

Key Stage 3

Pupils arriving to the school in year 7 with a level 3 or lower will follow the level 3 to 5 programme of study, those arriving with a level 4 will follow the level 4 to 6 programme of study and those arriving with a level 5 or better will follow the level 5 to 7 programme of study. These courses will run over two years (year 7 and 8). In year 9 pupils will either begin their GCSE course or will continue with key stage work until the end of year 9.

Levels 3-5 programme of study

Year 7

Autumn	Spring	Summer
Algebra Recognise multiples up to 10×10 Continue and describe simple sequences Know and recognise square numbers Continue simple sequence by counting on and back in constant steps Describe a sequence by using a rule Extend sequences into negative values Generate a sequence using the term to term rule Generate a sequence in a practical context Generate a sequence using a position to	Handling Data Find the mean, mode, median and range of a small set of discrete data Find the modal class for a small set of grouped discrete data Calculate the mean from a simple frequency table Extract information such as frequencies, mode and total frequency from bar charts, grouped bar charts, dual bar charts and compound bar charts Use the vocabulary of probability	Handling Data Decide what data would be relevant to an enquiry and possible sources Plan how to collect and organise small sets of data Select a suitable level of accuracy of data Select the sample size to use when collecting data Design a question for a questionnaire and a data collection sheet Construct frequency tables and grouped frequency table for discrete data

<p>term rule Solve problems using multiplication and division Find the inputs and outputs of functions using function machines Write mappings to express functions Construct expressions from worded descriptions Identify the unknown in an equation Find the rule for the nth term of a sequence Investigate sequences Find patterns and rules in sequences Test whether the rule works.</p>	<p>use a probability scale with words Understand and use the probability scale 0 to 1 Find the probabilities of equally likely outcomes List all the outcomes when one or two events happen Know that if the probability of an event is p, then the probability that it will not happen is $1 - p$</p>	<p>Construct a simple frequency table for continuous data Construct and interpret pictograms Draw conclusions from pictograms and bar charts Construct and interpret bar charts for discrete data Construct and interpret bar-line graphs, compound bar charts and dual bar charts Interpret pie charts Construct pie charts using ICT</p>
<p>Number Read & write whole numbers in figures & words Know what each digit represents in numbers with up to two decimal points Understand and use decimal notation and place value Multiply and divide whole numbers and</p>	<p>Algebra Write algebraic expressions from descriptions Know and use the order of operations including brackets Multiply a single term over a bracket Know how to simplify algebraic expressions by collecting like terms</p>	<p>Number Recognise and use metric units of measure Read and interpret scales of measuring instruments Recognise imperial units of measure and know how to convert to metric units Be able to add, double and halve, and</p>

decimals by 10, 100 and 1000
Add and subtract mentally
Recall addition and subtraction facts and positive integer complements
Know how to add and subtract whole numbers (both positive and negative) and decimals, using a written method
Know how to calculate a temperature rise and fall across 0°C
Order positive and negative integers
Know how to compare and order decimals
Understand and use decimal notation and place value
Know how to compare and order decimals
Know square numbers up to 10×10
Work out square numbers beyond 10×10
Remember multiplication facts up to 10×10
Know how to work out division facts
Enter numbers on a calculator in different contexts

Multiply a simple term over a bracket
Substitute integers into expressions and formulae that are written in words
Substitute integers into expressions and formulae that are written using algebra
Know how to derive a formula expressed in letter symbols

multiply mentally
Remember multiplication facts up to 10×10
Carry out mental calculations with decimals and percentages
Round positive whole numbers to the nearest 10, 100 or 1000
Round decimals to the nearest whole number or one decimal place
Know how to make estimates and approximations of calculations
Round positive whole numbers to any given power of 10
Know how to multiply using different written methods
Know how to multiply decimal numbers by whole numbers
Use an approximate calculation to check answers

