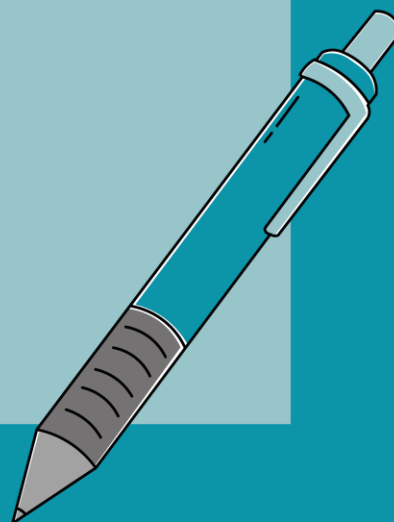


MATHS CURRICULUM OVERVIEW

KS3 overview



Manchester
Communication
Academy



Autumn Y7 Overview

Year 7	Autumn 1	Autumn 1	Autumn 1	Autumn 2	Autumn 2
Topic name	Sequences	Algebraic Notation	Place Value	FDP Equivalence	Addition and Subtraction
Declarative Knowledge	Understand: the difference between linear and non-linear sequences, the relevance of the nth term, what a like term is	Understand the purpose of algebra, the meaning of variable, term, expression	Understand mathematical symbol (<, >, =), converting between powers of 10 and their integer form, read and write numbers from a place value table.	Know that a fraction is also a division. Know the numerator, denominator, the percent sign, that decimals and percentages are out of 1 and 100 respectively.	Understand the perimeter is and how to read a timetable. Know terminology of bank statements
Procedural knowledge	Continuing pictorial and numerical sequences, finding the term-to-term rule and nth term	Use function machines, simplify algebra, form expressions from function machines, substitution. Generate sequences from the Nth term.	Rounding numbers. Calculate the median and range. Convert to and from standard form.	Convert fluently between FDP, Draw and interpret Pie Charts, Generate equivalent fractions.	Use a formal method to add and subtract decimals, calculate the perimeter of shapes. Use frequency trees, pictograms and bar charts. Mental and formal strategies of adding and subtracting.
Assessment/Outcomes	There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week. Baseline assessment upon entry to gather information on ability / gaps in knowledge.	There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.	There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.	There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.	There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.

<p>Prior knowledge</p>	<p>KS1 - pupils learn to count in steps of the numbers between 1 and 12 both forward and backwards, this knowledge evolves into the term to term rule, which in turn leads to calculating the Nth term and drawing linear graphs.</p>	<p>KS2 –Pupils first learn function machines in KS2, and then we build on this by using function machines to introduce variables / general rules in year 7.</p> <p>Y7 - This uses knowledge from the previous unit to generate sequences using substitution</p>	<p>KS2 – builds on understanding of place value and number from primary school</p>	<p>KS2 - shading fractions of amounts, read graphs like a bar chart and pie chart. Know how to use a number line</p> <p>Y7 – place value knowledge used to convert between FDP</p>	<p>KS2 – add and subtract integers, know how to use a number line</p> <p>Y7 - formal methods based on place value table</p>
<p>Future learning</p>	<p>Sequences leads into working in the Cartesian Plane in year 8. Also is used in the next yr7 unit to generate sequences</p>	<p>Algebraic Notation is the fundamental rules of working with letters, this sequence of work will follow into solving equations in sp1</p>	<p>Place value leads into multiplying and dividing by decimals and standard form calculators.</p>	<p>FDP leads into maths and money, interest rates and recurring decimals to fractions. Pie charts knowledge is developed further in constructions unit in su1</p>	<p>Adding and subtracting unit leads into deeper learning around adding and subtracting surds, standard form, and algebra. We discuss the mental strategies of how to add and subtract so that pupils can use less working memory completing these procedures in the future.</p>
<p>Why is this being studied?</p>	<p>National Curriculum Content is accessible for all ability ranges give pupils many opportunities to be successful, build confidence and articulate their thoughts during their first few weeks of high school. We introduce algebra in a nurturing by using pattern spotting and sequences to form the foundation of the subject.</p>	<p>National Curriculum Builds on the introduction to algebra from sequences to develop the basic understanding of algebra which will be fundamental to future skills like solving equations</p>	<p>National Curriculum The understanding of place value is key to being able to succeed at future topics like FDP equivalence, addition, subtraction multiplication, division. Underpins all number.</p>	<p>National Curriculum Pupils will see percentages and discounts in most shops they go into and most websites they visit. We want to give them the strategies for dealing with these marketing ploys to better understand and budget in the future. Also introduces key skills they will need to apply to future units ie percentages of amounts</p>	<p>National Curriculum Addition and subtraction is a key numeracy skill and this unit exposes pupils to a range of ways that addition and subtraction are used. Understanding properties of addition and subtraction will help with other skills like collecting like terms and adding/subtracting fractions, and later on surds and algebraic fractions.</p>

