Ministry of Education, Science and Technology

Accelerated Teaching Syllabus for

Junior Secondary I, II, and III Mathematics (2015 – 2016)

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Junior Secondary I Mathematics Term 1 Syllabus						
Week	**Theme / Concept**	**Topic**	**Objectives**	**Learning outcome**	**Suggested Teaching/ Learning Activities**	**Teaching/ Learning Aids**
1	Number and Operations	Brief history of number place value.	By the end of this term, pupils should be able to: - Use and interpret numbers and their pictorial representatives.	Pupils should use and interpret numbers and their pictorial representatives.	Related the history of the development of numbers	Visual aids of ancient numbers
		- Basic operations on Fractions	By the end of this term, pupils should be able to: - Add, Subtract, Multiply and Divide Fractions with the same or different denominators	Pupils solve problems such as add, subtractions, multiplication and division of fraction. Word problems involving fractions should be solved.	Using equivalent fractions and L.C.M to solve problems on different denominators	Problem solving

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2	Numbers and the Environment	• Set of numbers- natural, whole fractions and decimal numbers • Set of numbers - natural, whole fractions and decimals of objects, people etc.	Identify whole and natural numbers, fractions and decimals.	Pupils can describe environment using numbers Pupils solve and identify whole and natural numbers, fractions and decimals.	Use numbers to qualify objects, people. • Discuss numbers already encountered at primary level: - Whole numbers fractions, decimal numbers • Compare the values of the places on the left of the decimal point with those on the right. • Use standard notation to express numbers.	Use vanguards to show whole numbers and fractions -Number line strips of numbers, ruler

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3 4	Set/Whole Fraction	• Sets of numbers - Natural, whole, fractions and decimals. • Basic operation on whole numbers. Expressing fractions as decimals and vice versa.	- Identify whole and natural, numbers, fraction and decimal. - Do addition, subtraction, multiplication and division of whole numbers. Express fractions as decimals and vice versa	Pupils solve and identify whole and natural numbers fractions and decimal numbers. Pupils solve fraction as decimals and vice versa	Discuss numbers already encountered at primary level : - Whole numbers, fractions, decimal number. Express fractions as decimal, numbers and vice versa. Reinforce the techniques for the operations on all numbers already studied at primary level.	N umber line, strips of numbers, ruler.

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5		• Ratio and proportions - Expressing ratios in their simplest forms. - Sharing a quantity in a given ratio. - Direct proportions. - Inverse proportions. • Rates - Interpret rates such m/hr, ft/sec km/hr	Express quantities as ratios of each other in their simplest forms. Share quantities in a given ratio. Identify and solve problems on direct proportion. Identify and solve problems on Inverse proportions. Interpret rates such as m/hr, ft/sec, km/hr.	Pupils identify quantities as ratios of each other in their simplest form. Pupils solve problems on Direct and Inverse proportion. Pupils can know the distance covered by car, things etc.	Use the quantities and express as ratio and reduce them e.g. 80:200. Life skills: Problem solving Decision making. Let them share, e.g. mangoes or oranges in 2:3:5. Relate rates of work to proportion direct, inverse. Use local example to explain proportion.	

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6 7	Everyday Arithmetic Measurement and the Environment	• Rates • Measuring units. - Metric and imperial units of measurement for: (a) Length	Pupils can know the distance covered by car, things etc. Pupils can distinguished between - Metric and Imperial units for length and weight.	Discuss units for measuring lengths e.g. foot, strides metric and yards. Let pupils measure distance round objects and places in the environment.	Imperial gallons, pints, liters. Different measuring cup. Objects and places in the environment	

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8	Measurement and the Environment	- Metric and Imperial for: (2) Capacity (d) Area	Capacity	Pupils can distinguished between metric and Imperial units Pupils can find areas of place shapes e.g. square, rectangle	Dry measures discuss local units: tomato and butter cups, pints. Discuss metric (Liter) and Imperial (quarts, pints, etc) unit. Revise units of area and formula for finding areas of rectangles. Discuss areas of competitive rectangular figure.	Imperial gallons and pints local pints litres. Different measuring cups Blocks, tiles, strings, foot-ruler meter/yard stick.

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9	Measurement and Classroom Environment	• Measuring lengths and weights using their metric and Imperial measurements. - Calculation of lengths and weights without conversion in both metric and imperial units. - Finding perimeters and areas of plane figures	- Use the metric and imperial measurements to measure length and weight. - Add, subtract and multiply length and weight without conversion using the metric and imperial units. Find perimeter and areas of plane figures - Rectangles and squares etc.	Pupils can distinguished between metric and imperial units for length and weight. Pupils can calculate length and weight without using metric and imperial methods. Pupils solve problems on areas of rectangles and squares etc.	Ask the pupils to: items like books, the floor, chairs, window with metric and weight of common objects. Let pupils work out problems on blackboard and guide them to arrive at the correct answer. - Guide pupils to rename the lengths and weights. Discuss ways of calculating distance round an object. - Perimeter discuss length of material required to fence a compound. Let pupils be involved in measuring object and places. - Let pupils summarise	Different shapes of objects measuring instruments, e.g. 100 square chart or board.

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					findings and deduce formula for finding perimeter of rectangular objects.	