<p>Correctly interpret the display on a calculator</p> <p>Make estimates and approximations of calculators</p>		
<p>Number</p> <p>Recognise when two fractions are the same by using a diagram</p> <p>Know how to use fraction notation to describe parts of a shape</p> <p>Change an improper fraction to a mixed number</p> <p>Know how to add and subtract simple fractions</p> <p>Identify equivalent fractions</p> <p>Use a diagram to compare two or more fractions</p> <p>Simplify fractions</p> <p>Convert terminating decimals to fractions</p> <p>Understand that fractions relate to division</p> <p>Find simple fractions of quantities and measurements</p>	<p>Space, shape and measures</p> <p>Identify right angles, perpendicular lines and parallel lines</p> <p>Correctly describe lines, points and angles</p> <p>Calculate missing angles in a triangle, on a straight line and round a point</p> <p>Recognise vertically opposite angles</p> <p>Recognise and name triangles as equilateral, isosceles or scalene</p> <p>Recognise and name triangles as acute, right, obtuse or reflex</p> <p>Recognise and name quadrilaterals and begin to understand their properties</p> <p>Find a point on a grid</p> <p>Read and plot coordinates</p> <p>Solve a problem to work out a missing coordinate</p>	

<p>Remember percentage and fraction equivalents</p> <p>Know how to find a percentage of an amount</p> <p>Carry out mental calculations involving fractions, decimals and percentages</p>		
<p>Space, shape and measures</p> <p>Read measurements from different scales</p> <p>Make sensible estimates of lengths</p> <p>Choose which units to use when estimating lengths and areas</p> <p>Convert between metric units</p> <p>Solve problems involving length</p> <p>Measure and draw lines to within one millimetre</p> <p>Calculate the perimeter of a rectangle and other shapes</p> <p>Solve problems involving perimeter</p> <p>Find the area of a shape by counting the number of square centimetres inside it</p> <p>Know the correct units to use when</p>		

recording area Find the area of a rectangle using the formula $A = l \times w$ Find the area of shapes made from rectangles Calculate the surface area of a cube or cuboid		
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Year 8

Autumn	Spring	Summer
Algebra and Number Recognise multiples up to 10×10 Know how to apply tests for divisibility by 2,3,4,5,6,9,10 and 25 Know how to identify factors of numbers with more than four factors Recognise and use multiples and factors Find common factors including the highest common factor (HCF) of two numbers Know how to extend sequences, including into negative values	Space, shape and measures Make and name quadrilaterals made from two identical triangles Recognise reflections, rotations, and symmetry of 2-D shapes Identify right angles, perpendicular lines and parallel lines Recognise where a 2-D shape will be after a translation and correctly describe a translation Transform 2-D shapes by simple combinations of translations	Algebra Know how to generate terms of a sequence from practical contexts Know how to find a term of a practical sequence given its position in the sequence Know how to use algebra to describe the rule for the nth term in a sequence Find outputs of functions in words and symbols Find inputs of functions using inverse operations

<p>Know how to generate sequences using a term-to-term rule and a position-to-term rule</p> <p>Know how to read and plot coordinates in all four quadrants</p>	<p>Recognise reflection symmetry</p> <p>Reflect a shape in a mirror line</p> <p>Reflect a shape on a coordinate grid</p> <p>Know how to reflect, translate, or rotate a shape</p> <p>Follow instructions to make a pattern using transformations</p> <p>Design a pattern using transformations</p> <p>Make and recognise 2-D shapes in different contexts</p> <p>Contradict a wrong statement with a counter example</p> <p>Choose the maths to use to solve problems</p>	<p>Construct functions to describe mappings (complete a function machine)</p> <p>Draw a graph of a function</p> <p>Plot coordinates in all four quadrants</p> <p>Generate coordinates that satisfy a simple rule in the first quadrant</p> <p>Plot a graph of a simple linear function in the first quadrant</p> <p>Complete a table of values</p> <p>Plot a graph from a table of values</p> <p>use a real-life graph</p> <p>Read and plot real-life graphs and interpret information from them</p> <p>Know how to use simple formulae, substitute positive integers into formulae and derive a formula expressed in algebra</p> <p>Construct and solve simple linear equations using inverse operations</p>
<p>Space, shape and measures</p> <p>Recognise whether a shape has reflection symmetry</p> <p>Know about the symmetry properties of triangles and quadrilaterals</p>	<p>Handling Data</p> <p>Understand and use the probability scale</p> <p>Be able to list all the possible outcomes of an event</p>	<p>Space, shape and measures</p> <p>Identify types of triangle and quadrilateral and know their basic properties</p> <p>Calculate angles around a point</p>