Spring Y7 Overview

Year 7	Spring 1	Spring 1	Spring 1	Spring 2	Spring 2
Topic name	Multiplication and Division	Fractions and Percentages of Amounts	Equality and Equivalence	Directed Number	Addition and Subtraction of Fractions
Declarative Knowledge	Know the Order of Operations. Know the conversions for metric units. Understand the difference between a factor and a multiple. Understand that multiplication is commutative. Know the formulas for area of a rectangle, triangle, parallelogram and trapezia. Awareness of what a perpendicular height is. Know that the mean is a measure of average.	Understand how to represent a fraction and percentages as a bar model. Understand percentages as out of 100. Know how to use a calculator.	Understand fact families and the idea of inverse operations. Know the meaning of like terms and the idea that a variable represents an unknown numbers	Understand number line and negative numbers Recognise patterns for multiplying and dividing with negatives. Understand positive numbers have more than one square root.	Understand equivalent fractions. Understand we cannot add/subtract unlike terms ie no common denominator. Understand fractions that are larger than 1
Procedural knowledge	Formal methods to multiply and divide integers and decimals. Find HCF and LCM. Apply BIDMAS to calculations. Finding the mean. Finding area of different shapes	Find fractions of amounts including fractions bigger than 1. Find percentages of amounts with and without a calculator. Percentage increase and decrease.	Solve one and two step equations. Form simple equations from worded problems.	Order and compare negative numbers. Four operations with negatives. BIDMAS with negatives. Simplify algebraic expressions and solve equations with negatives.	Simplify fractions, Add and subtract fractions, convert between mixed numbers and improper fractions. Simplify algebraic fractions

<p>Assessment/Outcomes</p>	<p>There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.</p> <p>Summative assessment assesses knowledge from Autumn term and pre-requisites for Spring. This will identify gaps and inform future planning of recall activities like starters and prior knowledge checks.</p>	<p>There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.</p>	<p>There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.</p>	<p>There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.</p>	<p>There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.</p>
<p>Prior knowledge</p>	<p>KS2 - Pupils have learnt formal methods for multiplying and dividing integers in KS2 and been introduced to factors and multiples.</p> <p>Y7 - The place value topic from Autumn 1 leads into multiplying and dividing decimals. Finding the mean builds on from finding the median and range covered in Autumn</p>	<p>KS1/2 - Pupils have been introduced to fractions in KS1.</p> <p>Y7 - FDP unit from Autumn 1 allows for finding decimal and percentage equivalence to find percentages of amounts.</p>	<p>Y7 - Adding and subtracting unit from Autumn 1 underpins collecting like terms and manipulating algebra. Equality and equivalence unit builds on the algebraic notation unit from Autumn 1, which included like terms, writing expressions and function machines.</p>	<p>KS2 – Pupils have been exposed to negative numbers on number lines</p> <p>Y7 – This builds on a number of topics already covered in yr7 including place value, addition and subtraction, multiplication and division, equality and equivalence by including negatives.</p>	<p>KS2 –</p> <p>Y7 – this extends learning done in the FDP equivalence and fractions and percentages of amounts units. Students will need to use their knowledge of equivalent fractions</p>
<p>Future learning</p>	<p>Aspects of the multiplication and division unit appears in other units in yr7 including area in equality and equivalence to provide problem solving opportunities. Understanding of mean will appear in other statistics topics</p>	<p>This is revisited in su2 when looking at number sense. It is developed further in yr8 when pupils look at percentage change and simple interest. It also provides prior knowledge for the multiply and divide fractions unit in Yr8</p>	<p>Yr8 look at brackets equations and inequalities. For example, solving equations is developed from solving one and two-step equations in yr7 to looking at equations involving brackets and unknowns on both sides in yr8. Elements of this unit also appear in geometry</p>	<p>This will be revisited in the summer 2 term as part of Developing Number sense. Negatives also play a part in understanding the Cartesian plane in y8 and will be a key part of the y8 topic Number Sense</p>	<p>This will be revisited in the summer 2 topic developing number sense and then extended by looking at mental methods. In yr8, knowledge of fractions is developed by looking at multiplication and division</p>

			units in yr7 to provide problem-solving opportunities.		
Why is this being studied?	National Curriculum. Multiplication and division is fundamental skill and the variety of skills in learnt here will make recurring appearances in the curriculum. It also exposes students to real life uses including dealing with money.	National Curriculum. Fractions and percentages of amounts is a key life skill and will help pupils understand the world around them.	National Curriculum. After learning this content, there are opportunities to make links with this in future topics to deepen thinking. This topic is fundamental to understanding algebra.	National Curriculum. Understanding and calculating with negatives is a fundamental skill which can be applied in a variety of other topics. It is key in developing a students number sense.	National Curriculum. Adding and subtracting terms that are like is a consistent idea with algebra, numbers etc. Adding and subtracting fractions is a key skill and the prior learning that has taken place will allow students to access this material.

Summer Y7 Overview

Year 7	Summer 1	Summer 1	Summer 2	Summer 2	Summer 2
Topic name	Constructions	Developing Geometric Reasoning	Number Sense	Sets and Probability	Primes and Proofs
Declarative Knowledge	Identify parallel and perpendicular lines. Understand angles as a measure of a turn. Know different types of angles, triangles and quadrilaterals and understand their properties. Know polygons up to a decagon.	Understand basic angle rules for full turn, straight line and vertically opposite. Know sum of angles in triangle and quadrilateral.	Know mental strategies for addition, subtraction, multiplication and division. Know when to use mental or formal methods. Know the meaning of significant figures	Understand set notation. Use the vocabulary of probability and understand the probability scale. Know that the sum of probabilities for all possible outcomes is 1.	Know the definition of multiples, factors, primes, square and triangular numbers.

