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.

GRADE 7 PERIOD I TOPIC: ARITHMETIC SKILLS

OUTCOMES	OBJECTIVES	CONTENT	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCIES/ ASSESSMENT
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.	 Upon completion of this topic, learners will: Identify, define and give examples of even, odd and composite numbers Compute factors and prime factorization of positive integers Explain the sieve of Eratosthenes to determine the prime and composite numbers between 1 and 100. Find the LCM, GCF, and LCD of given positive integers. State the divisibility rule for 2, 3, 5 and 9. Give examples of numbers divisible by 2, 3, 5 and 9 Find the square and square roots of a given number. 	 Even, odd, prime and composite numbers Factors and factoring Divisibility rule LCM, GCF, LCD Squares and square roots 	 Inclusive and differentiate Learning: Individual seat work or group work in mixed groups, according to abilities, gender and learning styles: Guide learners to Identify, define and give examples of even, odd, prime and composite numbers. Guide learners to Identify, define and give examples of divisibility rules for 2, 3, 5, and 9. Guide learners to use the sieve of the Eratosthenes to determine prime numbers between 1 and 100. Assist learners to compute factors and prime 	 <u>A. Primary Text</u> M.F. Macrae, et al. New General Mathematics for Junior Secondary Schools 1 (Pearson/Longman) <u>B. Secondary Text</u> Mathematical Association of Ghana, Mathematics for Junior High Schools - Pupils' Book 1 (Pearson/Longman, 2005) <u>Other</u> <u>Materials/Supplementary</u> <u>Readings</u> Wall chart containing definition of even, odd, prime and composite numbers. A chart containing the 	 EXPECTED COMPETENCIES: Effective Communication Analytical Skills, Digital Skills, Digital Skills, Research and Problem Solving skills Organizational ability Creativity & Innovation skills A ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options: Attendances Oral questions and Answers

Factorization of positive integers from any Population data.	 Class Assignment and Participation Observation Assignments
5. Assist learners to Find LCM, GCF and LCD of given positive numbers.	ResearchQuizTest
 6. Guide learner to apply Divisibility rules. 7. Assist learners to find the square and square root of numbers. 	• Exams

GRADE 7 PERIOD I TOPIC: SETS

OUTCOMES	OBJECTIVES	CONTENT	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCIES/ ASSESSMENT
Learners are	Upon completion of	1. SETS	Inclusive and differentiate	Primary Text: Maths for	Expected
able to:	this topic, learners	Sets of objects	Learning:	Junior High for	Competencies:
Identify sets of	will:	and numbers	Individual seat work or group work	Liberia(Grade 7, Pupils	• Effective
Identify sets of objects and	 Identify sets of 	1.1 Describing	in mixed groups, according to abilities, gender and learning styles:	Book), Pearson	Communication
numbers, describe and write sets of	objects and numbers	and writing sets	1. Guide learners collect and sort objects into group and allow	Secondary Texts: MATHEMATICS FOR JUNIOR HIGH SCHOOLS	 Analytical Skills,
objects and numbers, distinguish	 Describe and write sets of 	1.2 Types of Sets	learners to describe the group of objects formed.	by Christian Akrong Hesse , Sept. 2012	• Digital Skills,
between different types of sets.	objects and numbers	(Finite, infinite, Unit, Empty	2. Guide learners to form other sets (groups) according to a given criteria using objects and	www.researchgate.ne/publicati on/276906944	 Research and Problem Solving skills
They are also able to	 Distinguish between different types 	or null sets) 1.3 Equal and	numbers.	http://www.amsi.org.au/teache r modules/pdfs/Sets and ven	• Organizational ability
distinguish between equal and equivalent	of sets	Equivalent Sets	3. Introduce the concept of a well- defined collection of objects or ideas	n_diagrams.pdf www.khanacademy.com	• Creativity & Innovation skills
sets, write subsets of given sets with members up to 5 and list the members of an	 Distinguish between equal and equivalent sets Write subsets 	1.4 Subsets1.5 Intersection and Union of sets	4. Assist learners to use real life situations to form sets. E.g. the set of female students in the ninth Grade class.	www.dictionary.com	ASSESSMENTS <u>STRATEGIES:</u> Can be used to check competences. Select relevant
intersection and union of sets	of given sets with members up to 5		5. Introduce ways of describing and writing sets using:		 Attendances
			• Defining property; i.e. describing the		• Oral questions and Answers

*	• List the member	members (elements) of a set in	
	of an intersection	words. E.g.	• Class
	and union of sets	a set of mathematical instruments.	Assignment and
		Tisting the membrane of a set	Participation
		 Listing the members of a set using only curly brackets' { }' 	Observation
		and commas to separate the	• Assignments
		members. E.g. $\mathbf{S} = \{0, 1, 2,,$	-
		26}	• Research
		NOTE: Use capital letters to	• Quiz
		represent sets. E.g. $\mathbf{A} = \{\text{months of the year}\}.$	
		E.g. $\mathbf{A} = \{\text{months of the year}\}.$	• Test
		6. (i)Assist learners to define	• Exams
		following sets:	
		a. Finite Sets	
		b. Infinite Sets	
		c. Unit Sets	
		d. Empty or Null sets	
		(ii) Assist learners' list members of the different types of sets, count and	
		classify them.	
		(iii) Use real situations to illustrate	
		each of the four sets describe above.	
		Assist learners define the following :	
		a. equal sets	
		b. equivalent sets	
		(ii)Assist learners to establish equal	
		sets as sets having the same	
		members. E.g. $\mathbf{P} = \{ \text{odd numbers} \}$	
		between 2 and 8} $\Box \mathbf{P} = \{3, 5, 7\}$. Q	
		= {prime numbers between 2 and 8}	
		$\Box \mathbf{Q} = \{3, 5, 7\}, \mathbf{P} \text{ is equal to } \mathbf{Q}.$	

members from sets A and B, i.e. a set with members 1 and 12 as the intersection of sets A and B.	
Introduce the intersection symbol" \cap and write A intersection B as RRRRRA \cap B = {1,12}.	
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 <i>union</i> of sets A and B. It is written as $A \cup \Box B$ and read as A union B.	

GRADE: 7 PERIOD: II TOPIC: FRACTIONS

OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCIES/ ASSESSMENTS
Learners are able to demonstrate and apply the knowledge to solve problems on fractions, and express fractions in the form of ratio and proportion.	 Upon completion of this topic, learners will: Simplify complex fractions Pointing out the fractional parts of a complex fraction Expressing complex fractions to ratio, proportions 	 Operations on fractions Fractional parts of numbers Combining and simplifying complex fractions Ratio and proportion written as fractions Solve word problems on ratio and proportion 	 Inclusive and differentiate Learning: Individual seat work or group work in mixed groups, according to abilities, gender and learning styles: 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 	Primary Text: Maths for Junior High for Liberia (Grade 7, Pupils Book), PearsonM.F. Macrae, et al. New General Mathematics for Junior Secondary Schools 1 (Pearson/Longman)Secondary Text Mathematical Association of Ghana, Mathematics for Junior High Schools - Pupils' Book 1 (Pearson/Longman, 2005)Other Materials/Supplementary ReadingsWall chart containing definition of even, odd, prime and composite numbers.A chart containing divisibility rules	 EXPECTED COMPETENCIES: Effective Communication Analytical Skills, Digital Skills, Digital Skills, Research and Problem Solving skills Organizational ability Creativity & Innovation skills ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options: Attendances Oral questions and Answers Class Assignment and Participation

		www.researchgate.ne/publicati	•	Observation
		<u>on/276906944</u>	•	Assignments
		http://www.amsi.org.au/teacher	•	Research
		_modules/pdfs/Sets_and_venn_ diagrams.pdf	•	Quiz
			•	Test
		www.khanacademy.com	•	Exams
		www.dictionary.com		

