

INTRODUCTION

Mathematics is an indispensable tool in the world. The knowledge and application of mathematics in everyday activities provide the critical core skills of computation, translating problems into mathematical language, application of mathematical concepts and being able to find solutions.

The General objectives for Grades 7 – 9 Mathematics:

1. Acquire the necessary skills that allow learners to become problem solvers and informed decision makers.
2. Make connections between Mathematics and the Global World.
3. Bring Mathematics to life with many real-life applications.
4. Become successful in the study of Algebra II, Geometry, Trigonometry and Pre-calculus.

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 7

PERIOD I

TOPIC: ARITHMETIC SKILLS

OUTCOMES	OBJECTIVES	CONTENT	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCIES/ ASSESSMENT
<p>Learners are able to demonstrate their skills in classifying even, odd, prime and composite numbers using the Sieve of Eratosthenes as well as divisibility rule and square and square root.</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> 1. Identify, define and give examples of even, odd and composite numbers 2. Compute factors and prime factorization of positive integers 3. Explain the sieve of Eratosthenes to determine the prime and composite numbers between 1 and 100. 4. Find the LCM, GCF, and LCD of given positive integers. 5. State the divisibility rule for 2, 3, 5 and 9. 6. Give examples of numbers divisible by 2, 3, 5 and 9 7. Find the square and square roots of a given number. 	<ol style="list-style-type: none"> 1. Even, odd, prime and composite numbers 2. Factors and factoring 3. Divisibility rule 4. LCM, GCF, LCD <p>Squares and square roots</p>	<p><u>Inclusive and differentiate Learning:</u> <i>Individual seat work or group work in mixed groups, according to abilities, gender and learning styles:</i></p> <ol style="list-style-type: none"> 1. Guide learners to Identify, define and give examples of even, odd, prime and composite numbers. 2. Guide learners to Identify, define and give examples of divisibility rules for 2, 3, 5, and 9. 3. Guide learners to use the sieve of the Eratosthenes to determine prime numbers between 1 and 100. 4. Assist learners to compute factors and prime 	<p><u>A. Primary Text</u> M.F. Macrae, et al. <i>New General Mathematics for Junior Secondary Schools 1</i> (Pearson/Longman)</p> <p><u>B. Secondary Text</u> Mathematical Association of Ghana, <i>Mathematics for Junior High Schools - Pupils' Book 1</i> (Pearson/Longman, 2005)</p> <p><u>Other Materials/Supplementary Readings</u></p> <ul style="list-style-type: none"> • Wall chart containing definition of even, odd, prime and composite numbers. <p>A chart containing the</p>	<p>EXPECTED COMPETENCIES:</p> <ul style="list-style-type: none"> • Effective Communication • Analytical Skills, • Digital Skills, • Research and Problem Solving skills • Organizational ability • Creativity & Innovation skills <p>A ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options:</p> <ul style="list-style-type: none"> • Attendances • Oral questions and Answers

			<p>Factorization of positive integers from any Population data.</p> <p>5. Assist learners to Find LCM, GCF and LCD of given positive numbers.</p> <p>6. Guide learner to apply Divisibility rules.</p> <p>7. Assist learners to find the square and square root of numbers.</p>		<ul style="list-style-type: none"> • Class Assignment and Participation • Observation • Assignments • Research • Quiz • Test • Exams
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SEMESTER ONE

**GRADE 7
PERIOD I
TOPIC: SETS**

OUTCOMES	OBJECTIVES	CONTENT	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCIES/ ASSESSMENT
<p>Learners are able to:</p> <p>Identify sets of objects and numbers, describe and write sets of objects and numbers, distinguish between different types of sets.</p> <p>They are also able to distinguish between equal and equivalent sets, write subsets of given sets with members up to 5 and list the members of an intersection and union of sets</p>	<p>Upon completion of this topic, learners will:</p> <ul style="list-style-type: none"> ❖ Identify sets of objects and numbers ❖ Describe and write sets of objects and numbers ❖ Distinguish between different types of sets ❖ Distinguish between equal and equivalent sets ❖ Write subsets of given sets with members up to 5 	<p>1. SETS Sets of objects and numbers</p> <p>1.1 Describing and writing sets</p> <p>1.2 Types of Sets (Finite, infinite, Unit, Empty or null sets)</p> <p>1.3 Equal and Equivalent Sets</p> <p>1.4 Subsets</p> <p>1.5 Intersection and Union of sets</p>	<p><u>Inclusive and differentiate Learning:</u> <i>Individual seat work or group work in mixed groups, according to abilities, gender and learning styles:</i></p> <ol style="list-style-type: none"> 1. Guide learners collect and sort objects into group and allow learners to describe the group of objects formed. 2. Guide learners to form other sets (groups) according to a given criteria using objects and numbers. 3. Introduce the concept of a well-defined collection of objects or ideas 4. Assist learners to use real life situations to form sets. E.g. the set of female students in the ninth Grade class. 5. Introduce ways of describing and writing sets using: <ul style="list-style-type: none"> • Defining property; i.e. describing the 	<p>Primary Text: Maths for Junior High for Liberia(Grade 7, Pupils Book), Pearson</p> <p>Secondary Texts: MATHEMATICS FOR JUNIOR HIGH SCHOOLS by Christian Akrong Hesse , Sept. 2012</p> <p>www.researchgate.net/publication/276906944</p> <p>http://www.amsi.org.au/teacher_modules/pdfs/Sets_and_venn_diagrams.pdf</p> <p>www.khanacademy.com</p> <p>www.dictionary.com</p>	<p>Expected Competencies:</p> <ul style="list-style-type: none"> • Effective Communication • Analytical Skills, • Digital Skills, • Research and Problem Solving skills • Organizational ability • Creativity & Innovation skills <p><u>ASSESSMENTS STRATEGIES:</u> Can be used to check competences. Select relevant options:</p> <ul style="list-style-type: none"> • Attendances • Oral questions and Answers

	<p>❖ List the members of an intersection and union of sets</p>		<p>members (elements) of a set in words. E.g. a set of mathematical instruments.</p> <ul style="list-style-type: none"> • Listing the members of a set using only curly brackets ‘{ }’ and commas to separate the members. E.g. $S = \{0, 1, 2, \dots, 26\}$ <p>NOTE: Use capital letters to represent sets. E.g. $A = \{\text{months of the year}\}$.</p> <p>6. (i) Assist learners to define following sets:</p> <ol style="list-style-type: none"> Finite Sets Infinite Sets Unit Sets Empty or Null sets <p>(ii) Assist learners’ list members of the different types of sets, count and classify them.</p> <p>(iii) Use real situations to illustrate each of the four sets describe above.</p> <p>Assist learners define the following :</p> <ol style="list-style-type: none"> equal sets equivalent sets <p>(ii) Assist learners to establish equal sets as sets having the same members. E.g. $P = \{\text{odd numbers between 2 and 8}\}$ $\square P = \{3, 5, 7\}$. $Q = \{\text{prime numbers between 2 and 8}\}$ $\square Q = \{3, 5, 7\}$, P is equal to Q.</p>		<ul style="list-style-type: none"> • Class Assignment and Participation • Observation • Assignments • Research • Quiz • Test • Exams
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			<p>Introduce equivalent sets as sets having the same number of elements. E.g. $A = \{1, 3, 5, 7\}$ and $B = \{\square\square\square\square\square\square\square\square\}$; A is equivalent to B.</p> <p>Note: P and Q are also equivalent sets but sets A and B are not equal sets. Thus all equal sets are equivalent but not all equivalent sets are equal</p> <p>Brainstorm with learners on the concept of a universal Set.</p> <p>Explain subsets as the sets whose members can be found among members of another set. E.g. if $A = \{1, 2, 3, \dots, 12\}$ and $B = \{4, 8, 9\}$, then set B is a subset of set A.</p> <p>Introduce the symbol of subset \subseteq. E.g. $B \subseteq A$ or $A \supseteq B$.</p> <p>Note: Introduce the idea of empty set as a subset of every set and every set as a subset of itself</p> <p>Guide learners to form two sets from a given set. E.g. $Q = \{\text{whole numbers up to } 15\}$ $A = \{0, 1, 10, 11, 12\}$ $B = \{1, 3, 4, 12\}$</p> <p>Let pupils write a new set containing common</p>		
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			<p>members from sets A and B, i.e. a set with members 1 and 12 as the intersection of sets A and B.</p> <p>Introduce the intersection symbol \cap and write A intersection B as $A \cap B = \{1,12\}$.</p> <p>Let learners list all the members of two sets without repeating any member to form a new set. Explain that this new set is called the union of sets A and B. It is written as $A \cup B$ and read as A union B.</p>		
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SEMESTER: ONE