Procedural knowledge	Draw and measure angles using protractors. Construct accurate triangles. Interpret and draw pie charts	Find missing angles using basic angle rules and sum of angles in triangle and quadrilaterals. Use algebra with basic angle rules. Form and solve equations. Investigate angles in parallel lines	Mental and formal methods for the 4 operations. Round numbers and use to estimate calculations. Fractions of amounts using mental methods. Use factors to simplify calculations and use number facts to derive other facts.	Represent sets as lists. Interpret and create Venn diagrams. Generate sample spaces for single events and calculate probabilities of a single event. List outcomes from two events.	Find multiples and factors including of algebraic expressions. Find HCF and LCM and product of primes. Use venn to find HCF and LCM. Make and test conjectures and use counterexamples.
Assessment/Outcomes	There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.	There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week. Summative assessment assesses knowledge from previous half terms and pre-requisites for Summer 2. This will identify gaps and inform future planning of recall activities like starters and prior knowledge checks.	There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.	There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.	There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.
Prior knowledge	KS2 – students have been exposed to drawing lines and angles Y7 – students have looked at area of triangles and rectangles in Sp1 multiplication and division unit. This unit builds on the pie charts skills looked at in the FDP unit in Au2	KS2 – students have been exposed to angle rules in primary school Y7 – this unit will use formal methods for addition and subtraction as well as incorporate algebraic knowledge looked at in Autumn 1 and Spring 1.	KS2 – Mental and formal methods for operations looked at in detail Y7 – This builds on formal methods looked at in Au2 Addition & subtraction, Sp1 Multiplication & division and fractions of amounts units. Also includes use of directed number from sp2	Real life knowledge of chance Y7 – FDP equivalence needed to understand representation of probabilities. Will have seen venn diagrams used to find LCM and HCF during sp1	KS2 – Awareness of types of number Y7 – This unit builds on the work with factors and multiples in sp1 and extends this to generic proofs involving other types of numbers too. Links to sequences with picture sequences to identify square and triangular numbers

<p>Future learning</p>	<p>Links to the next unit of developing geometric reasoning. Needed for constructions and loci.</p>	<p>These facts are built on further in year 8 angles unit in summer 1 and knowledge is also needed to form and solve equations in sp1. Parallel line angle rules develops from this knowledge and the ability to apply all knowledge in order to solve multi step problems.</p>	<p>Number sense is a fundamental skill. This unit is developed further in yr8 summer 1 by looking at conversions, time and money.</p>	<p>Data and probability is developed further in yr8 autumn 2 by looking at other data representations and finding probabilities from these.</p>	<p>The ability to generalise and prove is key to a well-rounded mathematical understanding. This skill helps developing a pupils reasoning skills.</p>
<p>Why is this being studied?</p>	<p>National Curriculum Underpins the understanding of angles and shapes</p>	<p>National Curriculum These angle facts are fundamental to develop further angle facts and apply to multistep problems</p>	<p>National Curriculum Number sense is a key maths skill and exposed pupils to real life situations where a decision about appropriate methods may be needed</p>	<p>National Curriculum Introduces the idea of probability and this knowledge is key for building on in future years. Set notation needs to be understood as a way of organising and representing information.</p>	<p>National Curriculum Encourages students to think critically and reason with their knowledge.</p>

Autumn Y8 Overview

Year 8	Autumn 1	Autumn 1	Autumn 1	Autumn 2	Autumn 2
Topic name	Ratio and Scale	Multiplicative Change	Multiply and Divide Fractions	Cartesian Plane	Representing Data and Probability
Declarative Knowledge	Understand meaning and representation of ratio. Understand bar models and ratio notation. Understand pi as the ratio between diameter and circumference	Know conversion rates for metric units. Understand what currency is. Understand the meaning of congruency and similar shapes. Understand scale factors is a multiplicative relationship	Understand representation of fractions	Understand the Cartesian plane	Understand correlation, know how to read inequalities, understand set notation
Procedural knowledge	Simplify ratios, compare ratio and fractions, write ratio in the form 1:n, share into a given ratio	Solve direct and inverse proportion problems. Explore conversion graphs. Convert between currencies. Find scale factors and missing lengths in similar shapes. Draw and interpret scale drawings including maps	Multiply fractions by integers and fractions. Divide fractions by integers and fractions. Mixed number multiplication and division.	Plot and identify coordinates. Link graphs to sequences and direct proportion. Identify and draw horizontal and vertical lines. Begin to plot lines with a gradient. Find midpoints of a line segment	Draw and interpret scatter graphs, ungrouped and grouped frequency tables, two way tables and Venn diagrams. Find probabilities from these representations and sample spaces
Assessment/Outcomes	There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.	There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.	There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week. Summative assessment assesses knowledge from yr7 and half term 1 and pre-requisites for next half term. This will identify gaps and inform future planning of recall activities like starters and prior knowledge checks.	There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.	There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.

