Curriculum Map – Mathematics

Year Group – 8

Autumn 1

Ratio and scale

8 sessions, 2 weeks

Knowledge:
Meaning and representation of ratio.
Ratio in the form n:1 or 1:n
Multiplication and division facts.
Place value knowledge
Value of pi ∏
Four quadrants of graphs (Higher Tier)

Skills:
Use ratio notation.
Solve worded problems involving ratio.
Simplify ratio to the simplest integer form.
Compare ratios and fractions.
Understand pi as a ratio.
Understand gradient as a ratio (Higher Tier)

Key Activities:
Complete sentences for every x there are y from given pictures.
Shade given pictures to represent given ratios.
Use the bar model to represent ratios.
Understand and use multiplication on both side of the ratio to fill in missing numbers.

Key Vocabulary:
Ratio
Notation
Simplify
Integer
Pi
Gradient

Multiplicative Change

8 sessions, 2 weeks

Knowledge:
All multiplication facts.
Corresponding division facts.
Graphing in the first quadrant.
Shape knowledge for regular 2D shapes.
Scale factor rules
Rules for identifying similar shapes.

Skills:
Solve problems involving direct proportion.
Read conversion graphs and plot points on conversion graphs.
Draw a line of best fit.
Calculate scale factor using known multiplication facts.

Key Activities:
Draw and read conversion graphs for money, measure and temperature.
Identify and draw similar shapes
Use multiplication to calculate / identify scale factor.
Interpret and draw scale diagrams in different contexts.
Apply scale factors and ratio to reading maps and mapping.

Key Vocabulary:
Proportion
Multiplication
Scale factor
Conversion
Quadrant

Multiplying and dividing fractions

10 sessions, 2.5 weeks

Knowledge:
All multiplication facts.
Rules for multiplying fractions.
Rules for dividing fractions.
Turning an integer into a fraction.
Algebraic representations for multiplication and division.

Skills:
Solve problems involving multiplication and division on fractions.
Use reciprocals to solve and check calculations.
Use the bar model to represent fractions.
Apply knowledge of integer and unit fractions to algebraic fractions.

Key Activities:
Multiply integers by fractions.
Multiply fractions by unit fractions.
Divide integers by fractions.
Divide fractions by unit fractions.
Use algebraic representations for multiplication and division.
Understand that a fraction is the numerator divided by the denominator.

Key Vocabulary:
Substitute
Fraction
Integer
Multiplication
Division
Reciprocal

***Assessment** (including hot and cold task):*

Assessment A cold task – 1st lesson

Assessment A hot task – last lesson

Assessment B to be used for any higher tier pupils or those working at the exceeding stage for their age.

GL Assessment progress tests – baseline.

Autumn 2

Working in the cartesian plane

12 sessions, 3 weeks

Knowledge:
All four quadrants of a graph.
How to read coordinate.
Negative numbers and place value.
The term parallel and how to identify this.
Algebraic expressions and representations.
Positive gradients.
Negative gradients.
Substitution of numbers in algebra.

Skills:
Draw table for substitution of y value.
Write x and y values from expressions as coordinates.
Use direct proportion to link y=kx
Recognise and use lines in the form y = x + a
Plot straight line graphs for different line equations.

Key Activities:
Draw straight line graphs from given coordinates.
Use substitution to calculate the x or y value in an equation.
Change x and y values to coordinates.
Plot coordinates accurately on graphs including all 4 quadrants.
Use algebraic expressions for straight line graphs.

Key Vocabulary:
Substitution
Cartesian plane
Graph
Quadrants
Algebraic expressions

Representing Data

10 sessions, 2.5 weeks

Knowledge:
All four quadrants of a graph.
How to read coordinate.
Linear and non-linear sequences.
Frequency tables and how to create these.
Two-way tables and how to complete these.
Discreet and continuous data and how to recognise the difference between these.

Skills:
Using addition and subtraction facts to complete two-way tables.
Interpret ungrouped frequency tables.
Plot coordinates on a graph.
Identify correlation in data for scatter graphs.
Apply knowledge of direct proportion to different contexts.