GRADE: 7

PERIOD: II

TOPIC: FRACTIONS

OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCIES/ ASSESSMENTS
<p>Learners are able to demonstrate and apply the knowledge to solve problems on fractions, and express fractions in the form of ratio and proportion.</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> 1. Simplify complex fractions 2. Pointing out the fractional parts of a complex fraction 3. Expressing complex fractions to ratio, proportions 	<ol style="list-style-type: none"> 1. Operations on fractions 2. Fractional parts of numbers 3. Combining and simplifying complex fractions 4. Ratio and proportion written as fractions 5. Solve word problems on ratio and proportion 	<p><u>Inclusive and differentiate Learning:</u></p> <p><i>Individual seat work or group work in mixed groups, according to abilities, gender and learning styles:</i></p> <ol style="list-style-type: none"> 1. Learners working in smaller groups shall do : Define, discuss and simplify complex fractions. 2. Solve problems relating to ratio, proportion and complex fraction. 3. Solve word problems on ratio and proportion 	<p><u>Primary Text: Maths for Junior High for Liberia (Grade 7, Pupils Book), Pearson</u></p> <p>M.F. Macrae, et al. <i>New General Mathematics for Junior Secondary Schools 1</i> (Pearson/Longman)</p> <p><u>Secondary Text</u> Mathematical Association of Ghana, <i>Mathematics for Junior High Schools - Pupils' Book 1</i> (Pearson/Longman, 2005)</p> <p><u>Other Materials/Supplementary Readings</u></p> <p>Wall chart containing definition of even, odd, prime and composite numbers.</p> <p>A chart containing divisibility rules</p>	<p>EXPECTED COMPETENCIES:</p> <ul style="list-style-type: none"> • Effective Communication • Analytical Skills, • Digital Skills, • Research and Problem Solving skills • Organizational ability • Creativity & Innovation skills <p><u>ASSESSMENTS STRATEGIES:</u> Can be used to check competences. Select relevant options:</p> <ul style="list-style-type: none"> • Attendances • Oral questions and Answers • Class Assignment and Participation

				www.researchgate.net/publication/276906944 http://www.amsi.org.au/teacher_modules/pdfs/Sets_and_venn_diagrams.pdf www.khanacademy.com www.dictionary.com	<ul style="list-style-type: none"> • Observation • Assignments • Research • Quiz • Test • Exams
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SEMESTER: ONE

GRADE: 7

PERIOD: III

TOPIC: DECIMALS, PERCENTS AND FRACTIONS

OUTCOMES	Objectives	CONTENTS	ACTIVITIES	MATERIALS/RESOURCES	COMPETENCIES/ ASSESSMENTS
<p>Learners are able to apply skills to analyze and compute simple interest, commission, discounts, profit and loss and royalty and also use skills in their business transactions and other areas.</p>	<p>Upon completion of this topic , learners will:</p> <ol style="list-style-type: none"> 1. Convert from decimal to percent/fraction and vice versa 2. Apply decimal and percent to the solution of problems involving commissions, discounts, taxes, interest, profits and losses and royolty 	<ul style="list-style-type: none"> • Conversion of decimal to percent and • fraction • Commission and discounts • Simple interest, profit and loss Taxes and royalty. 	<p><u>Inclusive and differentiate Learning:</u> <i>Individual seat work or group work in mixed groups, according to abilities, gender and learning styles:</i></p> <ul style="list-style-type: none"> • Guide learners to convert from decimal to percent and vice versa. • Guide learners to solve problems involving commission, discount, taxes, interest, profit and loss and royalty. 	<p><u>Primary Text: Maths for Junior High for Liberia(Grade 7, Pupils Book), Pearson</u> M.F. Macrae, et al. <i>New General Mathematics for Junior Secondary Schools 1</i> (Pearson/Longman)</p> <p><u>A. Secondary Text</u> Mathematical Association of Ghana, <i>Mathematics for Junior High Schools - Pupils' Book 1</i> (Pearson/Longman, 2005)</p> <p><u>Other Materials/Supplementary Readings</u></p> <ul style="list-style-type: none"> • Poster sheets containing the formulas for finding simple interest, discount, profit and loss, taxes and royalty. • Scientific calculator. • Computer <p>www.researchgate.net/publication/276906944</p>	<p><u>EXPECTED COMPETENCIES:</u></p> <ul style="list-style-type: none"> • Effective Communication • Analytical Skills, • Digital Skills, • Research and Problem Solving skills • Organizational ability • Creativity & Innovation skills <p><u>ASSESSMENTS STRATEGIES:</u> Can be used to check competences. Select relevant options:</p> <ul style="list-style-type: none"> • Attendances • Oral questions and Answers • Class Assignment and Participation • Observation • Assignments

			http://www.amsi.org.au/teacher_modules/pdfs/Sets_and_venn_diagrams.pdf www.khanacademy.com www.dictionary.com	<ul style="list-style-type: none">• Research• Quiz• Test• Exams•
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SEMESTER: TWO

GRADE: 7

PERIOD: IV

TOPIC: BASIC ALGEBRA

OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCIES/ ASSESSMENT
<p>Learners are able to</p> <ul style="list-style-type: none"> • Use the skills of adding, subtracting, multiplying and dividing signed numbers in daily life situation. • Evaluate algebraic expressions and formulas with specific emphasis on computing various population risks such as birth death and HIV etc. 	<p>Upon completion of this topic, learners will:</p> <ul style="list-style-type: none"> • Add, subtract, multiply and divide signed numbers with emphasis on population concept such as births and mortality. • Use the grouping symbols in performing basic operations • Identify, define and state examples of a term, variable, constant, co-efficient, exponent, monomial, binomial and trinomial. • Evaluate algebraic expressions and 	<ol style="list-style-type: none"> 1. Positive and negative integers(signed numbers) 2. Operations of addition, subtraction, multiplication and division on signed numbers 3. Basic algebraic expressions and variables: <ol style="list-style-type: none"> a. variable b. constant c. co-efficient d. exponents 4. Algebraic expressions and formulas 5. Solving and graphing linear open sentences in one variable. 	<p><u>Inclusive and differentiate Learning:</u></p> <p><i>Individual seat work or group work in mixed groups, according to abilities, gender and learning styles:</i></p> <ol style="list-style-type: none"> 1. Guide learners to add, subtract, multiply and divide signed numbers. 2. Guide learners to use the grouping symbols in performing these basic operations stated in activity 1. 3. Assist learners to identify, define and give examples of these terms: coefficient, exponent, monomial, binomial and trinomial. 4. Assist learners to evaluate expressions and formulas 5. Guide learners to evaluate algebraic expressions and formula. 	<p><u>A. Primary Text: Maths for Junior High for Liberia(Grade 7, Pupils Book), Pearson</u></p> <p>M.F. Macrae, et al. <i>New General Mathematics for Junior Secondary Schools 1</i> (Pearson/Longman)</p> <p><u>B. Secondary Text</u> Mathematical Association of Ghana, <i>Mathematics for Junior High Schools - Pupils' Book 1</i> (Pearson/Longman, 2005)</p> <p><u>Other Materials/Supplementary Readings</u> Graph sheet</p> <p>Number line calculator Population data</p> <p>www.researchgate.net/publication/276906944</p>	<p>EXPECTED COMPETENCIES:</p> <ul style="list-style-type: none"> • Effective Communication • Analytical Skills, • Digital Skills, • Research and Problem Solving skills • Organizational ability • Creativity & Innovation skills <p>ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options:</p> <ul style="list-style-type: none"> • Attendances • Oral questions and Answers

	<p>formulas with specific emphasis on computing various population risks such as birth, death, migration, etc.</p> <ul style="list-style-type: none"> Solve and graph linear open sentences in one variable. 	<p>6. Evaluation of algebraic expression and formulas</p>	<p>3. Define and explain the concept of the various population risks:</p> <ul style="list-style-type: none"> Birth rate Teenage Birth Abortion rate Teenage Abortion rate Estimated pregnancy rate Pregnancy rate Death rate HIV rate <p>4. State formulas for the following population risks</p> <ul style="list-style-type: none"> Birth rate Teenage birth Abortion rate Teenage Abortion rate Estimated pregnancy rate Pregnancy rate Death rate HIV rate 	<p>http://www.amsi.org.au/teacer_modules/pdfs/Sets_and_venn_diagrams.pdf</p> <p>www.khanacademy.com</p> <p>www.dictionary.com</p>	<ul style="list-style-type: none"> Class Assignment and Participation Observation Assignments Research Quiz Test Exams <p>Number line Calculator Population data</p>
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SEMESTER: TWO

GRADE: 7
PERIOD: V
TOPIC: GEOMETRY

OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS /RESOURCES	COMPETENCIES/ ASSESSMENTS
<p>Learners are able to demonstrate their skills to construct simple geometric figures such as line segments and angles using straight edge, protractor and compass and also to read and interpret the dimensions of drawings.</p>	<p>Upon completion of this topic, learners will:</p> <ul style="list-style-type: none"> • Identify and construct simple geometric figures such as line segment and angles • Bisect line segments and angles. • Identify and write examples of the kinds and properties of angles and polygons. • Find the perimeters and areas of given polygons. 	<p>Construction</p> <p>A. Kinds of polygons</p> <p>B. Perimeters and areas of Polygons</p> <p>C. Angles Bisect line segments and angles</p>	<p><u>Inclusive and differentiate Learning:</u></p> <p><i>Individual seat work or group work in mixed groups, according to abilities, gender and learning styles</i></p> <ul style="list-style-type: none"> ❖ Guide learners to identify and construct simple geometric figures such as line segments and angles. ❖ Guide learners identify and write examples of the kinds and properties of angles and polygons. ❖ Assist learners to find the perimeter and area of a given polygon and present it to the class. 	<p><u>Primary Text: Maths for Junior High for Liberia (Grade 7, Pupils Book), Pearson</u></p> <p>M.F. Macrae, et al. <i>New General Mathematics for Junior Secondary Schools 1</i> (Pearson/Longman)</p> <p><u>A. Secondary Text</u> Mathematical Association of Ghana, <i>Mathematics for Junior High Schools - Pupils' Book 1</i> (Pearson/Longman, 2005)</p> <p><u>Other Materials/Supplementary Readings</u></p> <ul style="list-style-type: none"> • Geometry set • Calculator • Computer <p>www.researchgate.net/publication/276906944</p>	<p>EXPECTED COMPETENCIES:</p> <ul style="list-style-type: none"> • Effective Communication • Analytical Skills, • Digital Skills, • Research and Problem Solving skills • Organizational ability • Creativity & Innovation skills <p>ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options:</p> <ul style="list-style-type: none"> • Attendances • Oral questions and Answers

				http://www.amsi.org.au/teacher_modules/pdfs/Sets_and_venn_diagrams.pdf www.khanacademy.com www.dictionary.com	<ul style="list-style-type: none">• Class Assignment and Participation• Observation• Assignments• Research• Quiz• Test• Exams
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SEMESTER: TWO