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10	Geometry and the Classroom Environment	• Angles: - Definition - Types of Angles	- Define an angle. - Name and state the types of angles	Pupils can defined and name the types of angles	Compare angles: $>90^0$, $<90^0$ and 90^0. Introduce name of angles; acute, obtuse, right angles. Identify angles in the classroom or home environment e.g. opening of doors, pages of books, swinging a pendulum.	Cut outs of various plane figures: clock, blackboard, mathematical instruments.
	Geometry and Classroom Environment	• Angles: - Definition - Types of Angles • Measurement using a protractor	Measure various angles using a protractor Pupils can identify different angles by using a protractor.	Pupils can identify different angles by using a protractor	Life skills making creative problem. Help pupils to engage in problem solving exercises. Stress the idea of rotation. Use protractor and set square to measure and compare angles	Compare angles at the ends of solids and furniture in the classroom. - Solve problems. - Draw angles and measure them. Draw specific angles.

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		• Parallel and Perpendicular lines	- Identify and name parallel and perpendicular lines	Pupils distinguished between parallel and perpendicular lines	Give pupils practice in: (1) Drawing and measuring lines accurately. (2) Using compass to draw patterns with circular objects	Cut outs of plane figures, angles, circles etc. Geometry set.
11	Slope	•	Find the slope of the stair cases and hills using the formula Slope = $\frac{\text{vertical height}}{\text{Horizontal distance}}$	Pupils solve gradient by using the formula	Let pupils measure the height and length of stairs and then divide Group work and project using problem solving skill methods. Like skills: Problem solving.	Cardboard stair cases, other objects to represent slopes.

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12	Percentages e.g. Per-centum	• Percentages - Expressing quantities as percentages - Percentages of given quantities	Express quantities as percentage. - Find percentage of given quantities	Pupils express one quantity as percentage to another or vice visa	Let pupils multiply given quantities by 100. Let pupils share by percentage. Determine percentages of different quantities e.g. 25% of Le320, 53% of 160	
		Expressing fractions and decimals as percentages. Expressing percentages as fractions and decimals	Express fractions and decimals as percentages. Express percentages as fractions and decimals	Pupils solve fractions and decimals as percentages. Vice visa	Express fractions as percentages. Compare percentages and fractions	

Junior Secondary I, Mathematics, Term 2						
Week	**Theme/ Concept**	**Topic**	**Objectives**	**Learning outcome**	**Suggested Teaching/ Learning Activities**	**Teaching / Learning Aids**
1	Measurement	Metric and Imperial units for capacity	Identify and state the metric and imperial units for capacity	Pupils can now measure volume in liters	Use conversion table for capacity. Encourage pupils to visit petrol stations to observe the metric unit for volume in the fuel pumps.	
2		Volume	Identify and state volume		Use conversion table for volume	
3	Geometry	Relationship between angles - Adjacent - Complementary	Identify two or more angles as adjacent. Identify only two adjacent as complementary angles.	Pupils can now give the different as between the various types of angles e.g. complementary, supplementary adjacent angles, vertically opposite angles.	Discuss adjacent angles at a point, complementary angles Life skills: problem solving. Let pupils pick out the 2 complementary angles.	Charts models
4		Supplementary Angle Vertically opposite angles	Identify only two adjacent angles as supplementary angles.		Let pupils pick out the 2 supplementary angles. Let pupils work in groups and find the complements and	

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					supplements of given angles. Let pupils use pens, pencil or rulers to intersect them to pick out the vertically opposite angles.	
5	Algebra	Multiplication of Algebraic expression.	Multiply algebraic expression correctly 2xa = 2a,a × b = ab	Pupils master the steps in solving algebraic expression	Guide pupils towards the technique of multiplying simple algebraic expression.	
6		Introduction to indices	Use the rule $a^m \times a^n = a^{m+n}$ to evaluate single multiplication, e.g. a×a×a = $a^{1+1+1} = a^3$	Pupils understand the role for multiplication of indices.	Let pupils discuss problems in multiplication and derive the rule, e.g $b^2 \times b^3 = b \times b \times b \times b \times b \times b = b^5$ $C^3 \times c^1 = c \times c \times c \times c = c^4$ Life skills: problem solving	
6		Simple Substitution	Evaluate expression given to values of the variables e.g. if a = 1, b = 2, find a + 2b + a = 1 + 2(2) +	Pupils can do simple substitution into algebraic expression	Oral exercises in substitution, e.g. what is 3a when a = 2? Life skills: creative thinking.	

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			$1^2 = 1 + 4 + 1 = 6$		Extend to expressions like 3a + 2, 2a + 3b, for given values of a and b.	
7	Algebra	❖ Simple linear equations in one variable	Solving simple linear equations in one variable e.g. 2x = 6; 3 + x = 5,2 + x = 3-x	Pupils solve linear equations and can represent them on a graph paper.	Treating linear equations as beam balancing. - Adding and subtracting same amount from both sides. - Dividing and multiplying both sides by the same number. Life skills: problem solving	Balancing scale different object weight
8 9	Graphs	Linear graphs - Plotting and joining point	Plot points and join them; Draw graphs of linear expressions such as x + y = 7 using given point.		Let pupils use graphs and plot points accurately and join them by using a rule. Let pupils plot the given points and join them using a ruler. Life skills: problem solving.	Graphs papers or square papers rulers.

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10	Statistics	Data Collection	Collect various sets of data, e.g. pupils who like various subjects; types and number of various animals in their environment.	Pupils are able to group data according to a given criteria.	Discuss the reason for data collection. Let pupils participate. Revise the meaning of the terms tally marks, frequency, data etc. Use objects in environment to group according to height, size, colour or special characteristics e.g. grouping pupils in class according to height, colour of school bags, weight, sizes of shoes etc.	Ruler, graph paper, plane papers, pupils in class
11		❖ Graphical representation of data pictograms, bar graph. ❖ Statistical interpretations	- Use pictures to represen t data - Use bar graphs to represen t data. - Interpret simple	Pupils can do graphical representation of data. Pupils can represent data as pictograms and bar graph.	List the number of pupils in each group and use data to draw the bar graph or pictogram. Like skills: problem solving Pupils draw pictographs and barographs from data	Data supplied by the teacher.