Key Activities:
Draw scatter graphs and read the coordinates of points plotted.
Identify positive and negative correlations in scatter graph.
Collate date for continuous and discreet data sets.
Represent grouped discreet data in different ways.
Draw and use lines of best fit

Key Vocabulary:
Qualitative
Continuous data
Discreet Data.
Scatter graph
Line of best fit

Tables and probability

4 sessions, 1 week

Knowledge:
Set notation.
Venn diagrams, how to use these and complete missing data.
Two-way tables and how to complete these.
Addition and subtraction facts.
Inverse operations.
Probability tress.

Skills:
Construct tables (sample spaces) to show more than one outcome.
Identify possible combinations.
Identify numbers of different combinations / possibilities.
Find probabilities from two-way tables.
Use Venn diagrams to find probabilities.
Use the product rule to find total outcomes.

Key Activities:
Complete probability trees and use the product rule to find the total number of possible outcomes.
Read, use and complete Venn diagrams to represent data and calculate probabilities.
Read, use and complete two-way tables to represent data and calculate probabilities.
Solve worded problems.

Key Vocabulary:
Set notation
Venn Diagram
Probability
Inverse
Two-way tables
Product.

***Assessment** (including hot and cold task):*

Assessment A cold task – 1st lesson

Assessment A hot task – last lesson

Assessment B to be used for any higher tier pupils or those working at the exceeding stage for their age.