GRADE: 7

PERIOD: VI

TOPIC: CO-ORDINATE GEOMETRY

OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS /RESOURCES	COMPETENCIES/ ASSESSMENTS
Learner are able to apply their skills to determine the volume and surface area of figures, and identify locations and graphs of simple open sentences in a plane.	Upon completion of this topic, learners will: Solid geometry Surface areas of polygons. Volume of polygons Co-ordinate geometry; integers, negative and positive (number line) co-ordinate point graph of open sentences in one variable	1. Solid geometry a. Surface areas of polygons. b. Volume of polygons 2. Co-ordinate geometry; a. integers, negative and positive (number line) b. co-ordinate point b. graph of open sentences in one variable	<u>Inclusive and differentiate Learning:</u> <i>Individual seat work or group work in mixed groups, according to abilities, gender and learning styles</i> Guide learner to find the volumes and surface areas of figures. 1. Guide learners to plot points and determine the coordinate of integers in the rectangular co-ordinate system R^2 . 2. Assist learners to graph open sentences in one variable. 3. Guide learners to apply one variable sentence to solve problems on numbers, geometry and ages 4. Assist learners to use the scientific calculator.	A. Primary Text : Maths for Junior High for Liberia(Grade 7, Pupils Book), Pearson M.F. Macrae, et al. <i>New General Mathematics for Junior Secondary Schools 1</i> (Pearson/Longman) B. Secondary Text Mathematical Association of Ghana, <i>Mathematics for Junior High Schools - Pupils' Book 1</i> (Pearson/Longman, 2005) <u>Other Materials/Supplementary Readings</u> <ul style="list-style-type: none"> • Graph sheets. <ul style="list-style-type: none"> □ Number line • Computer • Scientific calculator 	EXPECTED COMPETENCIES: <ul style="list-style-type: none"> • Effective Communication • Analytical Skills, • Digital Skills, • Research and Problem Solving skills • Organizational ability • Creativity & Innovation skills ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options: <ul style="list-style-type: none"> • Attendances • Oral questions and Answers

				www.researchgate.net/publication/276906944 http://www.amsi.org.au/teacher_modules/pdfs/Sets_and_venn_diagrams.pdf www.khanacademy.com www.dictionary.com	<ul style="list-style-type: none"> • Class Assignment and Participation • Observation • Assignments • Research • Quiz • Test • Exams
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SEMESTER: ONE

GRADE: 8

PERIOD: I

TOPIC: A OPERATIONS ON RATIONAL NUMBERS AND NUMBER THEORY

OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCES/ ASSESSMENTS
Learners are able to apply knowledge of operations of rational numbers and number theory and solve basic related problems.	<p>Upon completion of this topic, learners will:</p> <p>1. Operations on Rational numbers:</p> <p>a) Adding and subtracting whole numbers, decimals, fractions and integers.</p> <p>b) Multiply and divide whole numbers, decimals, fractions and integers.</p> <p>2. Problems involving operations</p> <p>3. Prime factorization</p> <p>4. Exponents</p>	<p>Operations on Rational numbers</p> <p>Adding and subtracting whole numbers, decimals, fractions and integers.</p> <p>a. Multiply and divide whole numbers, decimals, fractions and integers.</p> <p>2. Problems involving</p> <p>3. operations</p> <p>4. Prime factorization</p> <p>5. 4.Exponents</p> <p>Operations</p> <p>-Prime factorization</p> <p>-Exponents</p>	<p><u>Inclusive and differentiate Learning:</u></p> <p><i>Individual seat work or group work in mixed groups, according to abilities, gender and learning styles</i></p> <p>1. Guide learners to use data on population pattern to add, subtract, multiply and divide whole numbers.</p> <p>2. Guide learners to find the fractional part of candidates votes polled in from the 2017 elections.</p> <p>3. Guide the learners to find the missing measurement to complete a recipe using fractions</p> <p>4. Guide learners to add birth rate (positive and death rate (negative) as integers</p> <p>5. Assist learners to Use exponents to show how a</p>	<p>Primary Text: Maths for Junior High for Liberia(Grade 8, Pupils Book), Pearson</p> <p>M.F. Macrae, et al. <i>New General Mathematics for Junior Secondary Schools 2</i> (Pearson/Longman)</p> <p>Secondary Text Mathematical Association of Ghana, <i>Mathematics for Junior High Schools - Pupils' Book 2</i> (Pearson/Longman, 2005)</p> <p>Other Materials/Supplementary Readings</p> <ul style="list-style-type: none"> • Graph sheets. • Number line • Computer • Scientific calculator • Poster on population census for a community. 	<p>EXPECTED COMPETENCES:</p> <ul style="list-style-type: none"> • Effective Communication • Analytical Skills, • Digital Skills, • Research and Problem Solving skills • Organizational ability • Creativity & Innovation skills <p>ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options:</p> <ul style="list-style-type: none"> • Attendances • Oral questions and Answers

	<p>Operations - Prime factorization Exponents</p>		<p>disease can become pandemic</p>	<p>www.researchgate.net/publication/276906944</p> <p>http://www.amsi.org.au/teacher_modules/pdfs/Sets_and venn_diagrams.pdf</p> <p>www.khanacademy.com</p> <p>www.dictionary.com</p>	<ul style="list-style-type: none"> • Class Assignment and Participation • Observation • Assignments • Research • Quiz • Test • Exams
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SEMESTER ONE

GRADE 8

PERIOD I

TOPIC: APPLICATIONS OF SETS OF

NUMBERS

OUTCOMES	OBJECTIVES	CONTENT	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCIES/ ASSESSMENTS
<p>Learners are able to find the intersection of sets, union of sets, completion of a set and the number of subsets.</p>	<p>Upon the completion of this topic, learners will:</p> <ul style="list-style-type: none"> • Find the intersection of sets. • Find the union of sets • Find the complement of a set. • Find and write the number of subsets in a set with up to 5 elements. 	<p>Applications of sets of numbers</p> <ol style="list-style-type: none"> a. Finding the intersection of sets b. Finding the union of sets c. Finding the complement of a set d. Number of subsets 	<p><u>Inclusive and differentiate Learning:</u></p> <p><i>Individual seat work or group work in mixed groups, according to abilities, gender and learning styles</i></p> <p>Review with learners the definition of intersection of sets.</p> <p>Assist learners find the intersection of sets as you give them the sets.</p> <p>Discuss the concept of Universal Set and the Venn diagram.</p> <p>Show the relationship between Universal set and given sets,</p> <p>Assist learners to use the Venn diagram to illustrate the intersection of sets.</p> <p>Guide learners to use the Venn diagram to illustrate the intersection of two sets that is a null set. What are the two sets called?</p>	<p>Primary text: Maths for Junior High for Liberia(Grade 8, Pupils Book), Pearson</p> <p>Secondary text:</p> <p>MATHEMATICS FOR JUNIOR HIGH SCHOOLS by Christian Akrong Hesse, Sept. 2012</p> <p>www.researchgate.net/publication/276906944</p> <p>http://www.amsi.org.au/teacher_modules/pdfs/Sets_and_venn_diagrams.pdf</p> <p>www.khanacademy.com</p> <p>www.dictionary.com</p>	<p>EXPECTED COMPETENCIES:</p> <ul style="list-style-type: none"> • Effective Communication • Analytical Skills, • Digital Skills, • Research and Problem Solving skills • Organizational ability • Creativity & Innovation skills <p><u>ASSESSMENTS STRATEGIES:</u></p> <p>Can be used to check competences. Select relevant options:</p> <ul style="list-style-type: none"> • Attendances • Oral questions and Answers

			<p>Review the definition of union of sets.</p> <p>Guide learners to use the Venn diagram to illustrate the union of two sets.</p> <p>Assist learners to use the Venn diagram to illustrate union of two disjoint sets.</p> <p>Define and discuss “complement of a set”. Guide learners to find the complement of a given set.</p> <p>Guide learners to use the Venn diagram to illustrate the complement of a given set.</p> <p>Guide learners to find the number of subsets of sets with elements up to 5.</p>		<ul style="list-style-type: none"> • Class Assignment and Participation • Observation • Assignments • Research • Quiz • Test • Exams
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SEMESTER: ONE