GRADE: 7 PERIOD: III TOPIC: DECIMALS, PERCENTS AND FRACTIONS

OUTCOMES	Objectives	CONTENTS	ACTIVITIES	MATERIALS/RESOURCES	COMPETENCIES/ ASSESSMENTS
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.	 Upon completion of this topic , learners will: 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 rayolty 	 Conversion of decimal to percent and fraction Commission and discounts Simple interest, profit and loss Taxes and royalty. 	 Inclusive and differentiate Learning: Individual seat work or group work in mixed groups, according to abilities, gender and learning styles: 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. 	Primary Text: Maths for JuniorHigh for Liberia(Grade 7, PupilsBook), PearsonM.F. Macrae, et al. NewGeneral Mathematics forJunior Secondary Schools 1(Pearson/Longman)A. Secondary TextMathematical Association ofGhana, Mathematics for JuniorHigh Schools - Pupils' Book 1(Pearson/Longman, 2005)OtherMaterials/SupplementaryReadings• Poster sheets containing the formulas for finding simple interest, discount, profit and loss, taxes and royalty.• Scientific calculator.• Computerwww.researchgate.ne/publication/ 276906944	EXPECTED COMPETENCIES: • 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: • Attendances • Oral questions and Answers • Class Assignment and Participation • Observation • Assignments

		http://www.amsi.org.au/teacher_m	٠	Research
		odules/pdfs/Sets_and_venn_diagra ms.pdf	•	Quiz
		<u>ms.pur</u>	•	Test
		www.khanacademy.com	•	Exams
		www.dictionary.com	٠	

GRADE: 7 PERIOD: IV TOPIC: BASIC ALGEBRA

OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS/	COMPETENCIES/
				RESOURCES	ASSESSMENT
Learners are	Upon completion of	1. Positive and	Inclusive and	<u>A. Primary Text: Maths</u>	EXPECTED
able to	this topic, learners	negative	<u>differentiate Learning:</u>	for Junior High for	COMPETENCIES:
• Use the skills of adding,	will:Add, subtract, multiply and	integers(signed numbers)	Individual seat work or group work in mixed groups, according to abilities,	Liberia(Grade 7, Pupils Book), Pearson	• Effective Communication
subtracting, multiplying	divide signed numbers with	2. Operations of addition,	gender and learning styles:	M.F. Macrae, et al. New General Mathematics for	• Analytical Skills,
and dividing signed	emphasis on population	subtraction, multiplication	1. Guide learners to add, subtract, multiply and	Junior Secondary Schools 1 (Pearson/Longman)	• Digital Skills,
numbers in daily life situation.	concept such as births and mortality.	and division on signed numbers	divide signed numbers. 2. Guide learners to use the	<u>B.</u> Secondary Text Mathematical Association of	• Research and Problem Solving skills
• Evaluate algebraic expressions and	• Use the grouping symbols in performing basic operations	 3. Basic algebraic expressions and variables: a. variable b. constant 	grouping symbols in performing these basic operations stated in activity 1.	Ghana, Mathematics for Junior High Schools - Pupils' Book 1 (Pearson/Longman, 2005)	 Organizational ability Creativity & Innovation skills
formulas with specific emphasis on computing	• Identify, define and state examples of a term, variable, constant, co- efficient,	 c. co-efficient d. exponents 4. Algebraic expressions and 	3. Assist learners to identify, define and give examples of these terms: coefficient, exponent, monomial, binomial and trinomial.	Other Materials/Supplementary Readings Graph sheet	ASSESSMENTS <u>STRATEGIES:</u> Can be used to check competences. Select relevant options:
various population	exponent, monomial, binomial and	formulas 5. Solving and	4. Assist learners to evaluate expressions and formulas	Number line calculator Population data	Attendances
risks such as birth death and HIV etc.	 Evaluate algebraic expressions and 	graphing linear open sentences in one variable.	5. Guide learners to evaluate algebraic expressions and formula.	www.researchgate.ne/public ation/276906944	• Oral questions and Answers

formulas with specific emphasis on computing various population risks such as birth death, migration, etc. Solve and graph linear open sentences in one variable.		 3. Define and explain the concept of the various population risks: Birth rate Teenage Birth Abortion rate Teenage Abortion rate Teenage Abortion rate Estimated pregnancy rate Death rate HIV rate 4. State formulas for the following population risks Birth rate Teenage birth Abortion rate Teenage Abortion rate Teenage Abortion risks Birth rate Teenage birth Abortion rate Teenage Abortion rate Teenage Abortion rate HIV rate 	http://www.amsi.org.au/teac her_modules/pdfs/Sets_and_ venn_diagrams.pdf www.khanacademy.com www.dictionary.com	 Class Assignment and Participation Observation Assignments Research Quiz Test Exams Number line Calculator Population data
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GRADE: 7 PERIOD: V TOPIC: GEOMETRY

OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS /RESOURCES	COMPETENCIES/ ASSESSMENTS
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.	 Upon completion of this topic, learners will: 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. 	Construction A. Kinds of polygonsB. Perimeters and areas of PolygonsC. Angles Bisect line segments and angles	 Inclusive and differentiate Learning: Individual seat work or group work in mixed groups, according to abilities, gender and learning styles 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. 	Primary Text: Maths for Junior High for Liberia (Grade 7, Pupils Book), Pearson M.F. Macrae, et al. New General Mathematics for Junior Secondary Schools 1 (Pearson/Longman) A. Secondary Text Mathematical Association of Ghana, Mathematics for Junior High Schools - Pupils' Book 1 (Pearson/Longman, 2005) Other Materials/Supplementary Readings • Geometry set • Calculator • Computer Www.researchgate.ne/publi cation/276906944	 EXPECTED COMPETENCIES: Effective Communication Analytical Skills, Digital Skills, Digital Skills, Research and Problem Solving skills Organizational ability Creativity & Innovation skills ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options: Attendances Oral questions and Answers

	http://www.amsi.org.au/tea cher_modules/pdfs/Sets_an	•	Class Assignment and Participation
	<u>d_venn_diagrams.pdf</u> www.khanacademy.com	•	Observation
	www.dictionary.com	•	Assignments Research
		•	Quiz
		•	Test Exams

GRADE: <u>7</u>

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	 Solid geometry Surface areas of polygons. Volume of polygons Co-ordinate geometry; integers, negative and positive (number line) b. co-ordinate point graph of open sentences in one variable 	 Inclusive and differentiate Learning: Individual seat work or group work in mixed groups, according to abilities, gender and learning styles 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 R². 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. New General Mathematics for Junior Secondary Schools 1 (Pearson/Longman) B. Secondary Text Mathematical Association of Ghana, Mathematics for Junior High Schools - Pupils' Book 1 (Pearson/Longman, 2005) Other Materials/Supplementary Readings • Graph sheets. □ Number line • Computer • Scientific calculator	 EXPECTED COMPETENCIES: Effective Communication Analytical Skills, Digital Skills, Digital Skills, Research and Problem Solving skills Organizational ability Creativity & Innovation skills ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options: Attendances Oral questions and Answers

		www.researchgate.ne/publi cation/276906944 <u>http://www.amsi.org.au/tea</u> cher_modules/pdfs/Sets_an	 Class Assignment and Participation Observation
		d_venn_diagrams.pdf www.khanacademy.com	AssignmentsResearch
		www.dictionary.com	QuizTestExams

