style-type: none"> d. The existence and strength of radioactive detectors and radioactive substance. e. Fission and fusion reaction. (exp. U238 disintegration) f. Listing application of nuclear energy. <p>2. Group Demonstration: Drawing and displaying a Simple Performing tracer experiment.</p> <p>3. Individual Assignments/exercises:</p> <ol style="list-style-type: none"> c. Stating and discussing effects of radioactive substances on lives. 	<p>C. Primary Text Brian Arnold, Steve Wolley & Penny Johnson, Edexcel IGCSE Physics (Pearson, 2009).</p> <p>D. Secondary Text John Motey Addo & Barry Jackson, Senior High Physics (Longman, 2009)</p> <p>Peter Asiedu, Physics for Senior High Schools in West Africa- Aki-Ola Series- (Millennium Edition 4-2011)</p> <p>M. Melkon, Principles of Physics, (8th Edition)</p> <p>Paul Attakorah, Atta Kay Physics (Vol. 2, 2012 Edition)</p> <p>M. W. Anyakoha, New School Physics for Senior Secondary Schools(2016 Edition)</p> <p>C. Other <u>Resources/Supplementary Readings</u> Bob McDuell, Senior High Integrated Science (Pearson, 2009)</p>	<p><u>EXPECTED Competencies</u></p> <ul style="list-style-type: none"> • Effective Communication Skills • Research and Problems Solving • Digital Skills • Analytical Skills • Creativity and Innovation Skills <p><u>Assessment Strategies That can be used to Check Competencies; Select relevant options.</u></p> <ul style="list-style-type: none"> • Presentations • Writing Assignment • Quizzes written exercises • Identification of Lab apparatus • Lab Report

			<p>d. Explanation should include the cathode ray and x – rays, their nature, properties and characteristics</p>	<p>Vacuum tubes Voltmeter, ammeter ohm meter Resistors, capacitors and inductors Diodes and transistors Conduction wires Power source</p> <p>Links:</p> <p><u>www.dictionary.com</u> <u>www.khanacademy.com</u> <u>www.reviewgamezone.com</u> <u>www.commonsense.org</u> <u>www.redit.com</u> <u>www.study.com</u> <u>www.physicsworldm.com</u></p>	<ul style="list-style-type: none"> • Class participation • Attendance • Test Identification of Lab apparatus • Lab Report • Class participation • Attendance • Test
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SEMESTER: TWO

GRADE: 12
PERIOD: VI
TOPIC: HIGH ENERGY PHYSICS

OUTCOMES	SPECIFIC OBJECTIVES:	CONTENTS	ACTIVITIES	MATERIALS/RESOURCES	COMPETENCIES ASSESSMENTS
<p>Learners are able to:</p> <p>Describe the disintegration of atoms in produces energy particles can be accelerated and captured</p>	<p>Upon completion of this topic, students will:</p> <ol style="list-style-type: none"> 1. Examine the uncertainty principle 2. Analyze the principle quantum numbers and describe the motion of an electron 3. Discuss various types of particle accelerators 4. Identify and discuss the four basic interaction s between particles of matter 5. analyze the conservation laws of particle physics 	<ol style="list-style-type: none"> 1. Quantum mechanics 2. Particle Accelerators 3. Detecting instruments 4. Subatomic reactions <p>Einstein’s photoelectric equation</p>	<p><u>Inclusive and Differentiated Learning Individual seat works or work in mixed groups according to gender, abilities and learning styles.</u></p> <p>Calculation.</p> <ol style="list-style-type: none"> 1. Group Assignments/exercises: to examine the: <ol style="list-style-type: none"> a. Half –life experiment using Geiger counters b. Electron configuration of some light elements 2. Group Demonstration: to: <ol style="list-style-type: none"> a. Drawing and libeling diagram of various particle accelerators <p>Preparing a chart of subatomic particles</p>	<p>A. Primary Text Brian Arnold, Steve Wolley & Penny Johnson, Edexcel IGCSE Physics (Pearson, 2009).</p> <p>B. Secondary Text John Motey Addo & Barry Jackson, Senior High Physics (Longman, 2009)</p> <p>Peter Asiedu, Physics for Senior High Schools in West Africa- Aki-Ola Series- (Millennium Edition 4-2011)</p> <p>M. Melkon, Principles of Physics, (8th Edition)</p> <p>Paul Attakorah, Atta Kay Physics (Vol. 2, 2012 Edition)</p> <p>M. W. Anyakoha, New School Physics for Senior Secondary Schools(2016 Edition)</p>	<p><u>EXPECTED Competencies</u></p> <ul style="list-style-type: none"> • Effective Communication skills • Research and Problems Solving • Digital Skills • Analytical Skills • Creativity and Innovation Skills <p><u>Assessment Strategies That can be used to Check Competencies;</u></p> <p>Select relevant options.</p> <ul style="list-style-type: none"> • Presentations • Writing Assignment • Quizzes written exercises • Identification of Lab apparatus • .Lab Report • Class participation

				<p>C. Other Resources/Supplementary Readings</p> <p>Bob McDuell, Senior High Integrated Science (Pearson, 2009) Geiger Muller Counter</p> <p>www.dictionary.com</p> <p>www.khanacademy.com</p> <p>www.reviewgamezone.com</p> <p>www.commonsense.org</p> <p>www.redit.com</p> <p>www.study.com</p> <p>www.physicsworldm.com</p>	<ul style="list-style-type: none"> • Attendance • Test Identification of Lab apparatus • Lab Report • Class participation • Attendanceec
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