GRADE: 8
PERIOD: II
UNIT: II
TOPIC: BASIC ALGEBRAIC EXPRESSIONS AND FORMULAS

OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCES/ ASSESSMENTS
1. Learners are able to construct real-life problems which includes algebraic expression, binomials and trinomials and provide solutions.	<p>Upon completion of this topic , learners will:</p> <ol style="list-style-type: none"> 1. Evaluate basic expressions and formulas 2. Simplify basic algebraic expressions by combining like terms. 3. Solve problems involving basic algebraic expressions and formulas 4. Multiply and divide monomials. 5. Simplify numerical expressions by following the 	<ol style="list-style-type: none"> 1. Order of Operations 2. Algebraic Expressions 3. Using formulas 4. Adding and subtracting monomials, binomials and trinomials 5. Multiplying and dividing monomials, binomials and trinomials (laws of indices) 6. Equations involving inequalities 7. Solve verbal problems involving 	<p><u>Inclusive and differentiate Learning:</u> <i>Individual seat work or group work in mixed groups, according to abilities, gender and learning styles</i></p> <ol style="list-style-type: none"> 1. Guide learners to simplifying expressions involving order of operation. 2. Guide learners to evaluate algebraic expressions. 3. Assist learners to use formulas to solve problems. 4. Guide learners to add and subtract like terms. 	<p><u>Primary Text: Maths for Junior High for Liberia(Grade 7, Pupils Book), Pearson</u> M.F. Macrae, et al. <i>New General Mathematics for Junior Secondary Schools 2</i> (Pearson/Longman)</p> <p><u>A. Secondary Text</u> Mathematical Association of Ghana, <i>Mathematics for Junior High Schools - Pupils' Book 2</i> (Pearson/Longman, 2005)</p> <p><u>Other Materials/Supplementary Readings</u></p> <ul style="list-style-type: none"> • Graph sheets. • Number line • Computer • Scientific calculator • Poster on population census for a community. 	<p>EXPECTED COMPETENCES:</p> <ul style="list-style-type: none"> • Effective Communication • Analytical Skills, • Digital Skills, • Research and Problem Solving skills • Organizational ability • Creativity & Innovation skills <p>ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options:</p> <ul style="list-style-type: none"> • Attendances • Oral questions and Answers • Class Assignment and Participation

	order of operations.	algebraic expressions	5. Guide learners to multiply and divide monomials by using Laws of indices and present to the class.	www.researchgate.net/publication/276906944 http://www.amsi.org.au/teacher_modules/pdfs/Sets_and_venn_diagrams.pdf www.khanacademy.com www.dictionary.com	<ul style="list-style-type: none"> • Observation • Assignments • Research • Quiz • Test • Exams
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SEMESTER: ONE

GRADE: 8

PERIOD: III

TOPIC: PERCENT, PROPORTION AND RATES

OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCES/ ASSESSMENTS
<p>Learners are able to apply the concepts of percent and calculate simple interest, discount and commission, percent gain or loss, rates and word problems</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> 1. Convert fractions and decimals to percent and vice – versa 2. Identify the three types of percent. 3. Find rates using proportions. 4. Find simple interest, discount, commission, percent gain or loss, sales tax. 5. Solve word problems involving 	<ol style="list-style-type: none"> 1. Fractions, Decimals and Percent 2. The three parts of percent 3. Simple interest 4. Discount and commission 5. Percent gain or loss 6. Rates and unit rates 7. Word problems involving percent, using proportion to 	<p><u>Inclusive and differentiate Learning:</u> <i>Individual seat work or group work in mixed groups, according to abilities, gender and learning styles</i></p> <ol style="list-style-type: none"> 1. Guide learners to relate fractions, decimals and percent using graph paper. 2. Guide learners to use rates of goods to determine a better buy. 3. Open a mini business in the class using “symbol” money to purchase items on interest, as loan. 4. Guide learners to find the percentage of votes polled by candidates in the 	<p><u>Primary Text: Maths for Junior High for Liberia(Grade 8, Pupils Book), Pearson</u></p> <p>M.F. Macrae, et al. <i>New General Mathematics for Junior Secondary Schools 2</i> (Pearson/Longman)</p> <p><u>A. Secondary Text</u> Mathematical Association of Ghana, <i>Mathematics for Junior High Schools - Pupils’ Book 2</i> (Pearson/Longman, 2005)</p> <p><u>Other Materials/Supplementary Readings</u></p> <ul style="list-style-type: none"> □ Graph sheets. Number line Computer Scientific calculator Poster on population census for a community. 	<p>EXPECTED COMPETENCES</p> <ul style="list-style-type: none"> • Effective Communication • Analytical Skills, • Digital Skills, • Research and Problem Solving skills • Organizational ability • Creativity & Innovation skills <p>ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options:</p> <ul style="list-style-type: none"> • Attendances • Oral questions and Answers

	<p>applications of percent.</p> <p>6. Solve problems involving ratio and proportion</p>	<p>solve problems involving scale drawing (map and actual distance)</p>	<p>2017 general elections.</p> <p>5. Assist learners to compare orange and Lone Star telephone rates , discuss and present to the class</p> <p>6. Assist learners to find actual (ground) distances using Atlas of Liberia.</p>	<p>Number line Computer Scientific calculator Poster on population census for a community.</p> <p>www.researchgate.net/publication/276906944</p> <p>http://www.amsi.org.au/teacher_modules/pdfs/Sets_and_venn_diagrams.pdf</p> <p>www.khanacademy.com</p> <p>www.dictionary.com</p>	<ul style="list-style-type: none"> • Class Assignment and Participation • Observation • Assignments • Research • Quiz • Test • Exams
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SEMESTER: TWO

GRADE: 8

PERIOD: IV

TOPICS: 1. APPLICATION OF ALGEBRAIC CONCEPTS

2. RELATIONS AND FUNCTIONS

OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCES/A SSESSMENTS
<p>Learners are able to apply concepts and skills to solve problems involving numbers, ages and geometry. They are able also to determine domains and ranges of relations and function, graph relations, add, subtract, and multiply polynomials.</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> 1. Solve problems involving numbers, age, geometry, coins, etc. 2. Find the domain and range of a relation or function. 3. Graph relations and functions 4. Add and subtract polynomials 	<ol style="list-style-type: none"> 1. Number problems 2. Age problems 3. Coin problems 4. Geometry problems 5. Relation and functions 6. Graphing linear 7. Inequalities 8. Polynomials <ol style="list-style-type: none"> a. Adding and subtracting polynomials 	<p><u>Inclusive and differentiate Learning:</u> <i>Individual seat work or group work in mixed groups, according to abilities, gender and learning styles</i></p> <ol style="list-style-type: none"> 1. Guide learners to solve problems in one variable on coin, age, geometry, numbers and population density. 2. Guide learners to construct graph of order pairs. 3. Assist learners to differentiate between a relation and function. 4. Assist learners to determine the domain and the range of a function. 	<p><u>A. Primary Text:</u> Maths for Junior High for Liberia(Grade 8, Pupils Book), Pearson</p> <p>M.F. Macrae, et al. <i>New General Mathematics for Junior Secondary Schools 2</i> (Pearson/Longman)</p> <p><u>B. Secondary Text</u> Mathematical Association of Ghana, <i>Mathematics for Junior High Schools - Pupils' Book 2</i> (Pearson/Longman, 2005)</p> <p><u>Other Materials/Supplementary Readings</u></p> <ul style="list-style-type: none"> • Graph sheets. • Number line • Computer • Scientific calculator 	<p>EXPECTED COMPETENCES:</p> <ul style="list-style-type: none"> • Effective Communication • Analytical Skills, • Digital Skills, • Research and Problem • Solving skills • Organizational ability • Creativity & Innovation skills <p>ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options:</p> <ul style="list-style-type: none"> • Attendances

	<p>5. Add and subtract polynomials</p> <p>6. Multiply polynomials by monomials and / or binomials.</p>	<p>b. Multiplying polynomials by monomials, monomials and binomials</p>	<p>5. Guide learners to find the product of Polynomials of:</p> <p>a. two monomials b. two binomials</p>	<ul style="list-style-type: none"> • Poster on population census for a community. <p>www.researchgate.net/publication/276906944</p> <p>http://www.amsi.org.au/teacher_modules/pdfs/Sets_and_venn_diagrams.pdf</p> <p>www.khanacademy.com</p> <p>www.dictionary.com</p>	<ul style="list-style-type: none"> • Oral questions and Answers • Class Assignment and Participation • Observation • Assignments • Research • Quiz • Test • Exams
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SEMESTER ONE

GRADE 8

PERIOD IV

TOPIC: SIMULTANEOUS EQUATIONS

OUTCOMES	OBJECTIVES	CONTENT	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCIES/ ASSESSMENTS
<p>Learners are able to apply concepts to solve simultaneous equations by elimination and substitution methods</p>	<p>Upon completion of this topic, learners will:</p> <p>5.1 Solve simultaneous equations by elimination method</p> <p>5.2 Solve simultaneous equations by substitution method</p> <p>5.3 solve simultaneous equations by graph</p> <p>5.4 Solve simple word problems on simultaneous equations.</p>	<p>1. Simultaneous Equations</p> <p>1.1 Elimination Method</p> <p>1.2 Substitution Method</p> <p>1.3 Graphical Method</p> <p>1.4 Systems of equations word problems</p>	<p><u>Inclusive and differentiate Learning:</u> <i>Individual seat work or group work in mixed groups, according to abilities, gender and learning styles</i></p> <p>Define and discuss the “elimination method”.</p> <p>Assist learners to solve two systems of linear equations with unlike signs</p> <p>Assist learners to solve two systems of linear equations with like signs.</p> <p>Define and discuss the “substitution of method”</p> <p>Assist learners to solve simultaneous equations using substitution method</p> <p>Assist learners to solve simultaneous equations by the method of graphing</p> <p>Guide learners to formulate and solve simultaneous equations from word problems.</p> <p>Note: Do not include fractional equations in all problems on this topic.</p>	<p>Primary text: Maths for Junior High for Liberia(Grade 8, Pupils Book), Pearson Secondary text:</p> <p>MATHEMATICS FOR JUNIOR HIGH SCHOOLS by Christian Akrong Hesse , Sept. 2012</p> <p>www.researchgate.net/publication/276906944</p> <p>https://www.khanacademy.org/math/algebra/systems-of-linear-equations#equivalent-systems-of-equations</p> <p>Other Materials</p> <ul style="list-style-type: none"> • Graph notebook • Ruler • Eraser 	<p>Expected competencies:</p> <ul style="list-style-type: none"> • Effective Communication • Analytical Skills, • Digital Skills, • Research and Problem Solving skills • Organizational ability • Creativity & Innovation skills <p>ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options:</p> <ul style="list-style-type: none"> • Attendances • Oral questions and Answers