GRADE: 8

PERIOD: I

TOPIC: A OPERATIONS ON RATIONAL NUMBERS AND NUMBER THEORY

OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCES/ ASSESSMENTS
able to apply knowledge of operations of rational numbers and number theory and solve basic related problems.	 Upon completion of this topic, learners will: 1. Operations on Rational numbers: a) Adding and subtracting whole numbers, decimals, fractions and integers. b) Multiply and divide whole numbers, decimals, fractions and integers. b) Multiply and divide whole numbers, decimals, fractions and integers. 2. Problems involving operations 3. Prime factorization 4. Exponents 	Operations on Rational numbersAdding and subtracting whole numbers, decimals, fractions and integers.a.Multiply and divide whole numbers, decimals, fractions and integers.2.Problems involving3.operations4.Prime factorization5.4.ExponentsOperations-Prime factorization	 Inclusive and differentiate Learning: Individual seat work or group work in mixed groups, according to abilities, gender and learning styles Guide learners to use data on population pattern to add, subtract, multiply and divide whole numbers. Guide learners to find the fractional part of candidates votes polled in from the 2017 elections. Guide the learners to find the missing measurement to complete a recipe using fractions Guide learners to add birth rate (positive and death rate (negative) as integers Assist learners to Use exponents to show how a 	Primary Text: Maths for Junior High for Liberia(Grade 8, Pupils Book), PearsonM.F. Macrae, et al. New General Mathematics for Junior Secondary Schools 2 (Pearson/Longman)Secondary Text Mathematical Association of Ghana, Mathematics for Junior High Schools - Pupils' Book 2 (Pearson/Longman, 2005)Other Materials/Supplementary ReadingsGraph sheets.Number lineComputerScientific calculatorPoster on population census for a community.	 EXPECTED COMPETENCES: Effective Communication Analytical Skills, Digital Skills, Digital Skills, Research and Problem Solving skills Organizational ability Creativity & Innovation skills ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options: Attendances Oral questions and Answers

Operations - Prime	disease can become pandemic	www.researchgate.ne/publicat ion/276906944	Class Assignment and Participation
factorization Exponents		http://www.amsi.org.au/teach er_modules/pdfs/Sets_and_ve nn_diagrams.pdf	ObservationAssignments
		www.khanacademy.com	ResearchQuiz
		www.dictionary.com	TestExams

GRADE 8 PERIOD I TOPIC: APPLICATIONS OF SETS OF

NUMBERS

OUTCOMES	OBJECTIVES	CONTENT	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCIES/ ASSESSMENTS
Learners are able to find the	Upon the completion of this	Applications of sets of numbers	Inclusive and differentiate Learning:	Primary text: Maths for	EXPECTED COMPETENCIES:
intersection of sets, union of	topic, learners will:	a. Finding the	Individual seat work or group	Junior High for Liberia(Grade 8, Pupils Book), Pearson	Effective Communication
sets, completion of a set and the	• Find the	intersection of sets	work in mixed groups, according to abilities, gender and learning styles	Secondary text: MATHEMATICS FOR	• Analytical Skills,
number of subsets.	intersection of sets.	b. Finding the union of sets	Review with learners the definition of intersection of	JUNIOR HIGH SCHOOLS by	• Digital Skills,
	• Find the union of sets	c. Finding the complement	sets. Assist learners find the	Christian Akrong Hesse, Sept. 2012	• Research and Problem Solving skills
	• Find the complement of a set.	of a set	intersection of sets as you give them the sets. Discuss the concept of	www.researchgate.ne/pub lication/276906944	• Organizational ability
	• Find and write	d. Number of subsets	Universal Set and the Venn diagram.	http://www.amsi.org.au/te	• Creativity & Innovation skills
	the number of subsets in a set with up to 5		Show the relationship between Universal set and given sets,	acher_modules/pdfs/Sets _and_venn_diagrams.pdf	ASSESSMENTS <u>STRATEGIES:</u>
	elements.		Assist learners to use the Venn diagram to illustrate the intersection of sets.	www.khanacademy.com www.dictionary.com	Can be used to check competences. Select relevant options:
			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?		 Attendances Oral questions and Answers

Review the definition of union of sets.	Class Assignment and Participation
Guide learners to use the Venn diagram to illustrate the union of two sets. Assist learners to use the Venn diagram to illustrate union of two disjoint sets.	 Observation Assignments Research Quiz Test
Define and discuss "complement of a set". Guide learners to find the complement of a given set. Guide learners to use the Venn diagram to illustrate the complement of a given set. Guide learners to find the number of subsets of sets with elements up to 5.	• Exams