<p>Know how to translate a shape</p> <p>Be able to name different types of triangles</p> <p>Know how to work out missing angles in triangles</p> <p>Know the rules about angles that meet on a straight line or around a point</p> <p>Recognise 2-D diagrams and pictures which show views of 3-D solids</p> <p>Recognise and describe properties of 3-D solids in isometric drawings</p> <p>Measure and draw lines to within one millimetre and angles to within one degree</p> <p>Measure and draw angles, including reflex angles, to within 1° accuracy</p> <p>Construct a triangle if you know the length of two sides and the angle between them</p> <p>Construct a triangle if you know the angle of two sides and the length between them</p>	<p>Find the probability of equally likely outcomes</p> <p>Understand the probability of an event not occurring</p> <p>Be able to list all the outcomes of combined events</p> <p>Record all possible outcomes in a sample space diagram</p> <p>Collect data from a probability experiment</p> <p>Know how to estimate probabilities from experimental data</p> <p>Compare experimental and theoretical probabilities</p> <p>Understand and interpret diagrams, graphs and charts</p> <p>Find the mean, mode, median and range</p> <p>Use averages to compare distributions</p> <p>Decide which data would be relevant to an enquiry</p> <p>Identify possible sources of data</p> <p>Identify suitable sample size and type</p> <p>Design a data collection sheet and questionnaire</p>	<p>Calculate angles in a triangle</p> <p>Using angle facts to work out the angles of a quadrilateral</p> <p>Use ICT to reflect shapes</p> <p>Identify equal sides and equal angles of shapes made by reflection</p> <p>Use ICT to position an object or the line of reflection to create a given effect</p> <p>Use ICT to create given shapes using reflection</p> <p>Recognise different transformations</p> <p>Solve problems using properties of triangles</p> <p>Make quadrilaterals with two pairs of equal sides from two identical triangles by reflecting or rotating one of the triangles</p> <p>Identify equal sides and angles of a quadrilateral by splitting it into triangles and use these to solve problems</p> <p>Describe 3-D shapes, using the correct vocabulary</p>
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	<p>Prepare a report on a statistical enquiry Use appropriate diagrams, graphs and charts to illustrate important facts</p>	<p>Recognise nets that fold up to make a complete cube Recognise 3-D shapes from 2-D drawings Construct triangles, squares and rectangles using a ruler and protractor Draw lines to within 1mm of the correct length Construct and combine 2-D shapes to make nets Measure and draw angles to within 1° accuracy Construct a triangle if you know the lengths of two sides and the angle between them Construct a triangle if you know the size of two angles and the length of the side between them</p>
<p>Number Give a number as a fraction of a larger number Calculate fractions of quantities and measurements Know how to multiply a fraction by a</p>	<p>Number Be able to add and subtract mentally Know and use integer complements to 100 Know how to use the column method to add and subtract whole numbers and</p>	

integer

Identify equivalent percentages, fractions and decimals

Calculate percentages of quantities

Know how to use percentages to compare proportions

Express one quantity as a percentage of another

Check a result by working it backwards

Understand what proportion is

Use proportion to solve problems

Understand and use ratio notation

Reduce a ratio to its simplest form

Divide a quantity into two parts in a given ratio

Understand the relationship between ratio and proportion

decimals

Be able to make an estimate to check an answer

Recognise and use multiples and factors

Identify the common factors of two numbers

Find the highest common factor and lowest common multiple

Recognise prime numbers up to 100

Find common factors including prime factors

Find the lowest common multiple (LCM) of two numbers

Multiply whole numbers and decimals using mental and written methods

Check answers using approximate calculations

Understand squares and square roots and use the square and square root keys on a calculator

Understand when to round up or down after division

Remember multiplication facts up to 10×10 , and use these to derive division

	<p>facts</p> <p>Divide whole numbers and decimals using written methods</p> <p>Check answers using approximate calculations</p> <p>Recognise the equivalence of percentages, fractions and decimals</p> <p>Know how to use equivalent fractions to convert fractions to decimals</p> <p>Be able to use a calculator to convert fractions to decimals</p> <p>Use mental and written methods to calculate percentages of amounts and solve word problems</p> <p>Use a calculator to find percentages of amounts</p> <p>Understand the calculator display when dealing with money</p> <p>Express one number as a percentage of another</p>	
<p>Algebra</p> <p>Use arithmetic operations in algebra</p> <p>Simplify algebraic expressions by</p>		

collecting like terms Multiply a single term over a bracket Write simple equations from worded descriptions Solve simple equations Solve two-step equations and check the answer by substituting the value back into the equation		
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4-6 programme of study