<p>Prior knowledge</p>	<p>Y7 –representing fractions using bar models. Simplifying fractions</p>	<p>Y7 – geometric reasoning and understanding of types of shapes</p> <p>Y8 – builds on ratio unit by applying it to proportion and scale factors, using ratio for scale drawings</p>	<p>Y7 – looked at fractions of amounts which is equivalent to multiplying fraction by an integer, also saw addition and subtraction of fractions and was introduced to converting between mixed numbers and improper fractions</p>	<p>Y7 – Understanding direct number is key to understanding the Cartesian plane. Links are made to sequences and representing sequences on graphs is used to introduce plotting lines</p>	<p>Y7 – idea of probability is introduced in year 7 and pupils are introduced to set notation and Venn diagrams</p>
<p>Future learning</p>	<p>The next unit uses ratio to represent proportional relationships including similar shapes and scale drawings. This understanding is key to developing ratio and proportion skills including sharing ratio problems, combining ratio and algebra with ratio. Students also need a good understanding of pi to be able to find the area of a circle and solve problems with circles in Sp2.</p>	<p>Direct proportion is seen again when plotting direct proportion relationships in Cartesian plane unit as a way to introduce straight line graphs. Further knowledge will be similar shape problems with area and volume, proportional ingredient problems, direct and inverse proportion with algebra</p>	<p>Fractions and percentages of amounts will use these skills in spring term. Operations with fractions is a key numerical skill that can be applied to other areas of maths ie area of shapes. Understanding of this will be needed for algebraic fractions</p>	<p>Knowledge of Cartesian plane is applied when representing data in scatter graphs in the next unit. Plotting lines develops into understanding of gradients, y-intercepts, equations of lines and also non-linear graphs. Being able to identify horizontal and vertical lines and understanding the Cartesian plane is also key for performing rotations and reflection in summer term.</p>	<p>Data handling is covered in summer term where students will look at other representations such as bar charts and line graphs which will use frequency tables. These skills will be needed to find averages from frequency tables and graphs.</p>

Why is this being studied?	National Curriculum Ratio and proportion is a key part of the GCSE syllabus and it can be applied to lots of other aspects of maths. It is vital understanding to be able to access the next unit. It provides an opportunity for pupils to see ratio in real life situations	National Curriculum Builds on the understanding from the previous unit and allows students the opportunity to solve real life problems they may face for example, reading map scales. Proportion is a threshold concept for the year	National Curriculum This is a key numerical skill and students have already been exposed to finding fractions of amounts as a multiplication. Fractions is also a threshold concept for the year	National Curriculum Cartesian plane and coordinates is a threshold concept for the year. Having already looked at direct proportion, students are able to now plot that relationship as a graph as an introduction to straight lines.	National Curriculum Having just explored the Cartesian plane, students can now use this to represent data. This unit develops students to be good citizens as they will start to understand and engage with statistics and representations of data in the world around them.
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Spring Y8 Overview

Year 8	Spring 1	Spring 1	Spring 1	Spring 2	Spring 2
Topic name	Brackets Equations and Inequalities	Standard Form	Algebraic Techniques	Fractions and Percentages	Area of trapezia and circles
Declarative Knowledge	Understand the terms variable, expression, equation, like terms. Understand that a variable represents an unknown number. Recognise and understand inequality symbols	Understand what standard form is and why it is used. Understand powers of 10 written in index form	Identify linear and non-linear sequences. Understand the meaning of like terms. Know the laws of indices.	Know the numerator, denominator, the percent sign, that decimals and percentages are out of 1 and 100 respectively. Know how to use a calculator	Know the formulas for area of a trapezium and circle. Recognise parts of a circle.

Procedural knowledge	Multiply out brackets and factorise brackets. Solve two-step equations including with brackets. Form expressions. Represent inequalities on a number line and solve inequalities	Convert between standard form and ordinary numbers, compare and order standard form, begin to calculate with standard form.	Generate sequences from term to term rules and algebraic rules. Use nth term to find a given term in a linear sequence and find the nth term rule. Simplify expressions with indices including collecting like terms and multiplying and dividing terms. Simplify terms that include powers or powers.	Convert between fractions, decimals and percentages. Find percentage and fractions of amounts. Express one number as a fraction or percentage of another. Find percentage increase and decreases and work with percentage change. Calculator methods for finding percentages	Find area of trapeziums, circumference of circles and area of circles. Calculate area and perimeter of compound shapes.
Assessment/Outcomes	There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week. Summative assessment assesses prior knowledge, current knowledge and pre-requisites for next half term. This will identify gaps and inform future planning of recall activities like starters and prior knowledge checks.	There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.	There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.	There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week	There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week
Prior knowledge	Y7 – Pupils were introduced to algebraic notation and solving equations in year 7. This unit builds on this further by including expansion of brackets and forming equations.	KS2 – multiplying and dividing by 10,100, 1000 Y7 – Pupils look at place values and powers of 10. They were also introduced to standard form. This unit builds on this by including negative powers of 10 and calculating with standard form	Y7 – sequences was used as a way of introducing algebra. Substitution skills from y7 are needed to generate sequences. This unit builds on their understanding of simplifying algebraic expressions and like terms by introducing the laws of indices	Y7 – FDP equivalence was looked at in y7 as well as fractions and percentages of amounts Y8 – students have looked at multiplying fractions and fractions of amounts builds on this.	Y7 – students looked at area of rectangles, triangles and parallelograms in y7 and this can be used to find area of compound shapes in this unit. Students have also seen the concept of perimeter. Substitution skills from y7 are also needed to substitute into the correct area formulas.