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			and bar graph			
12 13					In the case of the bar graph stress the need for regular Intervals in the graph, the need for choosing a suitable scale and also the proportionality of the heights according to the number. In the case of the pictogram discuss: (i) The use of a standard size of picture to represent a number of items. (ii) Increasing the number of the pictures proportionally . Life skills: problem solving.	Illustration of graphs

Junior Secondary II, Mathematics, Term 1						
Week	**Theme/ Concept**	**Topic**	**Objectives**	**Learning outcome**	**Suggested Teaching/ Learning Activities**	**Teaching/ Learning Aids**
1	Number and Operation	• Integers positive Negative and Zero - Fractions	- Identify and state positioned, negative and zero. Integers; - Use integers meaningfully and so extend their idea of numbers. - Read temperature accurately from the thermometer Express whole numbers and decimals in standard forms	Establish the idea of integers as a combination of positive and negative whole numbers. Pupils can now express fractions and decimals in standard form.	Revise number introduced in year 1. Use activities involving going forwards and backwards, up and down, from a fixed point to introduce the idea of positive and negative numbers. Use debts, trade deficit, etc as negative numbers. Extend the number line to the left of zero (0). Combine number line strips to the left and right of zero (0), to establish the idea of integers as the	Number line strips with whole numbers and negative integers The real number line chart and numbers.

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					positive and negative whole numbers and negative integers left to right Left Right ∫∫∫ ∫∫∫∫ ∫ -3-2-1 0 1 2 3 Life skills: Decision making Explain standard forms to pupils with examples.	
2	Number and Operations	Place Value Factors and multiples - Prime numbers and prime factors.	Express number inwards. Distinguish between factors and multiples. Use multiplication tables to find factors and multiples of numbers.	Pupils are able to write out numbers in words. Pupils can hob down the factors and multiples of given numbers.	Use the place value chart to help pupils express numbers in words. Let pupils list: (i) Factors and multiples of numbers.	

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					(ii) Prime numbers within a range of numbers. (iii) Prime factors of certain numbers	
3	Number and Operations	Expressing numbers as product of prime factors H.C.F and L.C.M	Express numbers as product of Prime factors Calculate H.C.F and L.C.M of a set of numbers using prime factors.	Pupil can list down the prime factors and multiplies of any given number and calculate the HCF and LCM of these numbers.	Guide pupils to express numbers as product of their prime factors through many examples. Life skills: Problem solving From a list of common factors, choose the	

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					greatest common factor. Use prime factors method to calculate H.C.F of a list of common multiples, select the lowest common multiple. Use prime factor method to calculate the L.C.M of a set of numbers	
4	Everyday Arithmetic	• Harder ratios and proportions. • Simple Interest	- Solve harder problems on ratios and proportions. Solve problems on simple Interest.	Pupils are able to comprise between similar or different quantities. Pupils can understand	For better and further understanding, guide pupils through several examples of problems on harder ratios and proportions. Life skills: Problem solving.	Roles of boys and girls in school Population census report. Bank rates on loans

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				monitory transactions	To consolidate understanding of problems on simple interest, in pupils do more problems. A visit to banks is essential, where possible. Life skills: decision making	

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5	Everyday Arithmetic	Conversion of one unit to the other in the same system for (a) Length (b) Weight	Convert inches to feet, to yards and vice versa. - Convert centimeters to meters to kilometers and vice versa. - Convert ounces to pounds and vice versa. - Convert kilograms to grams and vice versa.	Pupils will understand the different systems of measurements and the use of the S.I units. Pupils can convert from smaller units and from larger units to smaller units.	Use conversion tables in the imperial system for length, e.g. 12m = 1ft Use the metric conversion table for length, e.g. 100cm = 1m 100m = 1 km. Use the imperial conversion table for weight e.g.16oz = 1ib. Use the metric table for weight, e.g. 1000g = 1kg. Let the pupils practice measurement and conversion Like skills: Decision making, problem solving, creative thinking	- Ruler - Pupils Conversion tables for weight in metric and imperial systems. - Beam balance - Concrete Objects in the school environment

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6	Measurement	• Compare lengths in metric and imperial systems for: • a) Length • Weight	Compare lengths in metric and imperial systems. Convert inches and yards to centimeters and meters and vice versa. - Convert pounds to kilograms and vice versa.	Pupils can convert imperial units to metric units.	Group competition observing pupils. Use concrete illustrations to compare the different systems of measuring lengths, weights. Give the following appropriate equivalent: 1inch = 2.54 cm 1ib = 0.45kg Life skills: Problem solving	Objects with metric and imperial calibration. Concrete objects in the classroom.
7&8	Geometry and the Environment	• Angles forms with parallel lines - Vertically, opposite corresponding, alternate and co-	Identify and find vertically, opposite corresponding, alternate and co-interior/allied angles.		Discuss the property corresponding alternate and allied angles, when a transversal cuts two or more.	Diagram showing the angles Cut out different triangles

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		interior/allied angles - Types of triangles	Name and identify scalene, isosceles, equilateral, right angle, acute angles, obtuse angles triangle.		Life skills: Decision making Creative thinking	Triangular objects in the school environment
9&10	Algebra	• Expansion e.g. a(x + b) ab(c + d), a(a + b + c), ab(c + d + e) etc. • Factorization - Common Factors - Simple grouping	Expand expression like: a(x + b), ab(c + d), a(a + b + c), factorize expression by: - Removing common factors. - Simple grouping of terms	Discuss common factors, identify common factors in expressions such as: $9x + 3y + 6z$ $Ab + a^2b - ab^2$ $8xy + 4x^2y - 6xy^2$ Life skills problem solving Pupils can write expressions as products of factors and simplified expressions	Discuss the following expansions with pupils (1) A(x + b) = ax +ab (2) Ab(a + b + c)= - $A^2b + a^2b^2$ + abc Write the expression as product of factors e.g. 9x + 3y + 6z = 3(3x + y + 2z) - $6m^2 + 2m^2$ = - $2m^2$ ($3m^2$ + 1)	Teacher provides a set of expression on the blackboard for the pupils to solve.