Term	Spring 1						Spring 2					
Unit title	**Brackets, equations & inequalities**		**Sequences**		**Indices**		**Fractions and percentages**		**Standard Index Form**		**Number sense**	
Length	10 sessions, 2.5 weeks 12 session, 3 weeks (HT)		3 sessions, 1 week 4 sessions, 1 week (HT)		5 sessions, 1.5 weeks 6 sessions, 1.5 weeks (HT)		10 sessions, 2.5 weeks 13 sessions, 3 weeks		9 sessions, 2.5 weeks 12 sessions, 3 weeks (HT)		8 sessions, 2 weeks 11 session, 2.5 weeks (HT)	
Outcomes	**Knowledge:** All multiplication facts. Corresponding division facts. Rules for addition and subtraction of integers. BODMAS / BIDMAS for the order of operations. Meaning of the following symbols > < and =	**Skills:** Form algebraic expressions. Use pictorial representation to support with writing algebraic expressions. Represent worded problems pictorially to support solving. Substitute integers into algebraic expressions to solve the equation. Use algebra tiles to represent expanding brackets. Solve problems involving inequalities	**Knowledge:** All multiplication facts. Corresponding division facts. Rules for addition and subtraction of integers. Understand the nth term as the place a number is in the sequence. BODMAS / BIDMAS for the order of operations.	**Skills:** Use known multiplication tables to identify patterns in numbers. Find the nth term in a sequence using a given rule. Apply knowledge of finding the nth term to identifying patterns in numbers and writing the rule for the nth term in a sequence. Use BODMAS / BIDMAS to solve algebraic rules to find the next number in a sequence. Multiply out brackets in a given rule.	**Knowledge:** Rules of addition and subtraction of integers. Conventions for writing algebra and how to combine like terms. Indices and order of operations. Highest common factors. Simplifying fractions to the lowest fraction.	**Skills:** Use algebra tiles to represent squared and cube numbers. Simplifying like terms in algebra. Apply highest common factors to simplifying algebra. Use the conventions for writing algebra to gather like terms and simplify expressions.	**Knowledge:** All multiplication facts. Rules for multiplying fractions. Rules for dividing fractions. Turning an integer into a fraction. Algebraic representations for multiplication and division. Calculator skills for completing calculations using all four operations.	**Skills:** Write percentages and decimals that are greater that 100% and 1. Reducing decimals and percentages when solving worded problems. Express one number as a fraction and decimal without using a calculator. Choose appropriate methods – including calculator and non-calculator – to solve percentage problems. Identify percentage change.	**Knowledge:** Using a calculator to get an answer to a calculation using the four operations. All multiplication facts. Corresponding division facts. Rules for addition and subtraction of integers. BODMAS / BIDMAS for the order of operations. Multiplication by 10 and powers of 10.	**Skills:** Identify billion when written in figures. Write numbers in standard form. Use positive and negative indices for standard form. Compare and order numbers in standard form. Apply the rules of addition and subtraction of indices to standard form problems. Solve worded problems involving standard from in 'real-world' applications.	**Knowledge:** Rounding rules – including the rounding rap to aid recall. Estimation and how to estimate to the nearest whole number. BODMAS / BIDMAS for the order of operations. Metric units and conversions – cm in m, mm in a cm, m in a km. How to tell the time in 24 hour and 12-hour clock. Meaning of the following symbols > < and =	**Skills:** Represent numbers on a number line of different intervals and estimate the value of the arrow. Round numbers to the nearest whole number and t o 1 decimal place. Use BODMAS / BIDMAS to solve calculations using the order of operations. Solve calculations involving money, units of length, weight and time.
Activities and Assessment	**Key Activities:** Represent algebraic expressions pictorially. Solve problems using algebra and substitute integers into given values. Identify common factors of given numbers. Use factorization and expanding of brackets to solve algebraic expressions. Understand and use the difference between expression, formulae and equation.		**Key Activities:** Express and continue sequences given the rules in words. Complete sequences using given algebraic rules. Understand and use nth term to solve and continue sequences. Draw a table of the first five terms to develop understanding of the nth term.		**Key Activities:** Understand the rules for simplifying indices when multiplying and dividing numbers with indices. Use algebra tiles to represent expressions and add / subtract values to simplify the expression. Group like terms together. Group like terms with indices together.		**Key Activities:** Solve worded problems involving percentages and decimals. Introduction to percentage change and how to calculate this. Calculator and non-calculator methods for calculating with percentages and decimals. Conversion between percentage and decimals including numbers greater than 100% and over 1. Convert between fractions and decimals using division.		**Key Activities:** Write numbers between 1000 and 1 billion in figures. Identify the place value of digits in numbers. Represent numbers in standard form using both positive and negative indices. Add and subtract numbers in standard form. Solve worded problems involving standard form. Apply multiplication and division rules to calculations involving indices.		**Key Activities:** Use order of operations to solve calculation. Explain the order of calculations using the BODMAS / BIDMAS rules. Make comparisons between units of measure using > < and = Solve problems with money including calculating change. Solve problems involving time – both in the 24 hour and 12-hour clock.	
	Key Vocabulary: Algebra Substitute Multiply Factorize Brackets Expand Common factors Greater than Less than Equal to		**Key Vocabulary:** Linear Non-linear Sequences Nth Term Generate Algebra		**Key Vocabulary:** Indices Base Index Simplify Factorize Highest Common Factor.		**Key Vocabulary:** Percentage Decimal Fraction Division Conversion Calculator Non-calculator		**Key Vocabulary:** Powers of 10 Positive Negative Indices		**Key Vocabulary:** Whole number Round One decimal place Two decimal places Three significant figures. BODMAS Units of measure Meter Liter	
	***Assessment* (including hot and cold task):** Assessment A cold task – 1st lesson Assessment A hot task – last lesson						***Assessment* (including hot and cold task):** Assessment A cold task – 1st lesson Assessment A hot task – last lesson Assessment B to be used for any higher tier pupils or those working at the exceeding stage for their age.					