					Y8 – Students have seen in yr8 that pi is the ratio between diameter and circumference
Future learning	Pupils will use this algebraic knowledge in the upcoming unit Algebraic Techniques. Students will also see solving equations in a problem solving setting in other units in yr8. Students extend knowledge in yr9 when they start to look at equations with unknowns on both sides.	Pupils will revisit standard form in yr9 to deepen understanding and pupils will need to correct standard form after calculations	y9 pupils look at sequences as an introduction to plotting straight line graphs. Knowledge of sequences here are key to developing this into working with non-linear and quadratic sequences. Laws of indices knowledge is extended to negative and fractional indices and working with changes of base.	Percentages will develop to look at repeated percentage change, compound interest and growth and reverse percentages. Pupils will be expected to use fractions and percentages in money problems in summer 1 and also in other multi-step problems	Fluency with area is key to solving multi-step problems involving shapes. Students will develop by finding area of compound shapes and also sectors of circles. Area is a pre-cursor to finding surface area and volume of 3D shapes.
Why is this being studied?	National Curriculum Solving equations is a key skill and can be used to make links with other topics and areas of maths. This builds on knowledge covered in yr7 and exposes students to solve real life problems by forming equations	National Curriculum This exposes students to why it is useful to represent numbers in standard form. The unit builds on student's prior knowledge of powers of 10 and place value. An understanding of standard form is needed to access some parts of the science curriculum also.	National Curriculum This unit builds on existing knowledge and increases student's confidence with manipulating algebra.	National Curriculum Pupils have the opportunity to solve real life problems and gain knowledge that can help them in their everyday life.	National Curriculum Pupils have sufficient prior knowledge of substitution, pi and area to develop their knowledge in this unit. The students mental schema for shape is developed here.

Summer Y8 Overview

Year 8	Summer 1	Summer 1	Summer 2	Summer 2	Summer 2
Topic name	Number Sense	Angles	Reflection and Rotation	Data Handling	Measures of Location
Declarative Knowledge	Understanding of place value. Know what BIDMAS stands for and that calculations need to follow this order of operations. Understanding of currency and the metric measurements for length, capacity and weight. Know how to read the time from analogue and digital clocks, 24 hr and 12 hr clocks. Know how to read a calendar and how the year works. Understand the meaning of credit and debit.	Understand angle notation and know the basic angle facts. Identify parallel lines. Know the properties of different triangles and quadrilaterals. Know the angle facts for parallel lines. Know what an irregular polygon and regular polygon is and the rules for interior and exterior angles	Know the meaning of symmetry and rotation. Understand what a 90, 180, 270 and 360 degree turn is.	Know what a questionnaire is and why one might be used. Know the difference between discrete and continuous data.	Know the meaning of, and how to find the mean, median and mode. Know that these averages are a measure of location. Know how to find the range and that it is a measure of spread
Procedural knowledge	Round numbers to the nearest significant figures. Use estimation to answer calculations. Solve problems with bank statements and utility bills. Convert between metric units and imperial units. Solve problems with time and calendars.	Use parallel line angle facts to find missing angles. Solve multi-step angle problems. Use the sum of exterior angles and interior angles of polygons to find missing angles and solve problems.	Recognise lines of symmetry and reflect shapes vertically and horizontally. Reflect shapes on a graph. Perform rotations.	Draw and interpret bar charts and pie charts. Use charts to tabulate discrete and continuous data. Choose appropriate diagrams given a set of data.	Find the mean mode median and range from a list of numbers and from charts, graphs and tables. Compare distributions using averages.

Assessment/Outcomes	There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.	There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.	There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.	There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.	There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week. Summative assessment assesses prior knowledge, current knowledge and pre-requisites for next half year. This will identify gaps, inform future planning in yr9, and help inform set changes.
Prior knowledge	KS2 – students have started to develop number sense in primary and also knowledge of time and money Y7 – students looked in detail and number sense and fluency with number topics. This is an opportunity to extend this knowledge and look at unseen contexts.	Y7 – developed geometric reasoning and was introduced to basic angle rules Y8 – algebraic understanding allows students to now access problems with angles and algebra including forming and solving	KS2 – symmetry and rotations of shapes Y8 – Cartesian plane allows students to reflect and rotate shapes on a graph and identify mirror lines and centres of rotation.	Y7 – started to look at pie charts both in the FDP unit and the constructions unit. Y8 – students have seen representations of data in the autumn term	Y7 – students were introduced to mean, median and range for lists of numbers
Future learning	Estimation and rounding leads to error intervals and bounds. Estimation can be used in the future as a technique for checking answers. Metric conversion is key for solving problems involving shapes and measure.	In the future, students will develop angle knowledge to solve angle problems with algebra, bearing problems and circle theorems,	Students will need to be able to describe reflections and rotations accurately. Transformation schema will be extended to include translations and enlargements.	Further representations of data such as frequency polygons and histograms. The understanding of enquiries will be used when estimating sample sizes and for capture recapture methods.	Pupils develop skills by calculating mean mode and median from both ungrouped and grouped frequency tables. Measures of location is further developed by looking at quartiles and in turn box plots and cumulative frequency.