Junior Secondary II, Mathematics, Term 2						
Week	**Theme/ Concept**	**Topic**	**Objectives**	**Learning Outcome**	**Suggested Teaching/ Learning Activities**	**Teaching and Learning Aid**
1	Number and Operations	Number pattern and sequences - Square numbers	Identify and form number patterns and sequences; List number patterns such as area numbers, odd numbers, square numbers	Pupils write number patterns in sequence. Pupils dosing operations with number patterns	Study pattern in different groups of numbers. Life skills: Creative thinking Pattern can be: (i) Adding a constant to the preceding number e.g. 1, 4, 7, 10. (ii) Multiplying proceeding number by a constant number 1, 2, 4, 8, 16, 32. (iii) Multiply by a constant and adding another constant e.g. 1, 3, 7, 5, 3, 1	Examples of number patterns on a chart

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2	Number and Operations	• Basic operations on Integers using the rules of sign	- Apply rules of signs to do basic operations on integers e.g. 3 – 5 = -2, -2 = 5 = 3, 2 ×(-3) = 6, 3 × (-4) = -12, -3 × (-4) = +12 6÷ (-2) = -3 -8 ÷ (-2) 2 + 4	Pupils can do simple operations with the sign rule. Pupils are above to master the sign rule.	Positive number more ahead Negative number, more backwards Plus sign – face right Minus sign - face left. Give the basic rules with many examples Life skills Problem solving Decision making Example, 7 – 4 starts from zero more to 7 turn left move 4 places forward, final positive 3. -6-(-3) start from zero to -6, turn left, move 3 places forward, final positive -9.	Number line

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3	Everyday Arithmetic	• Commission • Discount	- Calculate commissions; - Calculate discount, buying price, percentage discount	Enable pupils understand business operations. E.g. percentage discount, commission	Revise percentages of quantities multiply rate by the sales to get the commission, multiply discount percentage to get the discount multiply the discount percentage by marked price, then subtract to get the buying price. Life skills: Problem solving Decision making	
4	Measurement	• Distance speed and Time	- Calculate distance, speed or time given to the other two variables - Change from kilometer/hour to metres/seconds and vice versa	Pupils understand the relationship between speed, time and distance	Give examples on conversions from one system to another. Define speed, i.e. how fast a given distance is being covered. Use the idea of proportionality to	

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			-		explain the relationship between speed, distance and time (e.g when speed is constant the distance varies directly proportional to time). Introduce the idea of average speed. Encourage pupils to calculate average speed by recording the time taken to cover a given distance and then dividing the given distance by the time taken Life skills: Problem solving Decision making	

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5	Measurement	Distance, speed and time	- Calculate distance, speed or time given the other two variables.			Stop watch
6	Measurement	• Perimeters and area of fields, lawns, borders floor.	- Calculate perimeters and areas of fields, lawns, borders, floors, etc, using the formula 2(L + B) and (L × B) respectively Cost of fencing perimeters of fields and compounds etc	Pupils can differentiate between area and perimeter and do simple calculations on them.	Calculate areas of border, lawns, irregular shapes	Strips of paper and cut out
7	Geometry	• Construction - Gives straight lines - Gives angles - By copying angles - Bisectors of angles - Perpendicular bisector a given line.	- Use ruler and compasses and protractor to construct; - Given straight lines. - Copy given angles measure angles correctly.	Proper use if the compass, protractor and compass. Pupils can measure the size of angles accurately and	Use ruler and compasses only to: - Construct given straight lines. - Construct and copy given angles of different sizes.	Geometry set completely equipped

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Week	**Theme/ Concept**	**Topic**	**Objectives**	**Learning Outcome**	**Suggested Teaching/ Learning Activities**	**Teaching and Learning Aid**
8			- Bisectors of angles - Perpendicular bisectors of given lines.	construct copies of them. Pupils can bisect any given angle. Pupils can construct the perpendicular from a point, and on a given line.	- Measuring the angles and their constructed copies to see of they are of the same size. - Illustrate by folding the meaning of perpendicular bisector - Construct bisector of given angles. - Measure each half of a bisected angle. - Construct perpendicular bisectors of given straight lines.	