					<ul style="list-style-type: none">• Class Assignment and Participation• Observation• Assignments• Research• Quiz• Test• Exams
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SEMESTER: TWO

GRADE: 8

PERIOD: V

TOPIC: GEOMETRY AND MEASUREMENT

OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCES/ ASSESSMENTS
<p>Learner are able to apply the concepts to identify vertical, adjacent, complementary and supplementary angles. Compute the sum of angles of polygons, construct angles and triangles by SAS, ASA, SSS, find the areas of trapezoids, surface areas of prism and convert metric units</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> 1. Identify angle relationship (vertical, adjacent, complementary, and supplementary) 2. Compute the sums of angles in a given polygon 3. Construct angles and triangles by SAS, ASA, SSS 4. Find the area of trapezoid 5. Find the surface areas of prisms 6. Convert selected metric units. 	<ol style="list-style-type: none"> 1. Angle relationship <ol style="list-style-type: none"> a. Vertical angles b. Adjacent angles c. Complementary and supplementary angles 2. Simple polygons (sum of interior angles of regular polygons) 3. Construction of angles and triangles by using (SAS, ASA, SSS) 4. Area of trapezoid 5. Surface area of prisms 6. Conversion of metric units (selected units) 	<p><u>Inclusive and differentiate Learning:</u> <i>Individual seat work or group work in mixed groups, according to abilities, gender and learning styles</i></p> <ol style="list-style-type: none"> 1. Guide learners to draw two lines intersecting, and identify and name vertical and adjacent angles. 2. Guide learners to draw a right and straight angles and bisect their vertex angles using a ruler and identify and name the complementary and supplementary angles. 3. Guide learners to draw regular polygons. Divide each polygon into triangles by drawing lines from one point (vertex) to points (vertices) to form triangles. The sums of the inscribed triangles is 	<p><u>A. Primary Text:</u> Maths for Junior High for Liberia(Grade 8, Pupils Book), Pearson M.F. Macrae, et al. <i>New General Mathematics for Junior Secondary Schools 2</i> (Pearson/Longman)</p> <p><u>B. Secondary Text</u> Mathematical Association of Ghana, <i>Mathematics for Junior High Schools - Pupils' Book 2</i> (Pearson/Longman, 2005)</p> <p><u>Other Materials/Supplementary Readings</u> □ Graph sheets. •</p> <p>Number line Computer Scientific calculator Poster on population census for a community.</p> <p>Number line</p>	<p>EXPECTED COMPETENCES</p> <ul style="list-style-type: none"> • Effective Communication • Analytical Skills, • Digital Skills, • Research and Problem Solving skills • Organizational ability • Creativity & Innovation skills <p><u>ASSESSMENTS STRATEGIES:</u> Can be used to check competences. Select relevant options:</p> <ul style="list-style-type: none"> • Attendances • Oral questions and Answers

			<p>the sum of the interior angles of the regular polygon.</p> <p>4. Guide learners to use their compasses, protractors and rulers to construct angles and triangles by SAS, ASA and SSS.</p> <p>5. Guide learners to draw and find areas of trapezoid using the formula</p> <p>6. Guide learners to compute the surface areas of prisms using the formula as well as cubes and cuboids.</p> <p>7. Guide learners to convert between metric units considering length, mass, capacity and time.</p> <p>8. Guide learners to also change units of areas, volumes and surface areas using a carton.</p> <p>9. Assist learners find metric units</p>	<p>Computer Scientific calculator Poster on population census for a community</p> <p>www.researchgate.net/publication/276906944</p> <p>http://www.amsi.org.au/teacher_modules/pdfs/Sets and venn diagrams.pdf</p> <p>www.khanacademy.com</p> <p>www.dictionary.com</p>	<ul style="list-style-type: none"> • Class Assignment and Participation • Observation • Assignments • Research • Quiz • Test • Exams
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			conversion using physical models.		
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SEMESTER: TWO

GRADE: 8

PERIOD: VI

TOPIC: PROBABILITY, STATISTICS AND TRIGONOMETRY

OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCES/ ASSESSMENTS
Learners are able to apply the concepts and skills of statistics and probability to construct frequency tables, histograms and predict various simple events using the population data. They are able to also apply Pythagoras' Theorem to simple right-angled triangle	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> 1. Correctly arrange data in descending and ascending order 2. Prepare frequency table and construct histogram. 3. Make and interpret double bar graphs, double line graphs and circle graphs 4. Compute the mode, median, and mean of a set of a 5. Population data. 	<ol style="list-style-type: none"> 1. Frequency tables and Histograms 2. Measures of variability (range, variance and standard deviation) 3. Making and interpreting graphs(double bar , double lines , and circle) 4. Experiments with games of chance 5. Probability of an event(simple, independent, dependent) 6. Solving problems using 	<p><u>Inclusive and differentiate Learning:</u> <i>Individual seat work or group work in mixed groups, according to abilities, gender and learning styles</i></p> <ol style="list-style-type: none"> 1. Guide learners to go to a nearby health center and collect data on malaria patients for a month considering the following age range: (1-15 years). Use data to construct the frequency tables and histograms. 2. Guide learners to find the range, variance and standard deviation by using the population data. 3. Assist learners construct and interpret double bar graphs, double line graphs and circle graphs from data collected about students in the school (family size, favorite leader). 4. Assist learner define and discuss the following: 	<p><u>A. Primary Text: Maths for Junior High for Liberia(Grade 8, Pupils Book), Pearson</u> M.F. Macrae, et al. <i>New General Mathematics for Junior Secondary Schools 2</i> (Pearson/Longman)</p> <p><u>B. Secondary Text</u> Mathematical Association of Ghana, <i>Mathematics for Junior High Schools - Pupils' Book 2</i> (Pearson/Longman, 2005)</p> <p><u>Other Materials/Supplementary Readings</u></p> <ul style="list-style-type: none"> • Graph sheets. • Number line • Computer • Scientific calculator • Poster on population census for a community. 	<p>EXPECTED COMPETENCES:</p> <ul style="list-style-type: none"> • Effective Communication • Analytical Skills, • Digital Skills, • Research and Problem Solving skills • Organizational ability • Creativity & Innovation skills <p>ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options:</p> <ul style="list-style-type: none"> • -Attendances • -Oral questions and Answers • -Class Assignment and Participation • -Observation

	<p>6. Find the range, variance and standard deviation, using population data.</p> <p>7. Compute the probability of simple, independent and dependent events, using population data.</p> <p>8. Squares and Square Roots.</p> <p>9. Solve problems using Pythagoras Theorem.</p>	<p>Pythagoras Theorem</p>	<p>sample space and simple event. Form a sample space using some characteristics of a population data as events. Represent each event with figures from the population data. Find the probability of each simple event in the sample space- i.e. (probability of contracting STI, HI V etc.).</p> <p>5. Toss a coin, roll a die or spin the probability spinner and record events.</p> <p>6. Let learners review square and square root of real numbers.</p> <p>7. Let learners draw a right angle- triangle and label the longest length as “c”, other two lengths as “a” and “b” respectively. The longest length is called hypotenuse. Use the Pythagoras Theorem: The Theorem states that in any right –angled triangle, the square on the hypotenuse is equal to the sum of the squares of the other two sizes; $c^2 \equiv a^2 + b^2$</p>	<p>www.researchgate.net/publication/276906944</p> <p>http://www.amsi.org.au/teaching_modules/pdfs/Sets_and_venn_diagrams.pdf</p> <p>www.khanacademy.com</p> <p>www.dictionary.com</p>	<ul style="list-style-type: none"> ● -Assignments ● -Research ● -Quiz ● -Test ● -Exams
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SEMESTER ONE

GRADE 8
PERIOD VI
TOPIC : BEARING AND VECTORS

OUTCOMES	OBJECTIVES	CONTENT	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCIES/ ASSESSMENTS
Learners are able to locate the position of a point given its bearing and distance from a given point, identify the length and bearing of a vector, identify zero vector and identify equal vectors.	<p>Upon completion of the topic, learners will:</p> <ul style="list-style-type: none"> • Locate the position of a point given its bearing and distance from a given point • Identify the length and bearing of a vector • Identify a zero vector • Components of a vector in a number plane • Identify equal vectors 	<p>1.0 Bearing and vectors</p> <p>1.1 Bearing of a point from another point</p> <p>1.2 Idea of a vector</p> <p>1.3 Zero Vector</p> <p>1.4 components of a vector</p> <p>1.5 Equal vectors</p>	<p><u>Inclusive and differentiate Learning:</u> <i>Individual seat work or group work in mixed groups, according to abilities, gender and learning styles</i></p> <p>Define and discuss the concept of a bearing.</p> <p>Guide learners to describe the bearing of the cardinal points, North, East, South and West as $000^{\circ}(360^{\circ})$, 090°, 180° and 270° Respectively.</p> <p>Guide learners to locate the positions of points given their bearing from a given point.</p> <p>Assist learners to identify a vector as a movement (distance) along a given bearing.</p> <p>Guide learners take the distance along a vector as its length and a 3-digit clockwise angle from the north as its bearing.</p>	<p>Primary text : Maths for Junior High for Liberia(Grade 8, Pupils Book), Pearson</p> <p>Supplementary text:</p> <p>: MATHEMATICS FOR JUNIOR HIGH SCHOOLS by Christian Akrong Hesse , Sept. 2012</p> <p>www.researchgate.net/publication/276906944</p> <p>https://www.doctortang.com/AppliedMath30/Vectors%20Notes%20(answers).pdf</p> <p>Other materials:</p> <ul style="list-style-type: none"> ✓ Graph notebook ✓ Mathematical set 	<p>Expected competencies:</p> <ul style="list-style-type: none"> • Effective Communication • Analytical Skills, • Digital Skills, • Research and Problem Solving skills • Organizational ability • Creativity & Innovation skills <p>ASSESSMENTS STRATEGIES:</p> <p>Can be used to check competences. Select relevant options:</p> <ul style="list-style-type: none"> • Attendances • Oral questions and Answers • Class Assignment and Participation