Year 7

Autumn	Spring	Summer
Algebra Recognise and extend number sequences Generate terms of a sequence using term-to-term rules Generate and describe simple sequences Find a term given its position in the sequence Know that an arithmetic sequence goes up by the same amount each time Generate terms from a practical	Handling Data Find the mean, median, mode and range of a small set of discrete data Find the modal class for a small set of grouped discrete data Calculate the mean from a simple frequency table Extract information such as frequencies, mode and total frequency from bar charts, grouped bar charts, dual bar charts and compound bar charts Use the vocabulary of probability	Handling Data Decide what data would be relevant to an enquiry and possible sources of the data Plan how to collect and organise the data Select the accuracy level and sample size when collecting data Decide what data would be relevant to an enquiry and possible sources Discuss the range of possible methods

<p>sequence</p> <p>Find inputs and outputs of functions using a function machine</p> <p>Use inputs and outputs to find a function</p> <p>Know and use the order of operations with numbers</p> <p>Use arithmetic operations with algebra</p> <p>Simplify algebraic expressions by collecting like terms</p> <p>Write algebraic expressions from description</p>	<p>use a probability scale with words</p> <p>Understand and use the probability scale 0 to 1</p> <p>find the probabilities of equally likely outcomes</p> <p>List all the outcomes when one or two events happen</p> <p>Know that if the probability of an event is p, then the probability that it will not happen is $1 - p$</p>	<p>that could be used to investigate a problem, for example questionnaire, survey, modelling, data logging etc</p> <p>Plan how to collect and organise the data</p> <p>Discuss factors that may affect the collection of data, for example time, place, the type of people asked, phrasing of questions</p> <p>Discuss the range of possible methods that could be used to investigate a problem, for example questionnaire, survey, modelling, data logging etc</p> <p>Discuss and identify the data related to a problem</p> <p>Discuss the range of possible methods that could be used to collect primary data</p> <p>Discuss the range of possible sources of secondary data</p> <p>Interpret simple diagrams and charts</p> <p>Interpret simple pie charts depicting simple proportions of data, for example two or three categories</p>
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		<p>Draw conclusions based on the shape of line graphs</p> <p>Draw conclusions based on the shape of line graphs</p> <p>Construct pie charts for categorical data</p> <p>Construct and use line graphs to compare several sets of data</p> <p>Use and construct conversion graphs</p>
<p>Number</p> <p>Understand and use decimal notation and place value</p> <p>Compare and order decimals</p> <p>Multiply and divide decimals by 10, 100 and 1000</p> <p>Know where to position positive and negative numbers on a number line</p> <p>Order negative numbers</p> <p>Use positive and negative numbers in context</p> <p>Add, subtract, multiply and divide negative integers</p> <p>Recall positive integer complements to 100</p>	<p>Algebra</p> <p>Represent mappings which are expressed algebraically</p> <p>Represent mappings using fractional values</p> <p>Construct expressions from descriptions</p> <p>Using index notation with squares, cubes and roots</p> <p>Use index notation for small integer powers</p> <p>Simplify expressions with index notation</p> <p>Substitute integers into word and symbol formulae</p>	<p>Number</p> <p>Round positive whole numbers to any given power of 10</p> <p>Recognise positive integer powers of 10</p> <p>Round decimals to the nearest whole number or to one or two decimal places</p> <p>Compare and order decimals</p> <p>Recognise and use metric units of measure</p> <p>Read and interpret scales of measuring instruments</p> <p>Convert between metric units</p> <p>Recognise imperial units of measure and know their rough metric equivalents</p> <p>Mentally multiply and divide integers</p>