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					- Measure angles between bisector and line to test if it a 90^0. - Use set squares to construct a perpendicular from a point: - (i) on a given line and - (ii) outside the line Life skills: Problem solving	
9	Geometry	• Construction of triangles given all three sides	- Construction of triangles given all three sides using a ruler and a pair of compasses	Pupils acquire basic skills in the construction of angles and triangle	Draw several triangles with the necessary data (i.e. he gives three sides) for triangles with three sides given make sure that the compasses are	Geometry set, ruler, compasses and protractor

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					opened to the correct measure and that pupil hold them correctly the correct position. When measuring angles check that pupils fix their protractors at the correct point and read the angles from the correct side especially for obtuse angles. Life skills: Decision making	
10	Algebra	• Harder linear equations in one variable. • Simple word problems	- Solve harder linear equations in one variable involving brackets, e.g. (1) 2(3a + 4) = 14 (2) 4(x + 1) = 3(x +2)	Pupils can solve linear equations involving the use of brackets.	Give pupils practice in writing down correct equations. Revise expansion of simple algebraic expressions. Explain to pupils that we remove the brackets by multiplying as in	

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					expression, using different examples Life skills: Problem solving Decision making Creative thinking Help pupils understand a lot of algebraic statement, e.g. 2 more than x = 2 + x Twice x = 2x Do examples with pupils.	
11	Graphs	• Intersection of straight lines	- Draw two straight lines and find the co-ordinates of the point of interest.	Pupils can construct graph that interest from two sets of data	Draw graphs of straight lines that interest. Note the position of their points of intersection. Point out that draw and discuss graphs that interest. Discuss whether there points on the same line or not.	

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12	Graphs	• Simple simultaneous linear equations in two variables.	-Solve simple simultaneous linear equation graphically.	Pupils master the use of graphs to solve simultaneous equations.	Life skills: Problem solving Creative thinking Revise plotting of straight lines graphs of lines interested. Stress that the point of intersection is the solution of the two equations.	Graph sheets
13	Statistics	Graphical representation in of data pie-chart	Interpret pie charts: Calculate sectional angles and draw the pie chart	Pupils can represent data on a pie chart.	Revise bar chart and pictograms. Introduce the idea of the pie chart. Extra data from given pie chart.	Population statistics record, class attendance marks, pupils etc.

Junior Secondary III, Mathematics, Term 1						
Week	**Theme/ Concept**	**Topic**	**Objectives**	**Learning Outcome**	**Teaching/ Learning Activities**	**Teaching and Learning Aids**
1	Number and Operations	Basic Laws of Indices	Evaluate indicial expressions using the following rules: $a^n = \frac{ax\ ax\text{-}xa}{n\ factors}$ $a^m x a^n = a^{m+n}$ $a^m \div a^n = a^{m-n}$ $a^0 = 1$ $a^1 = a$ $(a^m)^n = a^{mxn}$ $\sqrt[n]{a} = a^{1/2}$ $\sqrt{a} = a^{1/2}$	Pupils can do problems using the different laws of indices	Discuss seven different examples of each rule. (i)$2^3 = \frac{2\ x2\ x2}{3\ fractions} = 8$ (ii)$3^2 x 3^3 = 3^{2+3} = 3x3x3x3x3 = 243$ (iii)$2^5 \div 2^3 = 2^{5-3} = 2^2 = 2x2 = 4$ (iv)$7^0 = 1, 12^0 = 1$ (v)$4^1 = 4;\ 9^1 = 9$ (VI)$3\sqrt{8} = 8^{1}/_{3} = 2$ (VII) $\sqrt{9} = 9½ = 3$ Life skills: Problem solving Decisions making thinking.	
1	Binary operation	Carry out evaluations of binary operations e.g if $a^* b = b+(a+b)$ then $3^*2 = 2+(3x2) = 2+6 = 8$	Pupils can do several exercises on the different binary operations	Introduce binary operations, let pupils practice examples on binary operations e.g a*b → b+(axb) if a=3,b=2 then 3*2 = 2+3x3=8, $a^n b$ → 1+(axb)	Charts showing table values for different binary operations on a given sets of numbers	

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				if a=b,=5 $4^n5 \longrightarrow 1+(4x5)=21$etc Build table of values for binary operations on given sets of numbers. Life skills . Problem Solving		
2	**Number and Operations and the environment**	**Number bases**	Write numbers bases correctly: e.g 212_3, 412 and not 23_3 or 213_2	Pupils can count in different bases.	Introduce numeration in bases two to five. Let pupils read and write number bases correctly.	Countable objects in the environment.
3	**Number and operation and the environment**	Place value in bases other than 10	Find values of digits in numbers other bases	Pupils can five he place value of digits in a number	Discuss number of different symbols necessary and use ideas of place value to represent greater numbers. Life skills: Problem	
		Conversions from any base to base 10	Convert from any base to base 10	Pupils can change from one base to the other	Revise some identical rules. Discuss numbers in other base which are less than ten, e.g. eight, three, two, etc.	

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					Do examples until pupils answer from any base to base 10	
	Number and operation and the environment		Convert from base 10 to other bases		Convert numbers in base ten to numbers in base five, by grouping in five e.g., room 8 in base ten is room 13 in base five. Convert to number in bases 2 to 5 by successive division by the base.	
4	Number and Operations and the Environment	Operation on numbers in bases 2 to 5.	Add subtract and multiply numbers in bases 2 to 5	Pupils can add, subtract and multiply in different bases.	Revise renaming ones as ten's, tens as hundreds etc. in addition and multiplication. Revise renaming tens as ones hundred as tens etc, in subtraction and division. Use similar techniques to carry out basic operations on numbers in bases	

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Week	**Theme/ Concept**	**Topic**	**Objectives**	**Learning Outcome**	**Teaching/ Learning Activities**	**Teaching and Learning Aids**
		Linear equations in one variable.	Solve equations such as $23_n=7$ find n.	Pupils can solve simple linear equations	other then base ten, e.g renaming ones as fives, or threes, or eights, fives as five etc Discuss equations like 12x +3 = 32 (base five) and equations like 12n =5 that can be reduced to linear equations.	
5	Everyday arithmetic one (1) and two (2)	Rates, electricity, water, GST, Postage	Calculate electricity, water GST, Postage rates	Pupils can calculate their electricity water bills can , use knowledge to understand how these bills are calculated	Used prepared electricity and water rates, GST and postage rates (where necessary) to study the method for calculations. (i) Domestic and commercial electricity charges (ii) Domestic and commercial water charges;	Electricity rate, Water rates Postage rates. GST rates.

