

# Key Stage 3: Mathematics Curriculum Map 2023-24

## Prior Learning:

At the start of KS3 students are expected to:

- Understand the relationship between powers of 10 from 1 hundredth to 10 million, and use this to make a given number 10, 100, 1,000, 1 tenth, 1 hundredth or 1 thousandth times the size (multiply and divide by 10, 100 and 1,000)
- Recognize the place value of each digit in numbers up to 10 million, including decimal fractions, and compose and decompose numbers up to 10 million using standard and nonstandard partitioning.
- Reason about the location of any number up to 10 million, including decimal fractions, in the linear number system, and round numbers, as appropriate, including in contexts.
- Divide powers of 10, from 1 hundredth to 10 million, into 2, 4, 5 and 10 equal parts, and read scales/number lines with labelled intervals divided into 2, 4, 5 and 10 equal parts.
- Understand that 2 numbers can be related additively or multiplicatively, and quantify additive and multiplicative relationships (multiplicative relationships restricted to multiplication by a whole number)
- Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse relationships, and place-value understanding.
- Solve problems involving ratio relationships.
- Solve problems with 2 unknowns.
- Recognize that fractions can be simplified and use common factors to simplify fractions.
- Express fractions in a common denomination and use this to compare fractions that are similar in value.
- Compare fractions with different denominators, including fractions greater than 1, using reasoning, and choose between reasoning and common denomination as a comparison strategy.
- Draw, compose, and decompose shapes according to given properties, including dimensions, angles, and area, and solve related problems

## Curriculum Intent:

Our curriculum is designed to recognise students' prior learning and allow them to develop interpersonal skills. Our intent is to aim to ensure that all children:

- become fluent in fundamental mathematics.
- are able to reason mathematically.
- can solve problems by applying their maths skills.

We provide appropriate level of challenge and encourage students to explain their choices.

This will translate into better GCSE outcomes, more post 16 options and improve their social mobility.

## SMSC

**Spiritual:** The study of mathematics enables students to make sense of the world around them and we strive to enable each of our students to explore the connections between their numeracy skills and every-day life. Developing deep thinking and an ability to question the way in which the world works promotes the spiritual growth of students. Students are encouraged to see the sequences, patterns, symmetry, and scale both in the man-made and the natural world and to use maths as a tool to explore it more fully.

**Moral:** The moral development of students is an important thread running through the mathematics syllabus. Students are provided with opportunities to use their maths skills in real life contexts, applying and exploring the skills required in solving various problems. For example, students are encouraged to analyze data and consider the

implications of misleading or biased statistical calculations. All students are made aware of the fact that the choices they make lead to various consequences. They must then make a choice that relates to the result they are looking for. The logical aspect of this relates strongly to the right/wrong responses in maths.

**Social:** Critical thinking skills and teamwork are fundamental to mathematics through creative thinking, discussion, explaining and presenting ideas. Students are encouraged to explain concepts to each other and support each other in their learning. In this manner, students realize their own strengths and feel a sense of achievement which often boosts confidence. Over time they become more independent and resilient learners.

**Cultural:** Mathematics is a universal language with a myriad of cultural inputs throughout the ages. Various approaches to mathematics from around the world are used and this provides an opportunity to discuss their origins. This includes different multiplication methods from Egypt, Russia and China, Pythagoras' Theorem from Greece, algebra from the Middle East and debates as to where Trigonometry was first used. We aim to develop an awareness of both the history of maths and the realization that many topics we learn today have travelled across the world and are used internationally.

### ORACY

All staff actively planning to use the following Oracy strategies:

- Exploratory Talking Points
- Structured Grid - Turn and Talk
- Odd One Out with sentence stems
- Concept Cartoons
- What is wrong/find the fib.
- Presentational talk

### LITERACY/NUMERACY/IT

All staff actively planning to use the following resources/strategies:

- Key vocabulary
- Sharing learning objectives
- Command words, sentence structure, Tier 1(Basic and common vocabulary used in everyday conversations), Tier 2(Words that often have multiple meanings and are referred to as academic vocabulary words) and Tier 3 (Words that are subject specific)
- Maths Watch
- Blookets
- Quizes
- Plickers