			<p>Assist learners to identify a zero vector</p> <p>Assist learners to demonstrate graphically in the number plane to develop the concept of component of a vector \vec{AB} as the horizontal and vertical distances travelled from A to B</p> <p>Guide learners to identify equal vectors as</p> <ul style="list-style-type: none"> • Having the same magnitude (length) • Having the same direction • the x-components are the same • the y-components are the same 		<ul style="list-style-type: none"> • Observation • Assignments • Research • Quiz • Test • Exams
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SEMESTER ONE

GRADE 9
PERIOD I
TOPIC: TWO-SET PROBLEMS

OUTCOMES	OBJECTIVES	COTENT	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCIES/ ASSESSMENTS
<p>Learners are able to apply the concepts of sets to solve simple two-set problems using the Venn diagram, find the complement of a set and represent it on the Venn diagram and determine the number of subsets of a set and determine rule for finding the number of subsets of a set.</p>	<p>Upon completion of this topic, learners will:</p> <ul style="list-style-type: none"> • Draw and use Venn diagrams to solve simple two-set problems • Find and write the number of subsets in a set with up to 5 elements. • Find the rule of the number of subsets in a set 	<ol style="list-style-type: none"> 1. Two-set problems 2. Number of subsets 	<p><u>Inclusive and differentiate Learning:</u> <i>Individual seat work or group work in mixed groups, according to abilities, gender and learning styles</i></p> <p>Guide learners to determine the Universal set of two sets by listing the members of the Universal set</p> <p>Assist learners to represent sets in the Venn diagram</p> <p>Guide learners to find the complement of a set and represent it on the Venn diagram</p> <p>Assist learners to use the Venn diagram to solve two- set problems</p> <p>Assist learners to write all the subsets of a given set with elements up to five.</p>	<p>Primary text : Maths for Junior High for Liberia(Grade 9, Pupils Book), Pearson Secondary text: : MATHEMATICS FOR JUNIOR HIGH SCHOOLS by Christian Akrong Hesse , Sept. 2012</p> <p>www.researchgate.net/publication/276906944</p> <p>http://www.amsi.org.au/teacher_modules/pdfs/Sets_and_venn_diagrams.pdf</p> <p>www.researchgate.net/publication/276906944</p> <p>http://www.amsi.org.au/teacher_modules/pdfs/Sets_and_venn_diagrams.pdf</p> <p>www.khanacademy.com</p> <p>www.dictionary.com</p>	<p>Expected competencies:</p> <ul style="list-style-type: none"> • Effective Communication • Analytical Skills, • Digital Skills, • Research and Problem Solving skills • Organizational ability • Creativity & Innovation skills <p>ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options:</p> <ul style="list-style-type: none"> • Attendances • Oral questions and Answers • Class Assignment and Participation • Observation • Assignments

			<p>Guide learners to find the number of subsets in a set with</p> <ul style="list-style-type: none"> • One element • Two elements • Three elements, etc. <p>Assist learners to deduce the pattern made by the number of subsets in a set with various number of elements (0, 1 , 2, ... , n) as 2^n</p> <p>Note:</p> <ul style="list-style-type: none"> • The empty set is a subset of every set. • Every set is a subset of itself 		<ul style="list-style-type: none"> • Research • Quiz • Test • Exams
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SEMESTER: ONE

GRADE: 9
PERIOD: I
TOPIC: ARITHMETIC

OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCES/AS SESSMENTS
<p>Learners are able to demonstrate skills in identifying and defining rational and irrational numbers, solve ratio and proportion problems, solve problems on variation, speed, average and rate problems, compute simple and compound interest, etc.</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> 1. Identify and define rational and irrational numbers 2. Solve ratio, proportion, variation, speed, average and rate of work problems. 3. Compute simple and compound interests. 4. Using formulas (Geometry). 5. Find a rational number halfway between another. 	<ol style="list-style-type: none"> 1. Rational and irrational numbers 2. Ratio, proportion and percent 3. Variation, speed and rate of work problems 4. Simple and compound interest 5. Using Geometry formulas 6. Density and rational numbers 	<p><u>Inclusive and Differentiated activities</u> Learners working in small mixed groups, considering their abilities, gender, and learning styles shall:</p> <ol style="list-style-type: none"> 1. Assist learners to identify and classify rational and irrational numbers using basic rules. 2. Guide learners to add, subtract, multiply and divide rational numbers using data from population census as examples. 3. Guide learners to identify the means and extremes of a proportion. 	<p>A. <u>Primary Text: Maths for Junior High for Liberia(Grade 9, Pupils Book), Pearson</u> M.F. Macrae, et al. <i>New General Mathematics for Junior Secondary Schools 3</i> (Pearson/Longman)</p> <p>B. <u>Secondary Text</u> Mathematical Association of Ghana, <i>Mathematics for Junior High Schools - Pupils' Book 1</i> (Pearson/Longman, 2005)</p> <p><u>Other Materials/Supplementary Readings</u></p> <ul style="list-style-type: none"> • Geometric set • Boxes • Cylindrical objects • Liter cups • Medicine droppers 	<p>EXPECTED COMPETENCES:</p> <ul style="list-style-type: none"> • Effective Communication • Analytical Skills, • Digital Skills, • Research and Problem Solving skills • Organizational ability • Creativity & Innovation skills <p>ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options:</p> <ul style="list-style-type: none"> • Attendances • Oral questions and Answers

			<p>4. Assist learners to use ratios and proportions to compute the shares of partners in a business, etc.</p> <p>5. Guide learners to solve problems involving direct and inverse variation.</p>	<p>Rulers and meter stick Graph sheets Coins Die Different stoppers Different color chalks Poster sheets Rulers and meter stick Graph sheets Coins Die Different stoppers Different color chalks Poster sheets</p> <p>www.researchgate.net/publication/276906944</p> <p>http://www.amsi.org.au/teacher_modules/pdfs/Sets_and_venn_diagrams.pdf</p> <p>www.khanacademy.com</p> <p>www.dictionary.com</p>	<ul style="list-style-type: none"> • Class Assignment and Participation • Observation • Assignments • Research • Quiz • Test • Exams
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SEMESTER: ONE

GRADE: 9
PERIOD: II
TOPIC: BASIC ALGEBRA

OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCES/ ASSESSMENTS
Learners are able to solve problems on indices and radicals in multiplying and dividing numbers, simplify radicals, convert radicals to exponents and vice-versa, add, subtract, multiply and divide polynomials, and find the squares of binomials and factor the difference of two squares	Upon completion of this topic, learners will: 1. Apply the laws of indices to simplify expressions 2. Simplify radicals and radical expressions 3. Convert radicals to exponents 4. Add and subtract polynomials 5. Multiply polynomials by a. Monomial b. Binomials by binomial 6. Factor the difference of two squares	1. Law of Indices 2. Simplifying radicals 3. Converting radicals to exponents 4. Adding and subtracting polynomials 5. Multiplying a. polynomials by monomials b. Binomials by binomials 6. Dividing polynomials by binomials 7. Factoring difference of two squares	<u>Inclusive and Differentiated activities</u> Learners working in small mixed groups, considering their abilities, gender, and learning styles shall: 1. Guide learners to use two polynomials and determine the sum and difference of the polynomials. 2. Assist learners to multiply two monomials and determine the product. 3. Guide learners to multiply two binomials and find the product. 4. Assist learners to multiply a polynomial by a monomial and find the product.	A. <u>Primary Text: Maths for Junior High for Liberia(Grade 9, Pupils Book), Pearson</u> M.F. Macrae, et al. <i>New General Mathematics for Junior Secondary Schools 3</i> (Pearson/Longman) B. <u>Secondary Text</u> Mathematical Association of Ghana, <i>Mathematics for Junior High Schools - Pupils' Book 1</i> (Pearson/Longman, 2005) <u>Other Materials/Supplementary Readings</u> <ul style="list-style-type: none"> • Geometric set • Boxes • Cylindrical objects • Liter cups • Medicine droppers • Rulers and meter stick • Graph sheets • Coins 	EXPECTED COMPETENCES: <ul style="list-style-type: none"> • Effective Communication • Analytical Skills, • Digital Skills, • Research and Problem Solving skills • Organizational ability • Creativity & Innovation skills ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options: <ul style="list-style-type: none"> • Attendances • Oral questions and Answers • Class Assignment and Participation