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					(iii) Local and international postage charges (iv) GST (v) Where possible, let pupils visit the National Power Authority, Water supply Unit, P:ost Office and Income Tax Department in their locality. Give examples of problems electricity, water, GST. Postage Problem solving Decision making	
6	Everyday Arithmetic one (1) and two (2)	Simple interest	Calculate the time rate, principal or amount given the other values	Knowledge can be used for bank transactions and loan	Explain worked exampled on finding the time, rate, principal, interest amount using formulae. Life skills: Problem solving Decision making	Charts showing formulae for interest, principle rate time, amount
7	Everyday Arithmetic	Compound interest	Calculate the use of	Knowledge can be for monetary	Revise simple interest. Where	

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	one (1) and two (2)		compound interest on loans	transactions in business enterprises	possible, expose pupils to the interests on bank loans. Let pupils find the interest for each year and add to previous interests to get the total (Compound) interest. Life skills: Problem solving	
8-9	Measurement	Areas of circles and triangles. *Areas of parallelograms and trapeziums.	Calculate area of circles, triangles. Parallelograms . Trapeziums	Pupils master the formulae for circles triangles, parallelograms and trapeziums and their applications in solving problems	Revise finding the areas of rectangular place surface. Use square place boards to find areas of plane figures Life skills: Problem solving Decision making	
10	Geometry and Trigonometry.	Types of polygons up to decagon.	Name and identify types of polygons up to decagon.	Pupils can name polygons with to ten sides.	Discuss polygons found in solids and the classroom environments.	Mathematical instruments, cut-outs diagrams of polygons and quadrilaterals.

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Week	**Theme/ Concept**	**Topic**	**Objectives**	**Learning Outcome**	**Teaching/ Learning Activities**	**Teaching and Learning Aids**
		Sum of interior angles of polygons up to pentagon	Calculate sum of interior angles of polygons up to a pentagon	Pupils can use the formula for the interior angles of a polygon to do calculations	Draw and name polygons on the blackboard and make cut out illustrations of them: from triangles to decagons. Life skills: Problem solving Decision making Measure interior and exterior angles of polygon. Deduce the sum of the exterior angles of polygon. Hence shoe that the sum of the interior angles is (2n-4) right angles.	
11	**Geometry and trigonometry**	Calculating sides and angles of polygons up to pentagon.	Calculate size of an exterior angle given the number of sides.	Given the number of sides, pupils are able to calculate the interior and exterior angles. Discuss the trapezium and the	Use sum to determine the size of an angle of a regular polygon.	

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Week	**Theme/ Concept**	**Topic**	**Objectives**	**Learning Outcome**	**Teaching/ Learning Activities**	**Teaching and Learning Aids**
		Calculation of interior and exterior angles	The interior and exterior angles can calculated the number of sides	kite as examples of other quadrilaterals. Summarize all properties discovered and use to calculate lengths and angles.		
12	**Algebra**	Factorizations by grouping and difference of two squares. Factorizations of quadratic equations	Factorize expressions by grouping, differences of two squares, Factoring quadratic trinomials	Pupils can factorize expressions by difference of two square and can factorize quadratic equations	Factorize polynomial expressions by grouping and use of common factors, eg, ap Zaqt+bp-2bq =a(p-2q)+b(p-2q) =(p-q) (a+b)	

Junior Secondary III: Mathematics, **Term:** 2						
Week	**Theme/ Concept**	**Topic**	**Objectives**	**Learning Outcome**	**Teaching/ Learning Activities**	**Teaching and Learning Aids**
1	**Number and Operation**	Approximation Using logarithms and antilog to evaluate multiplications and division. Evaluate squares and square roots of whole numbers.	Approximate decimal using: (i)decimal places (ii)significant figures (iii) standards forms. Evaluate multiplication and division using logarithms and antilog (excluding negative characteristics. Evaluate squares and square root of whole numbers	Pupils can distinguish between decimal places and significant figures. Pupils can now write common logarithms as powers of ten. Apply log characteristics in solving problems on logs.	Ensure that pupils clearly see the difference between decimal places and significant figures through several different. Examples Use the of 10^n and 10^{-n} to explain standard forms with different Examples Life skills Problem solving. Decision making. Let pupils understand that the common logarithm of any number is the index to which 10 must be raises to obtain the number that is common logarithms involve powers of 10. Example: (1) $10^3 = 100$ $\therefore \log 100 = 3$ (11) $10^{-3} = 0.001$ or $\frac{1}{100}$	Place value chart for decimals Mathematical tables

Junior Secondary III: Mathematics, **Term:** 2						
Week	**Theme/ Concept**	**Topic**	**Objectives**	**Learning Outcome**	**Teaching/ Learning Activities**	**Teaching and Learning Aids**
				Pupils can read logarithm and antilogarithm tables. Use of logarithm table to do. Multiplication and division.	∴log (0.001)=log ($\frac{1}{100}$)=-3 Introduce idea of characteristics and mantissa of logarithm from the logarithm tables. Example: Log characteristic mantissa 1. Log2 =0 2. Log 20 =1 3. Log 200 = 2 4. Log (0.2) = 5. Log (0.02) = Life skills Problem solving Stress that the characteristic is the number before he decimal point (can be positive zero or negative), and the mantissa is the decimal part guide pupils to be able to read real logarithm correctly from the log tables. Use logs to evaluate products, quotients and powers	3010 3010 3010 3010 3010 3010