Why is this being studied?	National Curriculum Number sense is fundamental to all other topics and skills used here will be frequently seen in other areas of maths in yr9	National Curriculum Students have the opportunity to develop these skills further in yr9 by looking at application of angles	National Curriculum Students work on the Cartesian plane is crucial to understanding this topic and transformations is picked up in yr9 when looking at enlargements	National Curriculum Opportunity for practical tasks, which expose pupils to real life situations and how statistical enquiries are used in different careers. Students are exposed to representations they may see in their daily lives making them more confident interacting with statistics.	National Curriculum Pupils build on knowledge from previous years and start to reason when comparing data sets. This prepares them for their life after school as they have the tools needed to make informed decisions,
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Autumn Y9 Overview

Year 9	Autumn 1	Autumn 1	Autumn 1	Autumn 2	Autumn 2	Autumn 2
Topic name	Number	Using percentages	Maths and money	Rotation and translation	Ratio and proportion	Enlargement and similarity
Declarative Knowledge	Understand the meaning of the four operations. Knowing that multiplying by a number between 0 and 1 makes a number smaller and dividing by a number between 0 and 1 makes it bigger. Understand the equivalence of fractions. Know standard form as an alternative form of large or small numbers.	Know that percentages are out of 100. Know that decimals can be represented as percentages and fractions and that it is possible to convert between each form.	Understand the concept of interest increasing a value and depreciation decreasing a value, by a fixed rate.	Understand the Cartesian plane. Understand that translation is a movement left/right and up/down and that rotation is a turn. Understand that reflection is a mirror image. Understand what a vector is. Knowing what a line of symmetry is.	Understand the meaning and representation of ratio. Understand that if two quantities are in direct proportion then as one increases the other increases and the reverse is true for inverse proportion.	Know that enlargements by an integer more than 1 will make a shape bigger. Understand positive, fractional and negative scale factors. Know that similar shapes have the same angles and their sides are in proportion.
Procedural knowledge	Add, subtract, multiply and divide both integers and decimals. List the	Convert between fractions, decimals and percentages and	Calculate simple and compound interest. Calculate	Identify order and lines of symmetry. Reflect an object in a	Convert quantities using direct proportion graphs.	Enlarge shapes by positive, fractional and negative scale

	<p>factors and multiples of a number. Find the highest common factor and lowest common multiple of two numbers. Simplify fractions. Add, subtract, multiply and divide fractions, including those given as mixed numbers. Convert in standard form and perform the four operations in standard form.</p>	<p>order them. Calculate the percentage of a number and be able to increase or decrease a value by a percentage, using multipliers. Calculate a percentage change. Express one quantity as a percentage of another. Find the original amount when given the result, after a percentage change.</p>	<p>depreciation by a fixed rate. Calculate best buys using the comparative and unitary method. Convert two quantities using conversion graphs. Convert between two currencies, including with graphs. Solve area problems with money.</p>	<p>given line. Rotate shapes around a centre of enlargement as a coordinate. Translate a shape from a vector. Describe a rotation, translation or reflection.</p>	<p>Solve simple direct proportion problems. Convert ratios to fractions. Simplify ratios. Calculate inverse proportion problems in context. Share a ratio and calculate parts of a ratio when given another part or their difference.</p>	<p>factors. Calculate missing sides in similar shapes.</p>
<p>Assessment/Outcomes</p>	<p>There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.</p>	<p>There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.</p>	<p>There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.</p>	<p>There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.</p>	<p>There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.</p>	<p>There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.</p> <p>Summative assessment assesses knowledge from yr9 half term 1, years 7/8 and pre-requisites for next half term. This will identify gaps and inform future planning of recall activities like starters and prior knowledge checks.</p>

<p>Prior knowledge</p>	<p>Y7 – Understand fractions as a division. Addition and subtraction of fractions, including mixed numbers. Convert to and from standard form. Formal methods of the four operations, including with decimals. Mental strategies for the four operations. Find HCF and LCM by listing.</p> <p>Y8 – multiply and divide fractions including with integers. Conversion with standard form. Four operations with standard form.</p>	<p>Y7 – Convert, compare and order fractions, decimals and percentages. Find percentages of an amount.</p> <p>Y8 – Convert fluently between fractions, decimals and percentages. Find percentage of amounts and percentage increase/decrease with and without a calculator. Express one number as a percentage of another.</p>	<p>Y7 – Percentage of amount and percentage increase/decrease.</p> <p>Y8 - Find percentage of amounts and percentage increase/decrease with and without a calculator.</p>	<p>Y7 – Draw and measure angles between 0 and 360 degrees.</p> <p>Y8 – Work with coordinates in all 4 quadrants. Perform and describe reflections in a line (given as an equations e.g. $x=4$). Perform rotations with simple shapes.</p>	<p>Y8 – Ratio is first introduced in y8 AU1. Write and simplify ratio. Share in a ratio. Compare ratios and fractions. Reading direct proportion graphs and solving basic direct proportion problems.</p>	<p>Y8 – Ratio is first introduced in y8.</p> <p>Y9 – Pupils learn/ review the other 3 transformations (reflection, rotation and translation) in year 9 AU1. Enlargement comes after the ratio unit once students have an understanding of ratio and scale factors.</p>
<p>Future learning</p>	<p>The four operations are prior knowledge for almost every future maths topic.</p> <p>Equivalence and four operations with fractions is prior knowledge for the next topic, converting between fractions, decimals and percentages and ordering.</p> <p>Multiplying fractions is needed to find the</p>	<p>This unit is prior knowledge for the next unit – maths and money. Percentage increase/decrease is prior knowledge for simple and compound interest.</p> <p>Converting between fractions and decimals can be helpful for scale factors in enlargement and similarity, solving equations and writing probabilities.</p>	<p>Currency conversion graphs will be useful when pupils learn proportion graphs in AU2.</p> <p>The unitary method for best buys will be a prior procedural knowledge for recipe questions and other ratio questions.</p>	<p>Translation is prior knowledge for the vectors unit that pupils will study in year 10.</p> <p>Reflecting in a line and plotting straight lines will help students with the straight-line graphs unit in Spring 2.</p>	<p>Ratio is a large topic and the prior knowledge to many topics in GCSE maths.</p> <p>It leads onto enlargements, similar shapes and area/volume, which use ratio form.</p> <p>Further ratio topics and problems will be covered in year 10 and 11 such as solving problems that combine ratio,</p>	<p>Enlargements is studied in more depth in year 10. Pupils will look at the effect of enlarging areas and volumes as well as proving if triangles are congruent or similar.</p>