GRADE: 8 PERIOD: II UNIT: II TOPIC: BASIC ALGEBRAIC EXPRESSIONS AND FORMULAS OUTCOMES OBJECTIVES CONTENTS ACTIVITIES MATERIALS/ RESOURCES COMPTENCES/ ASSESSMENTS I. Learners are able to construct real-life Upon completion of this topic, learners 1. Order of Operations Inclusive and differentiate Primary Text: Maths for Junior High for EXPECTED 1. Learners are algebraic Upon completion of this topic, learners 1. Order of operations Inclusive and differentiate Primary Text: Maths for Junior Mice Grade 7, Pupils EXPECTED you have a structure problems which includes 2. Algebraic Individual seat work or group Work or group M.F. Macrae, et al. New General Mathematics for Junior Secondary Schools 2 (Pearson/Longman) • Digital Skills, solutions. 2. Simplify basic algebraic 4. Adding and trinomials and formulas 1. Guide learners involving basic algebraic 5. Multiplying and dividing 1. Guide learners to cvaluate algebraic 2. Graph sheets. • Organizational ability 4. Multiply and divide monomials. 6. Equations involving inequalities 3. Assist learners to use formulas • Scinific aclculator of Graph sheets. • Attendances 5. Simpli			DE			
UNT:II TOPIC:BASIC ALGEBRAIC EXPRESSIONS AND FORMULASOUTCOMESOBJECTIVESCONTENTSACTIVITIESMATERIALS/ RESOURCESCOMPTENCES/ ASSESSMENTSI. Learners are able to construct real-life uldedsUpon completion of this topic, learners algebraic expressions and trinomials and trinomials and trinomials and trinomials and formulas1. Order of OperationsInclusive and differentiate Learning, Individual seat trinomials and trinomials, algebraic expressions by combining like terms.1. Order of OperationsInclusive and differentiate Expressions to similities, gender and learning stylesPrimary Text: Maths for Junior High for Liberta(Grade 7, Pupils Book), Pearson M.F. Macrae, et al. New work in mixed groups, according to similities, gender and learning stylesPrimary Text: Maths for Junior High Schools 2 (Pearson/Longman)EXPECTED COMPTENCES: Distills,0. Solve problems involving basic algebraic expressions and formulas0. Adding and subtracting monomials, dividing monomials, binomials and trinomials, involving basic algebraic expressions and formulas1. Guide learners trinomials (laws of involving basic algebraic expressions, binomials and trinomials, binomials, binomials and trinomials, binomials and trinomials, binomials, binomials, binomials and trinomials, binomials, binomials, binomials, binomials, binomials, binomials, binomials, binomials, binomials, binomials, binomials, binomials, binomials, binomials, binomials, binomials, binomials, binomials, binomials						
TOPIC:BASIC ALGEBRAIC EXPRESSIONS AND FORMULASOUTCOMESOBJECTIVESCONTENTSACTIVITIESMATERIALS/ RESOURCESCOMPTENCES/ ASSESSMENTS1. Learners are able to construct real-life problems which includesUpon completion of this topic , learners will:1. Order of OperationsInclusive and differentiate Learning: Individual seat work or group work in mixed groups, according to abilities, gender and learning stylesPrimary Text: Maths for Junior High for Liberia(Grade 7, Pupils Book), Pearson M.F. Macrae, et al. New General Mathematics for Junior Secondary Schools 2 (Pearson/Longman)EXPECTED COMPETENCES: • Effective Communication • Analytical Skills, • Organizational abilityprovide algebraic expressions by combining like terms.2. Simplify basic algebraic expressions by monomials, and formulas3. Using formulas monomials, dividing monomials, dividing monomials, binomials and trinomialsI. Guide learners to simplifying and dividing monomials, binomials and trinomials (laws of indices)Solve problems involving order of operation.Organizational ability · Organizational ability4. Multiply and divide work in monomials, binomials and formulas6.Equations involving inequalitiesOther Materials/Supplementary ReadingsAssessMentrs Stools - Pupils' Book 2 · Pupils' Book 2 · Number line · ComputerAssessMentrs · Scientific calcu						
OUTCOMESOBJECTIVESCONTENTSACTIVITIESMATERIALS/ RESOURCESCOMPTENCES/ ASSESSMENTS1. Learners are table to construct real-life problems which algebraic expression, binomials and provide solutions.Upon completion of this topic , learners will:1. Order of OperationsInclusive and differentiate Learning. Theirikal seat work or group work in mixed groups, according to abilities, gender and trinomials, and providePrimary Text: Maths for Liberia(Grade 7, Pupils Book), Pearson MF. Macrae, et al. New General Mathematics for Junior Secondary Schools 2 (Pearson/Longman)EXPECTED COMPTENCES: Learning, theirikal seat work or group work in mixed groups, according to abilities, gender and trinomials, tormomials, tormomials, algebraic expressions by combining like terms.1. Order of OperationsInclusive and differentiate Learning, to simplifying expressions involving braic algebraic expressions and formulasInclusive and operation.Primary Text: Maths for Unior High For Learning, trips tyles (Pearson/Longman)COMPTENCES/ Assessments to simplifying expressions, involving braic algebraic expressions and formulasInclusive and dividing monomials, trinomials (laws of indiving monomials,Primary Text: Maths for Unior High For Learning, tyles (Pearson/Longman, 2005)COMPTENCES/ Assessments to serversion, skills4. Multiply and divide monomials.6. Multiplying and individe monomials, timomials and trinomials (laws of individe monomials,1. Guide learners to use formulas to solve prob					1	
I. Learners are able to construct real-life problems which includes algebraic expression, binomials and trinomials and trinomials and formulasI. Order of OperationsInclusive and differentiate Learning. Individual seat work or group work in mixed groups, according to abilities, solutions.Primary Text: Maths for Junior High for Junior High for Junior High for Junior Secondary Schools 2 (Pearson/Longman)EXPECTED COMPETENCES: Estimation01. Evaluate basic expressions and trinomials and trinomials and trinomials and formulas2. Simplify basic algebraic expressions by combining like terms.3. Using formulasI. Guide learners to abilities, gender and learning stylesPrimary Text: Maths for Junior High for Junior High for Book), Pearson M.F. Macrae, et al. New General Mathematics for Junior Secondary Schools 2 (Pearson/Longman)A Adding and terms.Primary Text: Maths for Junior High for Junior High for and thematics for Junior Secondary Schools - Puplis' Book 2 (Pearson/Longman, 2005)A Research and Problem Solving skills3. Solve problems involving basic algebraic expressions and formulas5. Multiplying and dividing monomials, for indices)1. Guide learners to evaluate algebraic expressions.Other Materials/Supplementary ReadingsASSESSMENTS STRATEGIES: Can be used to check competer4. Multiply and divide monomials, involving numerical6. Equations indices)2. Guide learners to evaluate algebraic expressions.9. Assist learners to evaluate algebraic expressions.9. Assessmentary						COMPTENCES/
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numerical 7. Solve verbal 4. Guide learners community.		1				Answers
AVAPPAGIONG AV			7. Solve verbal			
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following the subtract like erms Class Assignment and Participation		following the		subtract like		-
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order of	algebraic		www.researchgate.ne/publi	
operations.	expressions	5. Guide learners	cation/276906944	Observation
		to multiply and divide	http://www.amsi.org.au/tea	• Assignments
		monomials by	cher_modules/pdfs/Sets_an	• Research
		using Laws of indices and	<u>d_venn_diagrams.pdf</u>	• Quiz
		present to the	www.khanacademy.com	• Test
		class.	www.dictionary.com	• Exams

GRADE: 8

PERIOD: III TOPIC: PERCENT, PROPORTION AND RATES

OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCES/ ASSESSMENTS
Learners are able to apply	Upon completion of this topic, learners	1. Fractions, Decimals and	Inclusive and differentiate Learning:	<u>Primary Text</u> : Maths for Junior High for	EXPECTED COMPETENCES
the concepts of percent and	will: 1. Convert	Percent	Individual seat work or group work in mixed groups, according to	Liberia(Grade 8, Pupils Book), Pearson	• Effective Communication
calculate simple interest, discount	fractions and decimals to	2. The three parts of	abilities, gender and learning styles	M.F. Macrae, et al. <i>New</i>	• Analytical Skills,
and commission, percent gain or	percent and vice – versa	percent	1. Guide learners to	General Mathematics for Junior Secondary Schools 2	• Digital Skills,
loss, rates and word problems	 Identify the 	3. Simple interest	relate fractions, decimals and percent	(Pearson/Longman)	• Research and Problem Solving
	three types of percent.	4. Discount and commission	using graph paper.2. Guide learners to use	<u>A. Secondary Text</u> Mathematical Association of Ghana, <i>Mathematics for</i>	skillsOrganizational
	3. Find rates using proportions.	5. Percent gain or loss	rates of goods to determine a better buy.	Junior High Schools - Pupils' Book 2 (Pearson/Longman, 2005)	 ability Creativity & Innovation skills
	4. Find simple interest, discount, commission,	6. Rates and unit rates	3. Open a mini business in the class using "symbol" money to purchase items on	<u>Other</u> <u>Materials/Supplementary</u> <u>Readings</u>	ASSESSMENTS <u>STRATEGIES:</u> Can be used to check competences. Select
	percent gain or loss, sales tax.	7. Word problems	interest, as loan.	☐ Graph sheets. Number line Computer	relevant options:
	5. Solve word problems involving	involving percent, using proportion to	4. Guide learners to find the percentage of votes polled by candidates in the	Scientific calculator Poster on population census for a community.	AttendancesOral questions and Answers

per 6. Sol inv	plications of rcent. problems involving volving ratio d proportion drawing (map and actual distance)	 2017 general elections. 5. Assist learners to compare orange and Lone Star telephone rates , discuss and present to the class 6. Assist learners to find actual (ground) distances using Atlas of Liberia. 	Number line Computer Scientific calculator Poster on population census for a community. <u>www.researchgate.ne/publicati</u> <u>on/276906944</u> <u>http://www.amsi.org.au/teache r_modules/pdfs/Sets_and_venn _diagrams.pdf</u> <u>www.khanacademy.com</u> <u>www.dictionary.com</u>	 Class Assignment and Participation Observation Assignments Research Quiz Test Exams
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GRADE: <u>8</u> PERIOD: <u>IV</u> TOPICS: 1. APPLICATION OF ALGEBRAIC CONCEPTS 2. RELATIONS AND FUNCTIONS

OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCES/A SSESSMENTS
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.	 Upon completion of this topic, learners will: Solve problems involving numbers, age, geometry, coins, etc. Find the domain and range of a relation or function. Graph relations and functions Add and subtract polynomials 	 Number problems Age problems Coin problems Coin problems Geometry problems Geometry problems Geometry problems Graphing linear Inequalities Polynomials a. Adding and subtracting polynomials 	 Inclusive and differentiate Learning: Individual seat work or group work in mixed groups, according to abilities, gender and learning styles Guide learners to solve problems in one variable on coin, age, geometry, numbers and population density. Guide learners to construct graph of order pairs. Assist learners to differentiate between a relation and function. Assist learners to determine the domain and the range of a function. 	 <u>A.</u> Primary Text: Maths for Junior High for Liberia(Grade 8, Pupils Book), Pearson M.F. Macrae, et al. New General Mathematics for Junior Secondary Schools 2 (Pearson/Longman) <u>B. Secondary Text</u> Mathematical Association of Ghana, Mathematics for Junior High Schools - Pupils' Book 2 (Pearson/Longman, 2005) <u>Other</u> <u>Materials/Supplementary</u> <u>Readings</u> Graph sheets. Number line Computer Scientific calculator 	 EXPECTED COMPETENCES: Effective Communication Analytical Skills, Digital Skills, Digital Skills, Research and Problem Solving skills Organizational ability Creativity & Innovation skills ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options: Attendances

5. Add an subtrac	t polynomials	5. Guide learners to find the product of Polynomials of:	• Poster on population census for a community.	Oral questions and Answers
6. Multipl	monomials,	a. two monomials b. two binomials	www.researchgate.ne/public ation/276906944	• Class Assignment and Participation
monom	nials and binomials omials.		http://www.amsi.org.au/teac her_modules/pdfs/Sets_and	Observation
			venn_diagrams.pdf	AssignmentsResearch
			www.khanacademy.com	• Quiz
			www.dictionary.com	TestExams

GRADE 8 PERIOD IV TOPIC: SIMULTANEOUS EQUATIONS

OUTCOMES	OBJECTIVES	CONTENT	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCIES/ ASSESSMENTS
able to apply o concepts to 1 solve 1 simultaneous 2 equations by 1 elimination and 1 substitution 1 methods 2	 Upon completion of this topic, learners will: 5.1 Solve simultaneous equations by elimination method 5.2 Solve simultaneous equations by substitution method 5.3 solve simultaneous equations by graph 5.4 Solve simple word problems on simultaneous equations. 	 Simultaneous Equations Equations Elimination Method Substitution Method Graphical Method Systems of equations word problems 	Inclusive and differentiateLearning:Individual seat work or group workin mixed groups, according toabilities, gender and learning stylesDefine and discuss the "eliminationmethod".Assist learners to solve two systemsof linear equations with unlike signsAssist learners to solve two systemsof linear equations with like signs.Define and discuss the "substitutionof method"Assist learners to solve two systemsof linear equations with like signs.Define and discuss the "substitutionof method"Assist learners to solve simultaneousequations using substitution methodAssist learners to solve simultaneousequations by the method of graphingGuide learners to formulate andsolve simultaneous equations fromword problems.Note: Do not include fractionalequations in all problems on this	RESOURCES Primary text: Maths for Junior High for Liberia(Grade 8, Pupils Book), Pearson Secondary text: MATHEMATICS FOR JUNIOR HIGH SCHOOLS by Christian Akrong Hesse , Sept. 2012 www.researchgate.ne/publicat ion/276906944 https://www.khanacademy.or g/math/algebra/systems-of- Inear-equations#equivalent- systems-of-equations Other Materials • • • g/math/algebra/systems-of- linear-equations#equivalent- systems-of-equations Other Materials • Graph notebook • Ruler • Eraser	 ASSESSMENTS Effective Communication Analytical Skills, Digital Skills, Digital Skills, Research and Problem Solving skills Organizational ability Creativity & Innovation skills ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options: Attendances Oral questions and Answers

		Class Assignment and Participation
		• Observation
		• Assignments
		• Research
		• Quiz
		• Test
		• Exams

SEMESTER: <u>TWO</u>

GRADE: <u>8</u> PERIOD: <u>V</u> TOPIC: GEOMETRY AND MEASUREMENT

OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS/	COMPETENCES/
				RESOURCES	ASSESSMENTS
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	 Upon completion of this topic, learners will: 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. 	 Angle relationship Vertical angles Adjacent angles Complementary and supplementary angles Simple polygons (sum of interior angles of regular polygons) Construction of angles and triangles by using (SAS, ASA, SSS) Area of trapezoid Surface area of prisms Conversion of metric units (selected units) 	 Inclusive and differentiate Learning: Individual seat work or group work in mixed groups, according to abilities, gender and learning styles Guide learners to draw two lines intersecting, and identify and name vertical and adjacent angles. 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. 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 	RESOURCES A. Primary Text: Maths for Junior High for Liberia(Grade 8, Pupils Book), Pearson M.F. Macrae, et al. New General Mathematics for Junior Secondary Schools 2 (Pearson/Longman) B. Secondary Text Mathematical Association of Ghana, Mathematics for Junior High Schools - Pupils' Book 2 (Pearson/Longman, 2005) Other Materials/Supplementary Readings Graph sheets. • Number line Computer Scientific calculator Poster on population census for a community.	 ASSESSMENTS EXPECTED COMPETENCES Effective Communication Analytical Skills, Digital Skills, Digital Skills, Research and Problem Solving skills Organizational ability Creativity & Innovation skills ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options: Attendances Oral questions and Answers

	 the sum of the interior angles of the regular polygon. 4. Guide learners to use their compasses, protractors and rulers to construct angles and triangles by SAS, ASA and SSS. 5. Guide learners to draw and find areas of trapezoid using the formula 6. Guide learners to compute the surface areas of prisms using the formula as well as cubes and cuboids. 7. Guide learners to convert between metric units considering length, mass, capacity and time. 8. Guide learners to also change units of areas, volumes and surface areas using a carton. 9. Assist learners find 	Computer Scientific calculator Poster on population census for a community www.researchgate.ne/publicat ion/276906944 http://www.amsi.org.au/teach er modules/pdfs/Sets and ve nn_diagrams.pdf www.khanacademy.com www.dictionary.com	 Class Assignment and Participation Observation Assignments Research Quiz Test Exams
	9. Assist learners find metric units		

	conversion using physical models.	
	physical models.	

GRADE: <u>8</u> PERIOD: VI TOPIC: PROBABILITY, STATISTICS AND TRIGONOMETRY

OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS/	COMPETENCES /
				RESOURCES	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	 Upon completion of this topic, learners will: 1. Correctly arrange data in descending and ascending order 2. Prepare frequency table and construct histogram. 3. Make and interpret double bar graphs, double 	 Frequency tables and Histograms Measures of variability (range, variance and standard deviation) Making and interpreting graphs(double bar, double lines, and circle) Experiments with games of 	 Inclusive and differentiate Learning: Individual seat work or group work in mixed groups, according to abilities, gender and learning styles 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. 	RESOURCESA. Primary Text: Maths for Junior High for Liberia(Grade 8, Pupils Book), PearsonM.F. Macrae, et al. New General Mathematics for Junior Secondary Schools 2 (Pearson/Longman)B. Secondary Text Mathematical Association of Ghana, Mathematics for Junior High Schools - Pupils' Book 2 (Pearson/Longman, 2005)Other Materials/Supplementary	 ASSESSMENTS EXPECTED COMPETENCES: Effective Communication Analytical Skills, Digital Skills, Digital Skills, Research and Problem Solving skills Organizational ability Creativity & Innovation skills ASSESSMENTS
	 line graphs and circle graphs 4. Compute the mode, median, and mean of a set of a 5. Population data. 	 chance 5. Probability of an event(simple, independent, dependent) 6. Solving problems using 	 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). Assist learner define and discuss the following: 	ReadingsGraph sheets.Number lineComputerScientific calculatorPoster on population census for a community.	 STRATEGIES: Can be used to check competences. Select relevant options: -Attendances -Oral questions and Answers -Class Assignment and Participation -Observation