Cross curricular links: Science, Geography, History, PE, Technology

## Year 7

	Autumn Term 1 7 weeks	Autumn Term 2 7weeks	Spring Term 1 6 weeks	Spring Term 2 6 weeks	Summer Term 1 6 weeks	Summer Term 2 7 weeks
<b>Module Title</b>	<b>Algebraic Thinking</b>	<b>Place Value and Proportion</b>	<b>Applications of Number</b>	<b>Directed Number and Fractional Thinking</b>	<b>Lines and Angles</b>	<b>Reasoning with Number</b>
<b>Learning Focus</b>	Sequences; Understand and use algebraic notation; Equality and equivalence	Place value and ordering integers and decimals; Fractions, decimal and percentage equivalence	Solving problems with addition and subtraction; Solving problems with multiplication and division; Fractions and percentages of amounts	Operations and equations with directed number; addition and subtraction of fractions	Constructing, measuring and using geometric notation; Developing geometric reasoning	Developing number sense; Sets and probability; Prime numbers and proof
<b>Level Descriptor (secure)</b>	Describe and continue sequences, represent and recognise different sequences, use one and two-step function machines for finding numerical and algebraic inputs and outputs, represent functions graphically, solve linear equations, simplify algebraic expressions	Recognise, understand and write numbers with place value up to a billion, use number lines for integers, fractions and decimals, compare and order numbers, find the range and median from a set of numbers, round numbers, convert between fractions, decimals and percentages	Use formal and mental methods for addition, subtraction, multiplication and division of integers and decimals. Solve problems in context of perimeter, money, tables and statistical diagrams. Understand and use order of operations. Solve problems involving area and mean.	Find fractions and percentages of amounts with and without calculator. Understand and use directed number, including with algebra. Solve two-step equations. Add and subtract fractions as mixed numbers and improper fractions. Add fractions and decimals.	Measure and draw angles up to 360 degrees. Identify and solve problems involving parallel and perpendicular lines. Recognise different polygons and solve angle problems involving polygons. Construct triangles. Draw and interpret pie charts.	Know and use mental addition, subtraction, multiplication and division strategies for integers, decimals and fractions. Use estimation. Create and interpret venin diagrams. Understand and find probability from Venn diagrams. Recognise prime, square and triangle numbers. Identify LCM and HCF. Write a number as a product of prime factors.
<b>Careers Focus</b>	Engineers, Conservation Scientists, Meteorologists, Oceanographers, Laboratory Technicians, Social Scientists, Carpenters, Electricians, Engine Mechanics, Electricians, Games Developer, Software Programmer, Web Designer, Network Engineer, Actuaries, Air Traffic Controllers,		Engineers, Data Analyst, Tax Accountant, Forensic Accountant, Auditor, Statistician, Games Developer, Software Programmer, Web Designer, Network Engineer, Actuaries, Computer Engineers and Analysts, Economists, Market Research Analysts, Dietitians and Nutritionists		Carpentry, Brick laying, Garden design, Interior Decorating, Banking and Finance, Aviation, Astronomy, Medicine, Data Analyst, Tax Accountant, Forensic Accountant, Auditor, Statistician, Economists, Market Research Analyst	
<b>Assessment</b>	1	2	3	4	5	6