		<p>8. Exponential expressions and radical expressions</p>	<p>5. Guide learners to divide polynomial by monomial and binomial.</p> <p>6. Guide learners to convert exponential expression to radical expression and vice versa.</p> <p>7. Assist learners to expand the sum of the binomial and difference of the binomial.</p> <p>8. Assist learners to also determine the factors of the difference of the two square</p> <p>9. Guide learners to convert exponential expressions to radical expression and conversely.</p> <p>10. Guide learners to factor the difference of two squares using method as: $x^2 - y^2 = x^2 - xy + xy - y^2$ $= x(x + y) - y(x + y)$ $= (x + y)(x - y)$</p>	<ul style="list-style-type: none"> • Die • Different stoppers • Different color chalks • Poster sheets <p>Applying the law of indices in multiplying and dividing arithmetic and algebraic expressions.</p> <p>www.researchgate.net/publication/276906944</p> <p>http://www.amsi.org.au/teacher_modules/pdfs/Sets_and_venn_diagrams.pdf</p> <p>www.khanacademy.com</p> <p>www.dictionary.com</p>	<ul style="list-style-type: none"> • Observation • Assignments • Research • Quiz • Test • Exams
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SEMESTER: ONE

GRADE: 9

PERIOD: III

TOPIC: RELATIONS AND FUNCTIONS

OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCES/ ASSESSMENTS
<p>Learners are able to apply concepts and skills to graph linear equations in two variables in the Cartesian Coordinate Plane and interpret linear graphs , evaluate functions and solve word problems on linear equations</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> 1. Define and represent relations and functions. 2. Find the Cartesian product of two relations and determine the domain and range of a given relation. 3. Evaluate linear function in one variable. 4. Determine the slope of a line given its equation and two points and vice – versa. 5. Evaluate linear function in two variables. 6. Graph linear equations in two variables given its slope and point. 	<ol style="list-style-type: none"> 1. Cartesian Product 2. Relations and Functions 3. Domains and Ranges 4. Linear Function in one variable (graphs) 5. Slope of a line given two points 6. Solving problems involving linear functions in one variable 7. Linear functions in two variables 8. Equation and graph of a line given its slope and y-intercept. 	<p><u>Inclusive and Differentiated activities</u> Learners working in small mixed groups, considering their abilities, gender, and learning styles shall:</p> <p>Assist learners to find Cartesian Products given two sets $A = \{2,3,5,7\}$ and $B = \{10,12,14,15\}$ Guide learners to use set A and set B above to pair the elements of set A with set B. and determine the domain and range of a given relation.</p> <p>1. Assist learners to evaluate linear functions</p>	<p>A. <u>Primary Text:</u> Maths for Junior High for Liberia(Grade 9, Pupils Book), Pearson M.F. Macrae, et al. <i>New General Mathematics for Junior Secondary Schools 3</i> (Pearson/Longman</p> <p>B. <u>Secondary Text</u> Mathematical Association of Ghana, <i>Mathematics for Junior High Schools - Pupils' Book 1</i> (Pearson/Longman, 2005)</p> <p><u>Other Materials/Supplementary Readings</u></p> <ul style="list-style-type: none"> ▪ Geometric set ▪ Boxes ▪ Cylindrical objects ▪ Liter cups ▪ Medicine droppers ▪ Rulers and meter stick ▪ Graph sheets ▪ Coins 	<p>EXPECTED COMPETENCES:</p> <ul style="list-style-type: none"> • Effective Communication • Analytical Skills, • Digital Skills, • Research and Problem Solving skills • Organizational ability • Creativity & Innovation skills <p><u>ASSESSMENTS STRATEGIES:</u> Can be used to check competences. Select relevant options:</p> <ul style="list-style-type: none"> • Attendances • Oral questions and Answers • Class Assignment and Participation • Observation

	<p>7. Solve problems involving linear function by graphing.</p>		<p>(one and two variables).</p> <p>2. Guide learners to graph linear functions.</p> <p>3. Assist learners to find the slope of a line given its equation.</p> <p>4. Guide learners to determine the slope of a line when two points are given.</p> <p>5. Guide learners to find the equation and graph of a line when its slope and y – intercept are known</p>	<ul style="list-style-type: none"> ▪ Die ▪ Different stoppers ▪ Different color chalks ▪ Poster sheets <p>Boxes Cylindrical objects Liter cups Medicine droppers Rulers and meter stick Graph sheets Coins</p> <p>Die Different stoppers Different color chalks Poster sheets</p> <p>www.researchgate.net/publication/276906944</p> <p>http://www.amsi.org.au/teacher_modules/pdfs/Sets_and_venn_diagrams.pdf</p> <p>www.khanacademy.com</p> <p>www.dictionary.com</p>	<ul style="list-style-type: none"> • Assignments • Research • Quiz • Test • Exams
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SEMESTER ONE

GRADE 9

PERIOD III

TOPIC: SIMULTANEOUS EQUATIONS

OUTCOMES	OBJECTIVES	CONTENT	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCIES/ ASSESSMENTS
Learners are able to solve simultaneous equations (both mechanical and word using the following methods: <ul style="list-style-type: none"> • Elimination method • Substitution method • Graphical method 	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> 1. Solve simultaneous equations using elimination 2. Solve simultaneous equations using substitution method 3. Solve simultaneous equations using graph 4. Solve basic word problems 	<p>5. Simultaneous Equations</p> <p>5.1 Elimination Method</p> <p>5.2 Substitution Method</p> <p>5.3 Graphical Method</p> <p>5.4 Systems of equations Word Problem</p>	<p><u>Inclusive and Differentiated activities</u></p> <p>Learners working in small mixed groups, considering their abilities, gender, and learning styles shall:</p> <p>Review the elimination method with learners</p> <p>Assist learners to solve simultaneous equations with unlike signs by the elimination method.</p> <p>Assist learners to solve two systems of equations with like signs using elimination method.</p> <p>Review the substitution Method with learners.</p> <p>Assist learners to solve simultaneous equations by the substitution method</p> <p>Assist learners to solve systems of equations by the graphical method</p>	<p>Primary text : Maths for Junior High for Liberia(Grade 9, Pupils Book), Pearson</p> <p>Secondary text</p> <p>www.researchgate.net/publication/276906944</p> <p>http://www.amsi.org.au/teacher_modules/pdfs/Sets_and_venn_diagrams.pdf</p> <p>www.khanacademy.com</p> <p>www.dictionary.com</p> <p>:</p>	<p>EXPECTED COMPETENCES:</p> <ul style="list-style-type: none"> • Effective Communication • Analytical Skills, • Digital Skills, • Research and Problem Solving skills • Organizational ability • Creativity & Innovation skills <p>ASSESSMENTS STRATEGIES:</p> <p>Can be used to check competences. Select relevant options:</p> <ul style="list-style-type: none"> • Attendances • Oral questions and Answers

			<p>Assist learners to formulate and solve equations from word problems</p> <p>Note : Fractional equations should be included in all problems.</p>		<ul style="list-style-type: none"> • Class Assignment and Participation • Observation • Assignments • Research • Quiz • Test • Exams
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SEMESTER: TWO

GRADE: 9

PERIOD: IV

TOPIC: GEOMETRY

OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCES/ ASSESSMENTS
Learners are able to apply properties of parallel and perpendicular lines to solve problems, use the properties of regular polygons to find their sum of internal and external angles .They are able to construct triangles with properties (SSS, SAS and ASA) and parallelograms , solve problems on similar triangles and identify types of angles(vertical, adjacent, complementary and supplementary angles).	Upon completion of this topic, learners will be able to: 1. Identify, define and state examples of transversal of parallel lines, perpendicular lines and their properties. 2. Identify and define regular polygons and their properties. 3. Find the sum of interior and exterior angles of regular polygons. 4. Construct triangles using SSS, SAS or ASA. 5. Construct parallelograms.	1. Parallel and perpendicular lines 2. Properties of regular polygons 3. Finding the sum of interior and external angles of regular polygons 4. Construction of triangles using SSS, SAS or ASA 5. Construction of parallelograms 6. Similar Triangles 7. Types of angles: a. Vertical angles b. Adjacent angles c. Complementary and supplementary angles	<u>Inclusive and Differentiated activities</u> Learners working in small mixed groups, considering their abilities, gender, and learning styles shall: 1. Identify, define and illustrate a. Assist learners to identify, define and illustrate parallel lines and transversal, perpendicular lines. b. Assist learners identify the properties of parallel lines with a transversal and state them. c. Assist learners identify the properties of perpendicular lines and state them.	Primary Text: Maths for Junior High for Liberia(Grade 9, Pupils Book), Pearson M.F. Macrae, et al. <i>New General Mathematics for Junior Secondary Schools 3</i> (Pearson/Longman) Secondary Text Mathematical Association of Ghana, <i>Mathematics for Junior High Schools - Pupils' Book 1</i> (Pearson/Longman, 2005) Other Materials/ Supplementary Readings Geometric sets www.researchgate.net/publication/276906944 http://www.amsi.org.au/teacher_modules/pdfs/Sets_and_venn_diagrams.pdf	EXPECTED COMPETENCES: <ul style="list-style-type: none">• Effective Communication• Analytical Skills,• Digital Skills,• Research and Problem Solving skills• Organizational ability• Creativity & Innovation skills ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options: <ul style="list-style-type: none">• Attendances• Oral questions and Answers

	<p>6. Solve problems involving similar triangles.</p> <p>7. Identify vertical, adjacent, complementary and supplementary angles.</p>		<p>2. Identify and define</p> <p>a. Assist learners identify and define regular polygons and their properties.</p> <p>3. Assist learners compute the sum of internal and external angles of a regular polygons</p> <p>4. Assist learners to construct triangles with these properties SSS, SAS and ASA.</p> <p>5. Assis learners to construct parallelograms;</p> <p>6. Assist learners to solve problems on similar triangles</p> <p>7. Assist learners to identify vertical, adjacent, complementary and supplementary angles.</p>	<p>www.khanacademy.com</p> <p>www.dictionary.com</p>	<ul style="list-style-type: none"> • Class Assignment and Participation • Observation • Assignments • Research • Quiz • Test • Exams
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SEMESTER: TWO