<p>Use standard column procedures to add and subtract whole numbers and decimals</p> <p>Recall multiplication facts up to 10×10</p> <p>Use the grid and standard methods for written multiplication</p> <p>practice mental multiplication</p> <p>Check answers by using approximate calculations and by working the problem backwards</p> <p>Know square numbers up to 10×10</p> <p>Work out square numbers beyond 10×10</p> <p>Find the square root of a square number</p> <p>Derive division facts from multiplication facts</p> <p>Use repeated subtraction for written division</p> <p>Check answers by using approximate calculations and by working the problem backwards</p>	<p>Substitute integers into expressions involving powers</p> <p>Know how to derive a formula expressed in letter symbols</p>	<p>and decimals</p> <p>Mentally calculate the squares of numbers that are multiples of a power of 10</p> <p>Multiply and divide integers and decimals by 0.1 and 0.01</p> <p>Use the grid and standard methods for written multiplication</p> <p>Check answers by using approximate calculations</p> <p>Use repeated subtraction for division of whole numbers and decimals</p> <p>Use division in practical examples involving money</p> <p>Check answers by using approximate calculations</p> <p>Check a result by working the problem backwards</p> <p>Know and use the order of operations</p> <p>Enter numbers on a calculator in different contexts</p> <p>Correctly interpret the display on a calculator</p> <p>Use a calculator effectively with</p>
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		calculations involving more than one step
<p>Space, shape and measures</p> <p>Work out the perimeters of rectangles, shapes made from rectangles, and regular polygons</p> <p>Work out the side length of a regular polygon from its perimeter</p> <p>Use names and abbreviations of units of measure to measure, estimate and solve problems involving length and time</p> <p>Work with side lengths given as algebraic expressions</p> <p>Find the area of a rectangle or a simple shape that can be split into rectangles</p> <p>Find the area of shapes which can be split into rectangles and triangles</p> <p>Make a triangle, parallelogram or trapezium with the same area as a given triangle</p> <p>Make a rectangle with the same area as a given triangle, parallelogram or trapezium</p> <p>Find the area of a triangle,</p>	<p>Space, shape and measures</p> <p>Use the correct vocabulary to describe lines and angles</p> <p>Label geometric diagrams correctly</p> <p>Know simple angle rules</p> <p>Find interior and exterior angles</p> <p>Know the rules for complementary and supplementary angles</p> <p>Find alternate and corresponding angles</p> <p>Understand the idea of proof</p> <p>Read and plot coordinates in all four quadrants</p> <p>Draw and recognise geometric shapes on a grid, using coordinates</p> <p>Find the mid-point of a line segment on a coordinate grid</p>	

<p>parallelogram or trapezium Draw lines to the nearest millimetre (mm) Recognise metric units of measure and know how to convert between them Solve simple problems involving units of measure Draw diagrams to scale</p>		
<p>Number Understand and use fraction notation Identify equivalent fractions Compare and simplify fractions Convert terminating decimals to fractions Use mental methods to solve fraction problems Add and subtract fractions with the same and with different denominators Use mental methods to solve fraction problems Change an improper fraction to a mixed number Use inverse operations to check</p>		

<p>fraction calculations</p> <p>Add and subtract mixed numbers</p> <p>Calculate fractions of quantities and measurements</p> <p>Multiply and divide integers by fractions and understand the effect</p> <p>Know that percentage is the number of parts per 100</p> <p>Recognise equivalent percentages, fractions and decimals</p> <p>Convert between decimals and fractions</p> <p>Order fractions</p>		
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Year 8

Autumn	Spring	Summer
<p>Algebra</p> <p>Find a term given its position in a sequence</p> <p>Generate terms of a sequence using position-to-term rules</p> <p>Use algebra to describe the nth term of a sequence</p> <p>Explain how the nth term is formed by looking at the sequence</p>	<p>Space, shape and measures</p> <p>Understand and describe translations and reflections</p> <p>Transform 2-D shapes using translation or reflection or a combination of them both</p> <p>Find and use lines of reflection (or mirror lines) on a coordinate grid</p> <p>Transform 2-D shapes by rotation</p> <p>Describe and carry out rotations on a coordinate grid</p> <p>Solve problems to find an angle of rotation</p>	<p>Algebra</p> <p>Generate sequences from practical contexts, from a term-to-term rule and the first term</p> <p>Find the general term of linear sequences</p> <p>Construct and solve simple and complex linear equations</p> <p>Use formulae to calculate unknown</p>