Junior Secondary III: Mathematics, **Term:** 2						
Week	**Theme/ Concept**	**Topic**	**Objectives**	**Learning Outcome**	**Teaching/ Learning Activities**	**Teaching and Learning Aids**
				Pupils can do squares and square roots using logarithms.	(whole numbers and fractions) Use logs to evaluate squares and square roots of whole numbers	
2	**Measurement**	Total surface area of cuboids, cubes and cylinders. Volumes of prisms with uniform cross sections.	Calculate the total surface areas of cuboids, cubes and cylinders. Calculate volumes of cuboids, cubes and cylinders. Calculate densities substances using	Pupils can use the formula for cuboids, cubes and cylinders to do simple calculations. Pupils can calculate the volume of cylinder , triangle and prism, given the cross sections area.	Derive the formulae for the TSA of cuboids, cubes ad cylinders. Do many examples of calculating TSA of cuboids, cubes and cylinders, Life skills: Problem solving Calculate the volume of prisms with uniform cross Section, e.g cylinder, triangle prism. Use product of area of cross section and height /length.	Examples of cuboids, cubes, cylinders in the environment

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Week	**Theme/ Concept**	**Topic**	**Objectives**	**Learning Outcome**	**Teaching/ Learning Activities**	**Teaching and Learning Aids**
		Densities of various substances	density mass volume	Differentiate between density and weight. Do simple calculation with the formula density = $\frac{mass}{volume}$	Define density as the ratio of mass to volume Discuss the difference between density and weight	
3	**Geometry And Trigonometry**	Angles is a circle Angles in the same segment (Theorem) Semi-circle. Angles subtended by an arc or a chord at the centre	Use theorems to find angles in circle. Discover the relationship between angles a circle	Apply the theorems of angles in the same segment, semi circle and angle subtended by an arc. Relationship between the angles in a circle	Discuss circle theorems with examples Life skills: Problem solving Decision making Creative thinking. Establish relation between angles in a circle. e.g the angle subtended at the circumference is half the angle subtended by the same arc at the centre	

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Week	**Theme/ Concept**	**Topic**	**Objectives**	**Learning Outcome**	**Teaching/ Learning Activities**	**Teaching and Learning Aids**
4	**Geometry And Trigonometry**	Construction of angles of 60^0,45^0 and 90^0	Construction of angles e.g 60^0, 30^0,90^0 and 45^0 using a ruler and pair of compasses.	Acquire the skills of drawing angles of 60^0, 30^0,90^0 and 45^0 a ruler and compasses. Acquire the skills for using a compass	Remind pupils that a perpendicular line makes an angle of 90^0 with the other line. Bisect the angle 90^0 to get the angle of $45^{0.}$. Discuss with pupils the measure of each angle of an equilateral triangle and show that each angle measures. Illustrate that by constructing an equilateral triangle, an angle 60^0 is constructed Bisect angle of 60^0 to get an angle of 30^0	
5	**Geometry and trigonometry**	Construction of triangle with given sides and angles	Construct triangles with a given sides and angles using a ruler and a pair of compasses	Pupils apply the skills learnt in drawing angles to construct triangle. Apply knowledge for constructing 60^0, 30^0, 90^0 to	Illustrate on the blackboard on to construct a triangle with given sides and angles. Stress that sketching is always necessary before constructing. Extend constructions to angles of	

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Week	**Theme/ Concept**	**Topic**	**Objectives**	**Learning Outcome**	**Teaching/ Learning Activities**	**Teaching and Learning Aids**
				construct 75^0 and 135^0	75^0, 135^0, etc, by combining the constructions described above. Give illustrations of these constructions on the blackboard and get pupils to practice construction of these angles	
6	**Geometry and Trigonometry**	Types of quadrilateral and their properties. Pythagoras Theorem	Name and identify types of quadrilaterals. State and apply Pythagoras theorem to right angles triangle.	Identify and name polygons with different numbers of sides, up to ten sides. Apply of Pythagoras theorem in calculating the sides of a right angled triangle. Establish that the square of the hypothenese in a right angle triangle is equal to the sum of the	Make a table depicting types of quadrilaterals and their properties. Life Skills Decision making Using Illustration such as squares semi –circles or equilateral triangles drawn on the sides of right angled triangles shown below, relate the sum of the areas of the B and C to that of A. Hence establish the area of any regular figure draw on	

Junior Secondary III: Mathematics, **Term:** 2						
Week	**Theme/ Concept**	**Topic**	**Objectives**	**Learning Outcome**	**Teaching/ Learning Activities**	**Teaching and Learning Aids**
				squares of the two sides. Solving word problems using Pythagoras theorem	the hypotenuse equals the sum of the areas of similar figures drawn on the other two sides. Using figure three, state Pythagoras theorem- the square on the hypotenuse equals the sum of the squares on the other two sides. i.e, $a^2 = b^2 + c$ Do simple calculations involving practical situations, e.g determining the length of a ladder leaning against wall.	
7	**Geometry and trigonometry**	Basic trigonometical ratios target cosine and sine	Give definitions of trigi ratios	Apply the formulae for trigonometrical rabios to do simple calculations e.g sides of the triangle.	Using a diagram of right – angled triangle on the blackboard, introduce the terms hypotenuse, and opposite sides in relation to specific angle on square paper, guide pupils to draw right angle triangles as shown, and measure the	Mathematical set, square paper