	probability of 2 events happening.				fractions and percentages.	
Why is this being studied?	National Curriculum The four operations is vital prior learning for all other topics within mathematics. Without these core skills, students will not be able to access future learning.	National Curriculum Builds on the understanding from the previous unit. Applies to real life concepts such as sales in a shop.	National Curriculum This builds on the previous percentages unit. This is a real-life application of maths that pupils will use to do their finances in the future.	National Curriculum This builds on from the transformation unit in year 8, going further by introducing translations.	National Curriculum Scale factors is one of the threshold concepts in year 9. Ratio covers a large proportion of the GCSE content. It is an alternative method for many other topics too such as fractions.	National curriculum It builds on students' understanding of the other transformations. This allow pupils to perform multiple transformations and describe them.

Spring Y9 Overview

Year 9	Spring 1	Spring 1	Spring 1	Spring 2	Spring 2
Topic name	Forming and solving equations	Pythagoras Theorem	Straight line graphs	Deduction	Probability
Declarative Knowledge	Understand algebraic notation e.g. $3a = 3 \times a = a+a+a$. Understand that an equation means that both sides are equal. Understanding of inequality symbols.	Understand that squaring a number or expression is multiplying by itself.	Understand that a straight line has the same gradient at any point on the line. Know that the equation of a straight line can always be put in the equation $y=mx+c$. Know that parallel lines have the same gradient.	Know that angles are out of 360 degrees. Understand that an angle is a measure of a turn.	Understand that probabilities lie between 0 and 1 and explain the likelihood of an event happening.

<p>Procedural knowledge</p>	<p>Solve one and two step equations and inequalities, including with an unknown on both sides. Solve equations that involve area, perimeter, volume, angles in shapes and word problems. Rearrange formulae in one or two steps. Draw inequalities on a number line and write from a number line. Find integer solutions from number lines.</p>	<p>Use Pythagoras to calculate the hypotenuse and smaller side of a right-angled triangle (by rearranging the formula). Calculate the distance between two coordinates. Find the perimeter or area of certain shapes using Pythagoras.</p>	<p>Drawing straight lines from a table of values. Find the equation of a straight line from its graph and draw a straight line from its equation. Calculate the nth term of a sequence and determine whether a term lies in a sequence. Calculate a line that is parallel to another and goes through a specific point.</p>	<p>Find missing angles in parallel lines using angle facts, including multi step problems. Find the interior and exterior angle of any polygon.</p>	<p>Use the product rule to calculate combinations. Create a sample space diagram and calculate probabilities. Create and complete a tree diagram and calculate probabilities. Calculate experimental probabilities and use it to work out expected outcomes. Complete frequency trees. Understand random and stratified sampling.</p>
<p>Assessment/Outcomes</p>	<p>There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.</p>	<p>There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.</p>	<p>There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.</p>	<p>There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.</p>	<p>There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.</p> <p>Summative assessment assesses knowledge from yr9 half terms 1-4, years 7/8 and pre-requisites for next half term. This will identify gaps and inform future planning of recall activities like starters and prior knowledge checks</p>

<p>Prior knowledge</p>	<p>Y7 - Basic substitution. Function machines. Forming simple equations and solving two-step equations. Calculating perimeter and area of a simple 2D shape. Find angles using basic angle facts.</p> <p>Y8 – Expand and factorise equations with brackets. Solve equations with brackets. Form and solve two step equations and inequalities. Area of 2D shapes – trapezium, parallelogram and circle. Angles in parallel lines and basic angle facts.</p>	<p>Y7 – recognise square numbers.</p>	<p>Y7 – Continue a sequence. Generate a sequence from the nth term. Plot linear and non-linear sequences on a graph. Find the nth term of linear sequences.</p> <p>Y8 – Use nth term to find a specific term in a sequence. Generate sequences from an algebraic rule (geometric/linear). Find the nth term of a linear sequence. Plot coordinates. Draw lines $y=x$, $y=-kx$, $y=kx$, $y=kx+a$. Recognise and draw $y=mx+c$. Check if a point lies on a line.</p>	<p>Y7 – Draw and measure angles up to 360 degrees. Understand and use sum of angles at a point, on a straight line, vertically opposite angles and angles in a triangle.</p> <p>Y8 - Understand and use the sum of exterior angles of any polygon. Understand and use the sum of interior angles of any polygon. Find angles on parallel lines and in special quadrilaterals.</p>	<p>Y7 – Sample space for single events. Find the probability of single events.</p> <p>Y8 – Find probabilities from frequency, Venn diagrams two-way tables.</p>
<p>Future learning</p>	<p>Forming and solving equations is prior knowledge for topics in the summer term in year 9 - Pythagoras and straight-line graphs and year 10 - solving quadratics and trigonometry.</p>	<p>Pythagoras leads onto 3D Pythagoras and trigonometry in year 10.</p>	<p>Straight-line graphs is prior learning for future Y9 topics - direct proportion, distance time graphs, velocity time graphs and representing inequalities. In year 10 and the GCSE, it is prior learning for tangents to a curve, scatter graphs and simultaneous equations.</p>	<p>In year 10, pupils will go on to trigonometry and bearings. They will need to have a good understanding of angles and angle facts. This will lead onto the sine and cosine rule.</p>	<p>In year 10, pupils consolidate all their knowledge of probability, which includes probabilities from sample space diagrams, Venn diagrams, two-way tables and tree diagrams and use these in problem solving questions. They will go onto more challenging combinations such as removing duplicates.</p>