 6 Find the range, variance and standard deviation, using population data. 7. Compute th probability simple, independent and dependent and dependent and dependent and dependent and square Roo 9. Solve problems using Pythagoras Theorem. 	e of ent g	 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.). 5. Toss a coin, roll a die or spin the probability spinner and record events. 6. Let learners review square and square root of real numbers. 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; c² ≡ a² + b² 	www.researchgate.ne/public ation/276906944http://www.amsi.org.au/teac her_modules/pdfs/Sets_and_ venn_diagrams.pdfwww.khanacademy.comwww.dictionary.com	 -Assignments -Research -Quiz -Test -Exams
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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.	 Upon completion of the topic, learners will: 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 	 1.0 Bearing and vectors 1.1 Bearing of a point from another point 1.2 Idea of a vector 1.3 Zero Vector 1.4 components of a vector 1.5 Equal vectors 	 Inclusive and differentiate Learning: Individual seat work or group work in mixed groups, according to abilities, gender and learning styles Define and discuss the concept of a bearing. Guide learners to describe the bearing of the cardinal points, North, East, South and West as 000°(360°), 090°, 180° and 27 Respectively. Guide learners to locate the positions of points given their bearing from a given point. Assist learners to identify a vector as a movement (distance) along a given bearing. Guide learners take the distance along a vector as its length and a 3-digit clockwise angle from the north as its bearing. 	Primary text : Maths for Junior High for Liberia(Grade 8, Pupils Book), Pearson Supplementary text: : MATHEMATICS FOR JUNIOR HIGH SCHOOLS by Christian Akrong Hesse , Sept. 2012 www.researchgate.ne/p ublication/276906944 https://www.doctortang .com/AppliedMath30/V ectors%20Notes%20(an swers).pdf Other materials: ✓ Graph notebook ✓ Mathematical set	 Expected competencies: Effective Communication Analytical Skills, Digital Skills, Digital Skills, Research and Problem Solving skills Organizational ability Creativity & Innovation skills ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options: Attendances Oral questions and Answers Class Assignment and Participation

	Assist learners to identify a zero vectorAssist learners to demonstrate graphically in the number plane to develop the concept of component of a vector AB as the horizontal and vertical distances travelled from A to BGuide learners to identify equal vectors as• Having the same magnitude (length)• Having the same direction• the x-components are the same e• the y-components are the same	 Observation Assignments Research Quiz Test Exams
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SEMESTER ONE

GRADE9PERIODITOPIC:TWO-SET PROBLEMS

OUTCOMES	OBJECTIVES	COTENT	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCIES/ ASSESSMENTS
Learners are able to	Upon completion	1. Two-set	Inclusive and	Primary text : Maths for	Expected competencies:
apply the concepts	of this topic,	problems	differentiate Learning:	Junior High for	Effective Communication
of sets to solve	learners will:		Individual seat work or	Liberia(Grade 9, Pupils	
simple two-set		2. Number of	group work in mixed	Book), Pearson	Analytical Skills,
problems using the	• Draw and use	subsets	groups, according to	Secondary text:	• Digital Skills,
Venn diagram, find	Venn		abilities, gender and	: MATHEMATICS FOR	Digital Dikins,
the complement of a	diagrams to		learning styles	JUNIOR HIGH	Research and Problem
set and represent it	solve simple		Guide learners to	SCHOOLS by Christian	Solving skills
on the Venn	two-set		determine the Universal	Akrong Hesse , Sept. 2012	
diagram and	problems		set of two sets by listing		Organizational ability
determine the			the members of the	www.researchgate.ne/public	Creativity & Innovation
number of subsets	• Find and write		Universal set	<u>a tion/276906944</u>	skills
of a set and	the number of		Assist learners to		SKIIIS
determine rule for	subsets in a		represent sets in the Venn	http://www.amsi.org.au/teac	
finding the number of subsets of a set.	set with up to		diagram	her_modules/pdfs/Sets_and	ASSESSMENTS
of subsets of a set.	5 elements.		ulagram	_venn_diagrams.pdf	STRATEGIES:
			Guide learners to find the		Can be used to check
	• Find the rule		complement of a set and	www.researchgate.ne/public	competences. Select relevant options:
	of the number		represent it on the Venn	ation/276906944	options.
	of subsets in a		diagram		
	set		6	http://www.amsi.org.au/teac	Attendances
			Assist learners to use the	her_modules/pdfs/Sets_and	• Oral questions and
			Venn diagram to solve	venn_diagrams.pdf	Answers
			two- set problems		
			_	www.khanacademy.com	• Class Assignment and
			Assist learners to write all		Participation
			the subsets of a given set	www.dictionary.com	i anterpation
			with elements up to five.		
					Observation
					• Assignments

Guide learners to find the number of subsets in a set with • One element • Two elements • Three elements, etc.	 Research Quiz Test Exams
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	
 Note: The empty set is a subset of every set. Every set is a subset of itself 	

SEMESTER: ONE

GRADE:9PERIOD:ITOPIC:ARITHMETIC

OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCES/AS SESSMENTS
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.	 Upon completion of this topic, learners will: 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. 	 Rational and irrational numbers Ratio, proportion and percent Variation, speed and rate of work problems Simple and compound interest Using Geometry formulas Density and rational numbers 	 Inclusive and Differentiated activities Learners working in small mixed groups, considering their abilities, gender, and learning styles shall: 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. 	 A. <u>Primary Text</u>: Maths for Junior High for Liberia(Grade 9, Pupils Book), Pearson M.F. Macrae, et al. New General Mathematics for Junior Secondary Schools 3 (Pearson/Longman B. <u>Secondary Text</u> Mathematical Association of Ghana, Mathematics for Junior High Schools - Pupils' Book 1 (Pearson/Longman, 2005) <u>Other</u> <u>Materials/Supplementary</u> <u>Readings</u> Geometric set Boxes Cylindrical objects Liter cups Medicine droppers 	 EXPECTED COMPETENCES: Effective Communication Analytical Skills, Digital Skills, Digital Skills, Research and Problem Solving skills Organizational ability Creativity & Innovation skills ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options: Attendances Oral questions and Answers

	 4. Assist learners to use ratios and proportions to compute the shares of partners in a business, etc. 5. Guide learners to solve problems involving direct and inverse variation. 	Rulers and meter stickGraph sheetsCoinsDieDifferent stoppersDifferent color chalksPoster sheetsRulers and meter stickGraph sheetsCoinsDieDifferent stoppersDifferent stoppersDifferent stoppersDifferent stoppersDifferent color chalksPoster sheetswww.researchgate.ne/publication/276906944http://www.amsi.org.au/teacher_modules/pdfs/Sets_and_venn_diagrams.pdfwww.khanacademy.comwww.dictionary.com	 Class Assignment and Participation Observation Assignments Research Quiz Test Exams
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SEMESTER: ONE