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Week	**Theme/ Concept**	**Topic**	**Objectives**	**Learning Outcome**	**Teaching/ Learning Activities**	**Teaching and Learning Aids**
			Use the given value of a particular ratio to find the other two.	Are able to utilize the tringonometicla ratios to calculate angles in the right angled triangle. Can use the value of one tri-ratio to calculate the values of the other two ratios.	lengths of different hypotenuse, adjacent and opposite sides. Taking early ratio in turn and show that for a particular angle. This ratio construct. Repeat for other angles and show that for different angles, the values of a particular ratio are different. Life skills Problem solving. Use the given value of one tri-ratios to find the values of the other two tri-ratios, e.g given that sine ø=$\frac{3}{5}$, Find cos ø and tar ø Life skills: Problem solving Decision making	
8	**Geometry and trigonometry**	**Finding angles given values of tri-ratios.**	Find angles from the trig-ratio tables.	Can use the tables of sine, cosine and tangent to find	Find angles when the sine, cosine and tangent of angles are given.	

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Week	**Theme/ Concept**	**Topic**	**Objectives**	**Learning Outcome**	**Teaching/ Learning Activities**	**Teaching and Learning Aids**
				the sine, cosine and target of angles.		
		Solving right angled triangles.	Find unknown angles and sides of a right angled triangle.		Do simple calculations using tri-ratios to find the lengths $0^0 – 90^0$ to pupils to help guide them establish the values of trig-ratios e.g Sin 0^0, Sin 90^0 Coso^0 =1, Cos 90^0= 0 Tan 0^0 = 0, Tan 90^0 = ∞	
		Bearing	Find the bearing of one point from another point given the bearing of the other point from the first point ,	Distinguish the direction of the cardinal points	Revise the cardinal points Introduce the mariners compass and allow group discussion on its uses. Stress that bearing is an angular measure, taken from a specific direction.	Mariners compass Mathematical set.

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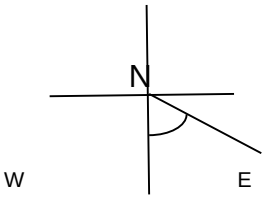
			e.g if the bearing of A from B is 060^0 find the nearing of B from A	Apply the cardinal points to work out the bearing of a point.	Discuss the two ways it can be measured. Life skills: Problem solving Decision making (i) From North or South towards the East or West. (ii) From North only using three digits. Also stress the words "of" and :"from" Give pupils practice in using both methods, e'g show that a position $S50^0$ e is equivalent to 130^0  50^0 P	

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Week	**Theme/ Concept**	**Topic**	**Objectives**	**Learning Outcome**	**Teaching/ Learning Activities**	**Teaching and Learning Aids**
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9	**Algebra**	**Linear equations involving fractions**	Solve equations involving fractions with normal denominators. **Solve simultaneous equations by method of** **(a) Substitution** **(b) Elimination**	The use of L.C.M of the denominators in solving fractional equations. Applying the methods of elimination and substitution to solve simultaneous equations.	Bring out the idea of multiplying each term of the equation by the L.C .M of the denominators to get an equivalent non- fractional equations. Life skills: Problem solving Explain the method of substitution using one of the equations to express one of the unknown quantities in terms of the other and substituting in the second equation. Discuss the method of elimination. Stress the need that the unknown quantities to be eliminated must have the same co-efficient on both equations.	

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Week	**Theme/ Concept**	**Topic**	**Objectives**	**Learning Outcome**	**Teaching/ Learning Activities**	**Teaching and Learning Aids**
		Word problems **Quadratic equation**	**Solve word problems leading to simultaneous equations.** **Solve quadratic equations using factors**	Changing word problems to simultaneous equations and apply in the methods of substitution and elimination. Writing equations as factors and using the factors to obtain the solutions Expansion of simultaneous equations.	Revise briefly factorization of quadratic expressions. Introduce the quadratic equation by equating quadratic expression to zero. Stress the need that before factorization, all quadratic equations of the form ax^2 bx+c=0 must be expressed in this form $x^2+\frac{b}{}x+\frac{c}{}=0$ if $(x+2^a)(x^a-3)=0$ either x+2 =0 or x -3 =0 i.e x=2-2 or x=3	

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10	**Algebra**			Changing word problems to quadratic equations	Encourage pupils to write down mathematic sentences from word problems using symbols. Solve quadratic equations by use of factors. Encourage pupils to solve quadratic equations individually and point out that there are always two	

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					solutions to a quadratic equation.	
11	**Graphs**	**Travel graphs distance/time interpretation**	Interpret travel graphs, distance covered, time taken	Pupils can develop a table of values and select a suitable scale to cover these values. Can accurately plot the points on the graph	Revise choice of scales and labeling of axes. Practice plotting distance covered against time given. Explain graph showing time at rest. Explain point of intersection of travel graphs Practice the interpretation of travel graphs. Draw travel graphs from pupils every day experiences. Life skills: Decision making Creative thinking	Graph paper Graph board
12	**Averages mean/median and mode (for ungrouped data with or without frequencies)**	**Find mean, median and mode of a set of ungrouped data**	Develop frequency table from a series of scores. Utilize the table to determine the	Use frequency table to determine the mode of scores. Order date in ascending order and hence	Population statistics record of class attendance and marks	

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Week	**Theme/ Concept**	**Topic**	**Objectives**	**Learning Outcome**	**Teaching/ Learning Activities**	**Teaching and Learning Aids**
			mean median and mode	determine the medians of both even and odd number of terms Calculate the mean by arithmetic average	Record of births, deaths, shop sales	
13	**Graphs**	**Construction of frequency tables**	Construct frequency tables given a set of date with frequencies		Draw a frequency table for ungrouped data	

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