## Year 8

	Autumn Term 1 7 weeks	Autumn Term 2 7weeks	Spring Term 1 6 weeks	Spring Term 2 6 weeks	Summer Term 1 6 weeks	Summer Term 2 7 weeks
<b>Module Title</b>	<b>Proportional Reasoning</b>	<b>Representations</b>	<b>Algebraic Techniques</b>	<b>Developing Number</b>	<b>Developing Geometry</b>	<b>Reasoning with Data</b>
<b>Learning Focus</b>	Ratio and scale; Multiplicative change; Multiplying and dividing fractions	Working in the cartesian plane; Representing data; Tables and probability	Brackets, equations and inequalities; Sequences; Indices	Fractions and percentages; Standard index form; Number sense	Angles in parallel lines and polygons; Area of trapezia and circles; Line symmetry and reflection	The data handling cycle; Measures of location
<b>Level Descriptor (secure)</b>	Understand, simplify, express and use ratio notation. Share in a ratio. Understand pi and gradient as ratio. Understand direct proportion and direct proportion graphs. Use conversion graphs. Explore similar shapes and use scale factors. Multiply and divide fractions, including by integers and unit fractions.	Work with co-ordinates and lines parallel to the axis. Recognise and use the line $y=x$ , $y=kx$ and $y=x+a$ . Understand negative gradients. Understand and use the line $y=mx+c$ . Link graphs to sequences. Draw and use scatter graphs. Identify different types of data and represent in different tables. Find probabilities from different tables and Venn diagrams.	Form and use algebraic expressions, including with directed number. Expand and factorise single brackets. Form and solve equations and inequalities. Generate sequences from words or algebra. Add, subtract, multiply and divide expressions with indices.	Convert between fractions, decimals and percentages. Use percentage multipliers. Express a number as a fraction/percentage of another with and without calculator. Work with percentage change. Investigate powers of 10. Compare, order and calculate with numbers in standard form. Round numbers. Estimate. Solve problems with money, length, units and time.	Know and use correct notation for angles and parallel lines. Construct triangles and quadrilaterals. Know and use properties of quadrilaterals. Use the sum of exterior and interior angles in a polygon. Calculate the area and perimeter of different shapes, including compound shapes. Recognise line symmetry. Reflect a shape in horizontal, vertical, and diagonal lines.	Find and interpret the range. Compare distributions using charts. Identify misleading graphs. Understand and use the mode, median and mean. Chose the most appropriate average. Identify outliers. Compare distributions from averages and the range.
<b>Careers Focus</b>	Business Advisor, Data Analyst, Tax Accountant, Forensic Accountant, Fund Manager, Stockbroker, Retail Banker, Research Scientist, Geospatial technician, Land surveyor, Meteorologist, Archaeologist, Cartographer, Land Surveyor		Teacher, Professor, Mathematicians, Cryptologists, Astronomers, Chemists, Physicists, Statisticians, Financial Analyst, Computer and Information Research Scientist, Air Traffic Controller, Application Software Developer, Medical Scientist, Automotive Engineer, Risk Analyst, Architect, Chemical Engineer, Application Software Developer, Electronics Engineer		Retail, Accountants, Actuary, Finance and Business Advisor, Data Analyst, Tax Accountant, Forensic Accountant, Fund Manager, Stockbroker, Retail Banker, Research Scientist, Sports and Analyst, Medical research, Molecular and Cellular Biologist, Carpentry, Brick laying, Garden design, Interior Decorating, Banking and Finance, Aviation, Astronomy	
<b>Assessment</b>	1	2	3	4	5	6
<b>Year 9</b>						
	Autumn Term 1 7 weeks	Autumn Term 2 7weeks	Spring Term 1 6 weeks	Spring Term 2 6 weeks	Summer Term 1 6 weeks	Summer Term 2 7 weeks

<b>Module Title</b>	<b>Reasoning with Algebra</b>	<b>Constructing 2 and 3 Dimensions</b>	<b>Reasoning with Number</b>	<b>Reasoning with Geometry</b>	<b>Reasoning with Proportion</b>	<b>Representation and Revision</b>
<b>Learning Focus</b>	Straight line graphs; Forming and solving equations; Testing conjectures	Three-dimensional shapes; Constructions and congruency	Numbers; Using percentages; Maths and money	Deduction; Rotation and translation; Pythagoras' Theorem	Enlargement and similarity; Solving ratio & proportion problems; Rates	Probability; Algebraic representation; Revision
<b>Level Descriptor (secure)</b>	Recognise, sketch and produce graphs of linear and quadratic functions. Solve one and two step equations and inequalities. Expand a pair of binomials. Show simple conjectures with algebra.	Use correct language and properties to describe 2 and 3-D shapes. Calculate the surface area of prisms. Construct bisectors and scale drawings Identify congruency in shapes.	Work confidently with integers, directed numbers and decimals. Identify HCF and LCM Add, subtract, multiply and divide fractions. Convert large and small numbers to standard form and back. Order numbers in standard form.	Recognise basic angle facts. Translate and rotate shapes. Know and apply Pythagoras' theorem to find missing lengths. Use Pythagoras' Theorem to solve real life problems	Find a linear scale factor. Enlarge shapes using a positive scale factor and a centre of enlargement. Draw and interpret speed distance graphs. Solve problems with density, mass and volume.	Record and analyse the outcomes of simple probability experiments. List the expected outcomes. Calculate single event probability. Draw and interpret quadratic graphs.
<b>Careers Focus</b>	Business Manager, Financial Analyst, Computer Programmer, Research scientist, Professional Engineer, Resource Manager, Architect and Builder, Health Care Professional, Jeweller, Air Traffic Controller, Dietitian, School Teacher, Nutritionist, Broadcast technician, Carpenter.		Weather forecaster, Realtors, Chef/Cook/Baker, Seamstress/Tailor, Contractor, Truck Driver, Farmer, Mechanic, Actuary, Accountant, Investment Bankers, Cashier, Economist, Interior Designer, Plumber, Animator, Surveyor, Car Designer, Optical Lens Maker, Astronomers		Cartographer, Construction Worker, Computer Aided Design Engineer, Game Developer, Robotics Engineer, Architect, Mortgage Broker, Stockbrokers, Commercial Lenders, Retail Banks, Bakers, Market research, Weather forecaster, Pharmacists, Business Owners, Project Manager, Electrician, App Developer, Acoustic Engineer.	
<b>Assessment</b>	1	2	3	4	5	6