GRADE: <u>9</u> PERIOD: <u>II</u>

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 	 Law of Indices Simplifying radicals Converting radicals to exponents Adding and subtracting polynomials Multiplying polynomials Multiplying polynomials Binomials by binomials Dividing polynomials by Dividing inomials Factoring difference of two squares Subtracting Subtracting	 Inclusive and Differentiated activities 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:</u> Maths for Junior High for Liberia(Grade 9, Pupils Book), Pearson M.F. Macrae, et al. New General Mathematics for Junior Secondary Schools 3 (Pearson/Longman) B. <u>Secondary Text</u> Mathematical Association of Ghana, Mathematics for Junior High Schools - Pupils' Book 1 (Pearson/Longman, 2005) <u>Other</u> <u>Materials/Supplementary</u> <u>Readings</u> Geometric set Boxes Cylindrical objects Liter cups Medicine droppers Rulers and meter stick Graph sheets Coins 	 EXPECTED COMPETENCES: Effective Communication Analytical Skills, Digital Skills, Digital Skills, Research and Problem Solving skills Organizational ability Creativity & Innovation skills ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options: Attendances Oral questions and Answers Class Assignment and Participation

8.	Exponential	5.		• Die	•	Observation
	expressions and radical expressions		divide polynomial by monomial and	Different stoppersDifferent color chalks	•	Assignments
			binomial.	Different color charksPoster sheets	•	Research
		6.	Guide learners to	Applying the law of indices	•	Quiz
			convert exponential expression to radical	in multiplying and dividing	٠	Test
			expression and vice Visa.	arithmetic and algebraic expressions.	•	Exams
		7.	Assist learners to expand the sum of the binomial and	www.researchgate.ne/publi cation/276906944		
			difference of the binomial.	http://www.amsi.org.au/tea cher_modules/pdfs/Sets_an		
		8.		<u>d_venn_diagrams.pdf</u>		
			also determine the factors of the	www.khanacademy.com		
			difference of the two square	www.dictionary.com		
		9.	Guide learners to convert exponential expressions to radical expression and conversely.			
		10.	Guide learners to factor the difference			
			of two squares using method as:			
			$-y^2 = x^2 - xy + xy - y^2$			
			(x + y) - y(x + y) (x + y) (x - y))			

SEMESTER: ONE

GRADE: <u>9</u> PERIOD: <u>III</u> TOPIC: RELATIONS AND FUNCTIONS

OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCES/ ASSESSMENTS
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	 Upon completion of this topic, learners will: Define and represent relations and functions. Find the Cartesian product of two relations and determine the domain and range of a given relation. Evaluate linear function in one variable. Determine the slope of a line given its equation and two points and vice – versa. Evaluate linear function in two variables. Graph linear equations in two variables given its slope and point. 	 Cartesian Product Relations and Functions Domains and Ranges Linear Function in one variable (graphs) Slope of a line given two points Solving problems involving linear functions in one variable Linear functions in two variables Equation and graph of a line given its slope and y-intercept. 	Inclusive and Differentiated activities Learners working in small mixed groups, considering their abilities, gender, and learning styles shall: 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. 1. Assist learners to evaluate linear functions	 A. <u>Primary Text</u>: Maths for Junior High for Liberia(Grade 9, Pupils Book), Pearson M.F. Macrae, et al. New General Mathematics for Junior Secondary Schools 3 (Pearson/Longman B. <u>Secondary Text</u> Mathematical Association of Ghana, Mathematics for Junior High Schools - Pupils' Book 1 (Pearson/Longman, 2005) <u>Other</u> <u>Materials/Supplementary</u> <u>Readings</u> Geometric set Boxes Cylindrical objects Liter cups Medicine droppers Rulers and meter stick Graph sheets Coins 	 EXPECTED COMPETENCES: 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: Attendances Oral questions and Answers Class Assignment and Participation Observation

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: • Elimination method • Substitution method • Graphical method	 Upon completion of this topic, learners will: 1. Solve simultaneous equations using elimination 2. Solve simultaneous equations using substitution method 3. Solve simultaneous equations using graph 4. Solve basic word problems 	 5. Simultaneous Equations 5.1 Elimination Method 5.2 Substitution Method 5.3 Graphical Method 5.4 Systems of equations Word Problem 	Inclusive and Differentiated activities Learners working in small mixed groups, considering their abilities, gender, and learning styles shall: Review the elimination method with learners Assist learners to solve simultaneous equations with unlike signs by the elimination method. Assist learners to solve two systems of equations with like signs using elimination method. Review the substitution Method with learners. Assist learners to solve simultaneous equations by the substitution method Assist learners to solve systems of equations by the graphical method	Primary text : Maths for Junior High for Liberia(Grade 9, Pupils Book), Pearson Secondary text www.researchgate.ne/publ ication/276906944 <u>http://www.amsi.org.au/te</u> acher_modules/pdfs/Sets_ and_venn_diagrams.pdf www.khanacademy.com www.dictionary.com :	 EXPECTED COMPETENCES: Effective Communication Analytical Skills, Digital Skills, Digital Skills, Research and Problem Solving skills Organizational ability Creativity & Innovation skills ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options: Attendances Oral questions and Answers

	Assist learners to formulate and solve equations from word problems	•	Class Assignment and Participation
	Note : Fractional equations should be included in all problems.	• •	Observation Assignments Research Quiz Test
			Exams

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. 	 Parallel and perpendicular lines Properties of regular polygons Finding the sum of interior and external angles of regular polygons Construction of triangles using SSS, SAS or ASA Construction of parallelograms Similar Triangles Similar Triangles Vertical angles Adjacent angles Complementary angles 	 Inclusive and Differentiated activities Learners working in small mixed groups, considering their abilities, gender, and learning styles shall: Identify, define and illustrate Assist learners to identify, define and illustrate parallel lines and transversal, perpendicular lines. Assist learners identify the properties of parallel lines with a transversal and state them. Assist learners identify the properties of parallel lines with a transversal and state them. 	Primary Text: Maths for Junior High forLiberia(Grade 9, Pupils Book), PearsonM.F. Macrae, et al. New General Mathematics for Junior Secondary Schools 3 (Pearson/Longman)Secondary Text Mathematical Association of Ghana, Mathematics for Junior High Schools - Pupils' Book 1 (Pearson/Longman, 2005)Other Materials/ Supplementary Readings Geometric setswww.researchgate.ne/publi cation/276906944http://www.amsi.org.au/tea cher_modules/pdfs/Sets_an d_venn_diagrams.pdf	 EXPECTED COMPETENCES: Effective Communication Analytical Skills, Digital Skills, Digital Skills, Research and Problem Solving skills Organizational ability Creativity & Innovation skills ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options: Attendances Oral questions and Answers

7. Ident adjac comj and	plementary	3.	Identify and define a. Assist learners identify and define regular polygons and their properties. Assist learners compute the sum of internal and external angles of a regular polygons Assist learners to construct triangles with these properties SSS, SAS and ASA.	www.khanacademy.com www.dictionary.com	•	Class Assignment and Participation Observation Assignments Research Quiz Test Exams
		 5. 6. 7. 	Assis learners to construct parallelograms; Assist learners to solve problems on similar triangles Assist learners to identify vertical,			
			adjacent, complementary and supplementary angles.			