<p>Find the outputs and inputs of function machines</p> <p>Express simple functions in symbols</p> <p>Draw mapping diagrams for simple functions that include negative numbers</p> <p>Read and plot coordinates in the first quadrant</p> <p>Generate first quadrant coordinates that satisfy a simple linear rule</p> <p>Plot a graph of a simple linear function in the first quadrant</p> <p>Plot coordinates in all four quadrants</p> <p>Recognise straight-line graphs parallel to the x- or y- axis</p> <p>use linear functions to generate coordinates in all four quadrants</p> <p>Plot graphs of functions in all four quadrants</p>	<p>Make generalisations and work algebraically</p> <p>Recognise rotational and line symmetry of a 2-D shape</p> <p>Identify congruent shapes</p> <p>Know that corresponding sides and angles are equal in congruent shapes</p> <p>Carry out combinations of transformations</p> <p>Identify and describe transformations</p> <p>Recognise when transformations have the same effect</p> <p>Describe enlargements</p> <p>Enlarge 2-D shapes, given a centre of enlargement and a positive whole-number scale factor</p> <p>Solve problems to find areas</p> <p>Solve problems which link perimeter or area to other topics in mathematics</p> <p>Write algebraic expressions for side lengths or areas</p>	<p>values</p> <p>Derive formulae from real-life situations</p> <p>Read and plot coordinates in all four quadrants</p> <p>Plot graphs of linear functions and real-life functions</p> <p>Discuss and interpret line graphs</p> <p>Draw, read and interpret distance-time graphs</p> <p>Interpret and discuss real-life graphs</p> <p>Identify and discuss practical examples of direct proportion</p> <p>Use graphs to decide when two variables are in direct proportion</p>
<p>Space, shape and measures</p> <p>Use a protractor to measure and draw angles to the nearest degree</p> <p>Draw a triangle accurately when given some of the sides and angles</p> <p>Know how to construct perpendicular</p>	<p>Handling Data</p> <p>Find the mode, mean, median and range for a small set of discrete data</p> <p>Calculate the mean for a small set of discrete data</p> <p>Calculate the mean from a simple</p>	<p>Space, shape and measures</p> <p>Measure and draw angles to the nearest degree</p> <p>Calculate angles in a triangle and angles around a point</p> <p>Construct triangles accurately using a</p>

<p>lines</p> <p>Know how to bisect a line or an angle</p> <p>Know how to construct a triangle using compasses</p> <p>Use knowledge about line and angle properties to solve problems in shapes made from triangles, quadrilaterals and other polygons</p> <p>Sort quadrilaterals using their side and angle properties</p> <p>Describe a direction using bearings</p> <p>Use angle rules to work out bearings</p> <p>Plan a return route if you know the outward route</p>	<p>frequency table</p> <p>Draw conclusions from simple statistics for a single distribution</p> <p>Calculate the mean from a set of data using an assumed mean</p> <p>Construct simple pie charts using categorical data on paper and using ICT</p> <p>Interpret and/or compare misleading bar chart and frequency diagrams</p> <p>Identify which types of graph is the most useful in the context of a problem</p> <p>Choose and justify appropriate diagrams, graphs and charts</p> <p>Compare two simple distributions using the range and either the mode or the median or the mean</p> <p>Compare two distributions using the shape of the distributions</p> <p>Compare two distributions given summary statistics</p> <p>Use two-way tables for discrete data</p> <p>Construct and use stem-and-leaf diagrams</p> <p>Make inferences about data through</p>	<p>ruler and protractor</p> <p>Construct shapes accurately using a ruler and compasses</p> <p>Visualise 3-D shapes and their properties</p> <p>Draw 3-D shapes using isometric paper</p> <p>Use plans and elevations to represent 3-D shapes</p> <p>Understand the geometric properties of cubes and cuboids</p> <p>Identify and construct nets of cubes and cuboids</p> <p>Identify nets of 3-D shapes</p> <p>Accurately construct nets of more complicated 3-D shapes</p> <p>Calculate the surface area of cubes, cuboids and shapes made from cuboids</p> <p>Solve problems involving surface area</p> <p>Know the formulae for the volume of a cube and cuboid</p> <p>Calculate the volumes of shapes made from cubes and cuboids</p> <p>Solve problems in everyday contexts involving volume</p>
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	<p>extracting information from a two-way table</p> <p>Interpret scatter graphs</p> <p>Construct simple scatter graphs</p> <p>Use a probability scale with words</p> <p>Understand and use the probability scale from 0 to 1</p> <p>Find and justify probabilities based on equally likely outcomes in simple contexts</p> <p>Know that if the probability of an event is P, the probability of it not occurring is $1-p$</p> <p>Identify all possible mutually exclusive outcomes of a single event</p> <p>Identify all the possible outcomes for two events with two or three outcomes in each event</p> <p>Calculate the probability of the final event of a set of events</p> <p>Use the vocabulary of probability to assign a probability to a complex event</p>	
<p>Number</p> <p>Know that percentage is the 'number of</p>	<p>Number</p> <p>Do mental calculations with squares, square roots, cubes and cube roots</p>	