Why is this being studied?	National Curriculum. Forming and solving equations is important prior learning for many other topics within mathematics and it is often combined with other areas of maths such as geometry. Forming and solving equations is a threshold concept for the year.	National curriculum. Pythagoras has real life applications and is used in many careers such as in construction and other areas of study such as engineering.	National curriculum. Straight-line graphs is a key GCSE topic. It also has many real life applications such as conversion graphs. Gradients/ rates of change is a threshold concept for the year.	National curriculum. This topic develops students' knowledge from angle facts learned in years 7 and 8 to move onto trigonometry in year 10. An understanding of angle facts is needed for careers in engineering and construction.	National curriculum. Probability is a large topic in GCSE maths. It is used in A level maths in the statistics modules e.g. normal distribution and is used in statistical models for businesses.
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Summer Y9 Overview

Year 9	Summer 1	Summer 1	Summer 2	Summer 2
Topic name	3D Shapes	Constructions and congruency	Rates	Algebraic representation
Declarative Knowledge	2D represents a flat shape and 3D are objects we see in real life. Understanding what a net is visually. Knowing that shapes look different depending on the angle that you look at them. Know the names of 3D shapes.	Understanding angles as a measure of turn. Draw and measure angles.	Understand speed as the ratio of distance to time time. Understand density as the ratio of mass to volume.	Understand what the graphs of: linear, quadratic, cubic, reciprocal, exponential look like.

Procedural knowledge	Draw and recognise the nets of 3D shapes e.g. prisms and cones. Draw plans and elevations of 3D shapes, including compound. Find the volume and surface area of prisms. Find the area of 2D and compound shapes.	Construct and interpret scale drawings. Construct a perpendicular bisector and angle bisector. Find the locus from a point, line, shape and equidistant between two points. Construct triangles. Identify congruent triangles.	Draw and interpret distance time graphs. Convert units of measurement and time. Solve basic rates of flow problems.	Plot quadratic and cubic graphs using a table of values. Solve simultaneous equations using the elimination method. Graph inequalities on axes.
Assessment/Outcomes	There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.	There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.	There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week.	There is a 20-minute unit assessment after every unit, which is marked and fed back on within 1 week. Summative assessment assesses knowledge from yr9, years 7/8 and pre-requisites for next half term. This will identify gaps and inform future planning of recall activities like starters and prior knowledge checks
Prior knowledge	Y8 – Find the area of 2D shapes – rectangle, triangle, parallelogram, trapezium and circle. Calculate the area of perimeter of compound shapes.	Y7 – Construct triangles using SSS, SAS and ASA Y8 – Construct triangles. Angle bisector and perpendicular bisector for higher groups.	Not covered specifically in years 7 or 8.	Y7 – Represent sequences on a graph. Y8 – Draw lines parallel to axes. Draw basic straight lines and notice patterns, leading to drawing lines in the form $y=mx+c$ from their equation.

<p>Future learning</p>	<p>In year 10, learning moves onto finding the volume and surface area of similar shapes. Pupils must also find the volume and surface area of spheres, cones and pyramids.</p>	<p>Construction is not revisited in year 10 however; it is closely linked to similarity and congruency, which is covered in depth in year 10.</p>	<p>Speed, distance, time is not covered as a separate unit in year 10 however it comes up within other topics such as estimation.</p>	<p>In year 10 pupils will learn how to solve quadratics using factorising and the formula. Some pupils will be able to identify trigonometric graphs too.</p>
<p>Why is this being studied?</p>	<p>National Curriculum. An understanding of 3D shapes is fundamental to understanding the world around us. It is useful in careers e.g. that involve construction of buildings. It also helps pupils to understand volume as a measurement of space inside a shape and this links to the surface area of a shape.</p>	<p>National curriculum. Construction is a useful tool to draw bisectors and perpendicular lines accurately, without needing a ruler or protractor. It is used in careers such as architecture.</p>	<p>National curriculum. Rates of change are linked closely to topics in science such as the relationship between density, mass and volume. Understanding these as a ratio also helps with further learning in A level maths such as differentiation and integration.</p>	<p>National curriculum. Plotting graphs and spotting patterns between a graph and its equation is a skill that is needed in careers that use data and technology in graphical forms e.g. market analyst.</p>