GRADE: 9

PERIOD: V

TOPIC: A. TRIGONOMETRY

B. MEASUREMENT

OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCES/ ASSESSMENTS
<p>1. Learners are able apply the Pythagoras Theorem to compute one side of a right angle triangle when the other two sides are given.</p> <p>2. Solve problems involving Pythagoras Theorem.</p> <p>3. Identify, define and compute the trigonometric ratios(functions) of a:</p> <p style="margin-left: 20px;">a. Sine of Acute angles</p>	<p>Upon completion of this topic, learners will:</p> <p>1. Apply the Pythagoras Theorem to compute one side of a right angle triangle when the other two sides are given.</p> <p>2. Solve problems involving Pythagoras Theorem.</p> <p>3. Identify, define and compute the trigonometric ratios (functions) of a:</p> <p style="margin-left: 20px;">a. Sine of Acute angles</p> <p style="margin-left: 20px;">b. Cosine of Acute angles</p>	<p>1. The Pythagorean Theorem</p> <p>2. Application of Pythagorean Theorem</p> <p>3. Sine, cosine and tangent of acute angles</p> <p>4. Trigonometric Tables</p> <p>5. Applications of sine, cosine and tangent ratios.</p> <p>6. Angles of elevation and depression</p> <p>7. Converting metric units and customary units</p>	<p><u>Inclusive and Differentiated activities</u> Learners working in small mixed groups, considering their abilities, gender, and learning styles shall:</p> <p>1. Guide learners to discuss the relationship amongst the sides of a triangle.</p> <p>2. Guide learners to discuss the Pythagorean Theorem and use it to solve problems.</p> <p>3. Explain and write the sine, cosine and tangent of acute angles' relationship in their own words.</p> <p>4. Assist learners to extract data for sine, cosine, tangent,etc. from the trigonometric table</p>	<p>A. <u>Primary Text: Maths for Junior High for Liberia(Grade 9, Pupils Book), Pearson</u> M.F. Macrae, et al. <i>New General Mathematics for Junior Secondary Schools 3</i> (Pearson/Longman)</p> <p>B. <u>Secondary Text</u> Mathematical Association of Ghana, <i>Mathematics for Junior High Schools - Pupils' Book 1</i> (Pearson/Longman, 2005)</p> <p><u>Other Materials/Supplementary Readings</u></p> <ul style="list-style-type: none"> • Geometric set • Boxes • Cylindrical objects • Liter cups • Medicine droppers • Rulers and meter stick • Graph sheets • Coins 	<p>EXPECTED COMPETENCES:</p> <ul style="list-style-type: none"> • Effective Communication • Analytical Skills, • Digital Skills, • Research and Problem Solving skills • Organizational ability • Creativity & Innovation skills <p>ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options:</p> <ul style="list-style-type: none"> • Attendances • Oral questions and Answers

	<p>c. Tangent of Acute angles</p> <p>4. Find angles of depression and elevation using the sine, cosine and tangent of ratios.</p> <p>5. Use trigonometry tables (calculators) in finding sine, cosine and tangents of acute angles of right triangle</p> <p>6. Solve problems involving angle of elevation and depression.</p> <p>7. Convert metric units to customary units and vice versa.</p>		<p>5. Assist learners to apply sine, cosine, and tangent ratios to acute angles of a right triangle.</p> <p>6. Assist learners solve problems involving angles of elevation and depression</p> <p>7. Assist learners to convert metric units to customary units and vice versa</p> <p>8. Guide learners in groups on the application of sine, cosine and tangent ratios.</p> <p>9. Assist learners to use liter cup, medicine dropper, rulers and yardstick to determine the ratio using metric units and customary units of length and capacity.</p>	<ul style="list-style-type: none"> • Die • Different stoppers • Different color chalks • Poster sheets <p>www.researchgate.net/publication/276906944</p> <p>http://www.amsi.org.au/teacher_modules/pdfs/Sets_and_venn_diagrams.pdf</p> <p>www.khanacademy.com</p> <p>www.dictionary.com</p>	<ul style="list-style-type: none"> • Class Assignment and Participation • Observation • Assignments • Research • Quiz • Test • Exams
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SEMESTER: TWO

GRADE: 9

PERIOD: VI

TOPIC: PROBABILITY AND STATISTICS

OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCES/ ASSESSMENTS
<p>1. Learners are able to make frequency tables and histograms from a given data.</p> <p>2. Find measures of central tendency using population data.</p> <p>3. Compute the measures of variability (range, variance and standard variation)</p> <p>4. Read and interpret stem and leaf, box and whiskers and scatter plots. Make stem and leaf plot from a set of class test scores.</p> <p>5. Use the fundamental counting principle in solving: a. Multiplication b. Venn diagram c. Diagrams with two finite.</p>	<p>Upon completion of this topic, learners will:</p> <p>1. Frequency tables and Histograms.</p> <p>2. Measures of Central tendency (mode, median and mean).</p> <p>3. Measure of variability (range, variance and standard variation).</p> <p>4. Stem and leaf plot</p> <p>5. Box and whisker plot</p> <p>6. Scatter plot</p> <p>7. Permutation</p>	<p>1. Frequency table and Histograms</p> <p>2. Measures of central tendency (mode, median and mean)</p> <p>3. Measure of variability(range, variance and standard variation)</p> <p>4. Stem and leaf plot</p> <p>5. Box and whisker plot</p> <p>6. Scatter plot</p> <p>7. Combination</p> <p>8. Permutation</p>	<p>Divide learners into small mixed groups, according to abilities, gender and learning styles shall</p> <p>1. Collect data of the scores of 40 learners who sit the Math test. Construct a frequency table and histogram from the data.</p> <p>2. Collect and present data about favorite meal on a histogram and find the central tendency of the data.</p> <p>3. Make :</p> <p>a. Stem and leaf plot from class test scores.</p> <p>b. Box and whisker plots from class test score.</p> <p>4. List the number of attires taken from a set of shirts and trousers.</p>	<p>A. Primary Text: Maths for Junior High for Liberia(Grade 9, Pupils Book), Pearson M.F. Macrae, et al. <i>New General Mathematics for Junior Secondary Schools</i>(Pearson/ Longman)</p> <p>B. Secondary Text Mathematical Association of Ghana, <i>Mathematics for Junior High Schools - Pupils' Book</i>(Pearson/Longman, 2005)</p> <p>Other Materials/Supplementary Readings Geometric set Boxes Cylindrical objects Liter cups</p>	<p>EXPECTED COMPETENCES:</p> <ul style="list-style-type: none"> • Effective Communication • Analytical Skills, • Digital Skills, • Research and Problem Solving skills • Organizational ability • Creativity & Innovation skills <p>ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options:</p> <ul style="list-style-type: none"> • Attendances • Oral questions and Answers

<p>6. Find permutation and combination of an event occurrence.</p>	<p>8. Combination</p>		<p>find the probability of picking a color shirt and trouser from a set of attire.</p> <p>5. Define and explain the concepts of statistical terminologies and their effect on the population. Let learners use given data or hypothetical figures representing HIV data to make a frequency table. Use the frequency table to construct a histogram. Find the central tendencies (Mean, mode and median) using the data. Construct stem and leaf plot using the data. Construct the box and whisker plot using the data.</p>	<p>Medicine droppers Rulers and meter stick Graph sheets Coins Die Different stoppers Different color chalks Poster sheets www.researchgate.net/publication/276906944 http://www.amsi.org.au/teacher_modules/pdfs/Sets_and_venn_diagrams.pdf www.khanacademy.com www.dictionary.com</p>	<ul style="list-style-type: none"> • Class Assignment and Participation • Observation • Assignments • Research • Quiz • Test • Exams
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SEMESTER ONE

**GRADE 9
PERIOD VI
TOPIC: VECTOR ADDITION**

OUTCOMES	OBJECTIVES	CONTENT	ACTIVITIES	MATERIALS/RESOURCES	COMPETENCIES/ASSESSMENTS
<p>Learners are able to apply concepts to find sum of two vectors graphically and vectorially.</p>	<p>Upon completion of this topic, learners will:</p> <p>1. Add two vectors</p>	<p>1. Addition of two vectors</p>	<p><u>Inclusive and Differentiated activities</u> Learners working in small mixed groups, considering their abilities, gender, and learning styles shall:</p> <p>Review bearing and vectors with learners</p> <p>Guide learner to add vectors using graphical method</p> <p>Assist learners to find the magnitude and bearing of the sum (resultant) of two vectors by trigonometry.</p>	<p>Primary text: Maths for Junior High for Liberia(Grade 9, Pupils Book), Pearson MATHEMATICS FOR JUNIOR HIGH SCHOOLS by Christian Akrong Hesse , Sept. 2012</p> <p>www.researchgate.net/publication/276906944</p> <p>https://www.doctortang.com/AppliedMath30/Vectors%20Notes%20(answers).pdf</p> <p>Other materials:</p> <ul style="list-style-type: none"> ✓ Graph notebook ✓ Mathematical set 	<p>EXPECTED COMPETENCES:</p> <ul style="list-style-type: none"> • Effective Communication • Analytical Skills, • Digital Skills, • Research and Problem Solving skills • Organizational ability • Creativity & Innovation skills <p>ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options:</p> <ul style="list-style-type: none"> • Attendances • Oral questions and Answers • Class Assignment and Participation

					<ul style="list-style-type: none">• Observation• Assignments• Research• Quiz• Test• Exams
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