<p>parts per 100'</p> <p>Find simple percentages of quantity</p> <p>Express one number as a fraction or percentage of another</p> <p>Understand and use ratio notation</p> <p>Reduce a ratio to its simplest form</p> <p>Divide a quantity into two or more parts in a given ratio</p> <p>Understand the relationship between ratio and proportion</p> <p>Understand what proportion is</p> <p>Use direct proportion in simple contexts</p> <p>Use proportion to solve problems</p> <p>Recognise the equivalence of percentages, fractions and decimals</p> <p>Use the equivalence of percentages, fractions and decimals to compare simple proportions</p> <p>Understand the relationship between ratio and proportion</p> <p>Check a result by considering if it is of the right order of magnitude</p> <p>Check a result by working the problem</p>	<p>Make and justify estimates and approximations of calculations</p> <p>Use brackets and the memory on a calculator</p> <p>Use a calculator to find squares, square roots, cubes and cube roots</p> <p>Know and use simple tests of divisibility</p> <p>Identify multiples and factors</p> <p>Recognise prime numbers</p> <p>Find the lowest common multiple of two or three numbers</p> <p>Find the highest common factor of two or three numbers</p> <p>Use a factor tree to find the prime factors of a number</p> <p>Use mental methods to solve fraction and decimal problems</p> <p>Calculate fractions of quantities and measurements</p> <p>Know how to multiply and divide integer by a fraction</p> <p>Be able to add and subtract fractions with different denominations</p> <p>Use the equivalence of fractions, decimals and percentages to solve word problems mentally</p> <p>Estimate the answer to a calculation</p>	
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<p>backwards Use the context of a problem to check if the answer is sensible Use the unitary method to solve word problems involving ratio and direct proportion</p>	<p>Check a result by working the problem backwards Carry out calculations with more than one step on a calculator Know how to enter numbers on a calculator in different contexts Correctly interpret the calculator display Do calculations involving fractions and mixed numbers on a calculator Know how to enter time as a mixed number on a calculator Use a standard written method for multiplying decimals Use repeated subtraction for division of whole numbers and decimals Use division in practical contexts involving money</p>	
<p>Algebra Solve linear equations Construct and solve linear equations Solve linear equations involving brackets Construct and solve simple and complex linear equations with unknowns on one side</p>		

5-7 programme of study

Year 7

Autumn	Spring	Summer
<p>Algebra Add, subtract, multiply and divide positive and negative numbers Use the sign change key to input negative numbers into a calculator Find square numbers, square roots, cube numbers and cube roots Write numbers using index notation Use the square, square root, cube and cube root keys on a calculator Understand and use the index laws for multiplication and division of numbers in index form Use the index laws for positive powers of letters Find the lowest common multiple and highest common factor Find and use the prime factor decomposition of a number</p>	<p>Algebra Use function machines to describe mappings Find the outputs and inputs of functions expressed in words and symbols using inverse operations Draw mapping diagrams for simple functions involving positive and negative numbers, and fractions Use function machines to describe mappings Use algebra to describe mappings Understand what a linear function is and find its inverse Generate, read and plot coordinates in all four quadrants Recognise straight line graphs parallel to the x or y axis Plot graphs of simple linear functions Compare values of a linear function to</p>	<p>Number Use standard column procedures to add and subtract integers and decimals Multiply and divide decimals by 10, 100, 1000 Read and write positive integer powers of 10 Multiply and divide integers and decimals by 0.1 and 0.01 Understand the effect of multiply and dividing by numbers less than 1 Round positive whole numbers to any given power of 10 Round decimals to one or two decimal places Compare and order decimals Recognise integer powers of 10 Mentally multiply integers and decimals Use doubling and halving for mental calculations involving negative numbers</p>