SEMESTER: TWO

GRADE: 9 PERIOD: V TOPIC: A. TRIGONOMETRY

B. MEASUREMENT

OUTCOMES	OJECTIVES	CONTENTS	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCES/ ASSESSMENTS
 Learners are able apply the Pythagoras Theorem to compute one side of a right angle triangle when the other two sides are given. Solve problems involving Pythagoras Theorem. Identify, define and compute the trigonometric ratios(functions) of a: a. Sine of Acute angles 	 Upon completion of this topic, learners will: 1. Apply the Pythagoras Theorem to compute one side of a right angle triangle when the other two sides are given. 2. Solve problems involving Pythagoras Theorem. 3. Identify, define and compute the trigonometric ratios (functions) of a: a. Sine of Acute angles b. Cosine of Acute angles 	 The Pythagorean Theorem Application of Pythagorean Theorem Sine, cosine and tangent of acute angles Trigonometric Tables Applications of sine, cosine and tangent ratios. Angles of elevation and depression Converting metric units and customary units 	 Inclusive and Differentiated activities Learners working in small mixed groups, considering their abilities, gender, and learning styles shall: Guide learners to discuss the relationship amongst the sides of a triangle. Guide learners to discuss the Pythagorean Theorem and use it to solve problems. Explain and write the sine, cosine and tangent of acute angles' relationship in their own words. Assist learners to extract data for sine, cosine, tangent,etc. from the trigonometric table 	 A. <u>Primary Text</u>: Maths for Junior High for Liberia(Grade 9, Pupils Book), Pearson M.F. Macrae, et al. New General Mathematics for Junior Secondary Schools 3 (Pearson/Longman) B. <u>Secondary Text</u> Mathematical Association of Ghana, Mathematics for Junior High Schools - Pupils' Book 1 (Pearson/Longman, 2005) <u>Other</u> <u>Materials/Supplementary</u> <u>Readings</u> Geometric set Boxes Cylindrical objects Liter cups Medicine droppers Rulers and meter stick Graph sheets Coins 	 EXPECTED COMPETENCES: Effective Communication Analytical Skills, Digital Skills, Digital Skills, Research and Problem Solving skills Organizational ability Creativity & Innovation skills ASSESSMENTS STRATEGIES: Can be used to check competences. Select relevant options: Attendances Oral questions and Answers

		51	
c. Tangent of	5. Assist learners to apply	• Die	Class Assignment
Acute angles	sine, cosine, and tangent	Different stoppers	and Participation
	ratios to acute angles of	• Different color chalks	
4. Find angles of	a right triangle.	• Poster sheets	Observation
depression and			
elevation using the	6. Assist learners solve	www.researchgate.ne/publicati	 Assignments
sine, cosine and	problems involving	on/276906944	• Research
tangent of ratios.	angles of elevation and		
	depression	http://www.amsi.org.au/teacher	• Quiz
5. Use trigonometry		modules/pdfs/Sets_and_venn	• Test
tables (calculators)	7. Assist learners to	diagrams.pdf	
in finding sine,	convert metric units to		• Exams
cosine and tangent	customary units and vice	www.khanacademy.com	
of acute angles of	versa		
right triangle		www.dictionary.com	
	8. Guide learners in groups		
6. Solve problems	on the application of		
involving angle of	sine, cosine and tangent		
elevation and	ratios.		
depression.			
	9. Assist learners to use		
7. Convert metric	liter cup, medicine		
units to customary	dropper, rulers and		
units and vice	yardstick to determine		
versa.	the ratio using metric		
	units and customary		
	units of length and		
	capacity.		

SEMESTER: TWO

GRADE: 9 PERIOD: VI TOPIC: PROPARILITY AND

TOPIC: PROBABILITY AND STATISTICS

OUTCOM	ES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCES/ ASSESSMENTS
and histogram	ncy tables t	Upon completion of his topic, learners vill:	1. Frequency table and Histograms	small mixed groups, according to abilities,	A. <u>Primary Text:</u> Maths for Junior High for Liberia(Grade 9, Pupils	EXPECTED COMPETENCES: • Effective
given data.2. Find measure central tender	es of ncy using	1. Frequency tables and Histograms.	2. Measures of central tendency (mode, median and mean)	gender and learningstyles shall1. Collect data of the	Book), Pearson M.F. Macrae, et al. <i>New</i> <i>General Mathematics</i> <i>for Junior Secondary</i>	CommunicationAnalytical Skills,
3. Compute the measures of variability (rational)		2. Measures of Central tendency (mode, median and mean).	3. Measure of variability(range, variance	scores of 40 learners who sit the Math test. Construct a frequency table and histogram from the data.	Schools(Pearson/ Longman)	Digital Skills,Research and Problem Solving
variance and variation)	standard	3. Measure of variability (range, variance and	and standard variation)	2. Collect and present data about favorite meal on	B. <u>Secondary Text</u> Mathematical Association of Ghana, <i>Mathematics for Junior</i>	skills Organizational ability
4. Read and inte stem and leaf whiskers and plots. Make s	f, box and scatter stem and	standard variation). 4. Stem and leaf	 4. Stem and leaf plot 5. Box and whisker 	a histogram and find the central tendency of the data.	High Schools - Pupils' Book(Pearson/Longman, 2005)	 Creativity & Innovation skills
leaf plot fro of class test s5. Use the fundation	scores.	plot 5. Box and whisker	plot 6. Scatter plot	3. Make :a. Stem and leaf plot from class test	<u>Other</u> <u>Materials/Supplementary</u> Readings	ASSESSMENTS STRATEGIES: Can be used to check
counting prin solving: a. Multiplicatio	nciple in	plot	7. Combination	scores. b. Box and whisker plots from class test	Geometric set Boxes	competences. Select relevant options:
Venn diagram Diagrams wit	n c.	6. Scatter plot7. Permutation	8. Permutation	score. 4. List the number of	Cylindrical objects Liter cups	AttendancesOral questions and
finite.				attires taken from a set of shirts and trousers.	•	Answers

6. Find permutation and combination of an event occurrence.	8. Combination	find the probability of picking a color shirt and trouser from a set of attire.	Medicine droppers Rulers and meter stick Graph sheets	Class Assignment and Participation
		5. Define and explain	Coins	Observation
		the concepts of	Die	• Assignments
		statistical terminologies and	Different stoppers	• Research
		their effect on the	Different color chalks	• Quiz
		population. Let learners use given	Poster sheets	• Test
		data or hypothetical figures representing	www.researchgate.ne/publi	• Exams
		HIV data to make a frequency table. Use	cation/276906944	
		the frequency table to	http://www.amsi.org.au/tea	
		construct a histogram. Find the	<u>cher_modules/pdfs/Sets_an</u>	
		central tendencies	d_venn_diagrams.pdf	
		(Mean, mode and median) using the	www.khanacademy.com	
		data. Construct stem and leaf plot using	www.dictionary.com	
		the data. Construct		
		the box and whisky		
		plot using the data.		

SEMESTER ONE

GRADE 9 PERIOD VI TOPIC: VECTOR ADDITION

OUTCOMES	OBJECTIVES	CONTENT	ACTIVITIES	MATERIALS/RESOU RCES	COMPETENCIES/ ASSESSMENTS
Learners are able to apply concepts to find sum of two vectors graphically and	Upon completion of this topic, learners will: 1. Add two	1. Addition of two vectors	<u>Inclusive and</u> <u>Differentiated activities</u> Learners working in small mixed groups, considering their abilities, gender, and	Primary text: Maths for Junior High for Liberia(Grade 9, Pupils Book), Pearson MATHEMATICS FOR	EXPECTED COMPETENCES:Effective Communication
vectorially.	vectors		learning styles shall: Review bearing and vectors with learners	JUNIOR HIGH SCHOOLS by Christian Akrong Hesse , Sept.	Analytical Skills,Digital Skills,
			Guide learner to add vectors using graphical method	2012 www.researchgate.ne/pu blication/276906944	 Research and Problem Solving skills Organizational ability
			Assist learners to find the magnitude and bearing of the sum (resultant) of two	https://www.doctortang. com/AppliedMath30/Ve ctors%20Notes%20(ans	• Creativity & Innovation skills
			vectors by trigonometry.	wers).pdf Other materials: ✓ Graph notebook ✓ Mathematical set	ASSESSMENTS <u>STRATEGIES:</u> Can be used to check competences. Select relevant options:
					AttendancesOral questions and Answers
					 Class Assignment and Participation

		Observation
		• Assignments
		• Research
		• Quiz
		• Test
		• Exams