Term	Summer 1						Summer 2			
Unit title	Angles in parallel lines and polygons		Area of trapezia and circles		Line symmetry and reflection		The data handling cycle		Measures of location	
Length	12 sessions, 3 weeks 15 session, 3.5 weeks (HT)		8 sessions, 2 weeks		5 sessions, 1.5 weeks		12 sessions, 3weeks		8 sessions, 2 weeks	
Outcomes	**Knowledge:** Names of 2D triangles and properties. Angles on a straight line total 180˚ Angles round a point total 360˚ Angles in a triangle total 180˚and angles in a quadrilateral total 360˚	**Skills:** Understand and use basic angle notation and rules Identify vertically opposite angles. Understand, read, write and use angle notation correctly. Identify alternate and corresponding angles with parallel lines and the transversal. Calculate with alternate and corresponding angles. Understand and use the sum of exterior angles of any polygon	**Knowledge:** Area of regular 2D shapes and how to calculate this. The term perimeter and how to calculate this in regular and irregular 2D shapes. The parts of a circle including radius, diameter and sector. Multiplication facts for squaring. Label the circumference of a circle.	**Skills:** Calculate the area of triangles, rectangles and parallelograms. Calculate the area of a trapezium. Calculate the perimeter and area of compound shapes. Calculate the area of a circle. Calculate the area of a circle and parts of a circle without a calculator Calculate the area of a circle and parts of a circle with a calculator	**Knowledge:** Properties of regular 2D shapes. Graphical skills – identifying the x and y axis, read, write and plot coordinates.	**Skills:** Recognize line symmetry Reflect a shape in a horizontal or vertical line with the shapes touching the line. Reflect a shape in a horizontal or vertical line with shapes not touching the line. Reflect a shape in a diagonal line	**Knowledge:** Completion of tally chart and frequency tables. Basic graphing skills – drawing and labelling of axis, drawing simple bar charts and interpreting pictograms. The rules for >, <, =, ≤ and ≥ Range = greatest value – lowest value Plotting point accurately on graphs for line graphs. Graphical skills – identifying the x and y axis, read, write and plot coordinates.	**Skills:** Identify the data handling cycle – pose a question, collect data, analyze data, interpret the results. Set up a statistical enquiry Design and criticize questionnaires – including how to improve questions to gather the data required. Draw and interpret pictograms, bar charts and vertical line charts Draw and interpret multiple / dual bar charts. Draw and interpret pie charts Choose the most appropriate diagram for a given set of data Identify misleading graphs Find and interpret the range – including calculating from a given data set.	**Knowledge:** All four operation and ability to calculate with all four operations with 3-digt numbers. The rules for >, <, =, ≤ and ≥ Range = greatest value – lowest value Completion of tally chart and frequency tables. Two-way tables and how to complete these.	**Skills:** Understand and use the mean, median and mode to calculate different averages of data sets. Identify outliers from given data sets. Compare distributions using averages and the range and make reasoned conclusions. Find the mean from an ungrouped frequency table (HT) Find the mean from a grouped frequency table (HT) Use frequency x midpoint to calculate the mean from a grouped frequency table. (HT)
Activities and Assessment	**Key Activities:** Investigate angles between parallel lines and the transversal Identify and calculate with co-interior, alternate and corresponding angles Solve complex problems with parallel line angles Construction triangles and special quadrilaterals – learn the side, side, side etc rules. **Key Vocabulary:** Alternate angle Parallel line Transversal Vertically opposite angles Corresponding angles Co-interior Triangle Quadrilateral Isosceles Equilateral Scalene		**Key Activities:** Investigate the area of a circle. Area = length x width Area of a triangle = ½ base x height Area of parallelogram = base x perpendicular height. Area of trapezium = ½ (a + b) x height Apply knowledge of the area of regular 2D shapes to worded problems and compound shape problems. **Key Vocabulary:** Area Perimeter Parallelogram Trapezium Perpendicular Base Height Width Length		**Key Activities:** Identify lines of symmetry in regular and irregular 2D shapes. Know that a parallelogram has no lines of symmetry. Reflet shapes across the x and y axis Reflect shapes diagonally as well as horizontally and vertically. Draw the line of reflection using a given value on a graph e.g. y = 2 **Key Vocabulary:** Kite Rhombus Pentagon Trapezium Symmetry Line of symmetry Reflection Horizontal Vertical Diagonal Perpendicular		**Key Activities:** Identify sources of data including surveys, questionnaires, libraries and internet searches. Interpret bar graphs and line charts in both horizontal and vertical orientations. Developing graphing skills for all types of graphs – bar charts, line graphs, pie charts Represent and interpret grouped quantitative data Compare distributions using graphs and charts. Focus in this unit on developing graphing skills – this will provide the basis for work in the end of KS3 and GCSE. **Key Vocabulary:** Data collection Primary data Secondary data Hypothesis Bar chart Pictogram Dual / multiple bar chart Pie chart Axis		**Key Activities:** Choose the most appropriate average for a given data set. Teach the 'mean in average' song to help remember the different averages and how to calculate them. Mean – is average (add the numbers up and divide by the total number) Median – the middle number Mode – the number that occurs most in a given data set. **Key Vocabulary:** Mean Median Mode Range Frequency Grouped Ungrouped Outliers Two-way table Distributions
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