<p>Understand and use the index laws for multiplication and division of numbers in index form</p> <p>Use the index laws for numbers</p> <p>Generate and describe integer sequences</p> <p>Generate and predict terms from practical contexts</p> <p>Generate a sequence using a term to term rule</p> <p>Generate a sequence using a position to term rule</p>	<p>find the coefficient of x</p> <p>Plot and compare graphs of linear functions</p> <p>Understand the meaning of m and c in linear functions in the form of $y = mx + c$</p> <p>Find the gradient of a straight line graph</p> <p>Draw and use graphs to solve distance-time problems</p> <p>Plot the graph of a function derived from a real life problem</p> <p>Sketch a distance-time graph for the approximate relationship between two variables</p> <p>Construct linear functions from real life graphs, plot a graph and interpret it</p> <p>Discuss and interpret distance-time graphs and other graphs including ones which are not continuous straight lines</p>	<p>Multiply and divide integers and decimals by 0.1 and 0.01</p> <p>Estimate square roots</p> <p>Mentally calculate the squares of numbers that are multiples of a power of 10</p> <p>Find square roots by factorising</p> <p>Use known cube roots to work out others mentally</p> <p>Solve word problems, involving squares, square roots, cubes and cube roots, using a mental method.</p> <p>Multiply integers and decimals using written methods</p> <p>Check answers by using approximate calculations</p> <p>Divide integers and decimals using written methods</p> <p>Check answers by using approximate calculations</p> <p>Use approximate calculations to check answers</p> <p>Check a result by working the problem backwards</p>
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<p>Shape, space and measure</p> <p>Apply properties of angles to solve problems</p> <p>Identify and calculate interior and exterior angles in triangles and quadrilaterals</p> <p>Understand the idea of proof</p> <p>Recognise the difference between conventions definitions and derived properties</p> <p>Draw an angle accurately using a protractor</p> <p>Construct a triangle using a protractor and ruler</p> <p>Construct a triangle using compasses and a ruler</p> <p>Draw a right angled triangle using</p>	<p>Handling Data</p> <p>Convert between metric units</p> <p>Convert between metric and imperial units</p> <p>Convert between compound and metric units</p> <p>Calculate the area and perimeter of rectangles and shapes made from rectangles</p> <p>Deduce and use the formula for the area of triangles, parallelograms and trapeziums</p> <p>Calculate the area of composite shapes</p>	<p>Shape, space and measure</p> <p>Recognise and describe, line, rotational and plane symmetries</p> <p>Know what 'congruent' means and identify congruent shapes</p> <p>Transform 2D shapes by combining reflections, rotations and translations</p> <p>Understand that these transformations map objects onto congruent images</p> <p>Write and simplify ratios notation</p> <p>Use ratio and fractions to solve problems involving proportion</p> <p>Use proportional reasoning to solve</p>

<p>compasses and ruler</p> <p>Know the properties of quadrilaterals</p> <p>Solve geometrical problems involving quadrilaterals and explain the reasons</p> <p>Know the names of parts of a circle</p> <p>Use a straight edge and compass to construct the perpendicular bisector of a line and angle</p> <p>Use a straight edge and compass to investigate the properties of overlapping circles</p> <p>Find the sum of the interior and exterior angles of polygons</p> <p>Find an interior and exterior angle of a regular polygon</p> <p>Use the interior and exterior angles of a regular and irregular polygon to solve problems</p>	<p>made from triangle and rectangles</p> <p>Find the area and perimeter of circles using circles formulae</p> <p>Find the diameter and radius of a circle given it circumference or area</p> <p>Find the area and perimeter of compound shapes involving circles</p> <p>Calculate the surface area of cubes, cuboids and other prisms</p> <p>Know and use the formula for the volume of a cuboid</p> <p>Calculate the volumes of shapes made from cuboids</p> <p>Calculate the volumes of prisms</p> <p>Solve problems about length, area, volume and circles</p> <p>Solve problems using metric and imperial units</p>	<p>problems</p> <p>Use ratio to solve problems</p> <p>Enlarge 2-d shapes using a positive integer scale factor</p> <p>Enlarge 2-d shapes given a positive integer scale factor and a centre of enlargement inside or on the shape</p> <p>Enlarge 2-d shapes given a scale factor and a centre of enlargement</p> <p>Understand the effect of enlargements on lengths, angles and perimeters of shapes</p>
<p>Handling Data</p> <p>Understand that random events are unpredictable</p> <p>Use fractions to compare the chances that events will happen</p> <p>Represent the likelihood of something</p>	<p>Algebra</p> <p>Use the equals sign correctly</p> <p>Write expressions from diagrams or word descriptions</p> <p>Explain what each letter means in a function or a formula</p>	

happening on a probability scale
Understand the term 'mutually exclusive'
Identify all the possible outcomes for one, two or three successive events
Use diagrams and tables to represent probability
If the probability of an outcome occurring is P then the probability of it not occurring is $1 - P$
Identify all the mutually exclusive outcomes of an experiment and know that the sum of probabilities of all mutually exclusive outcomes is 1 and use this when solving problems.
Know what a frequency table is and how to use it to collect data
Use data collected in an experiment to make predictions about what might happen if the experiment is repeated
Understand that if you carry out an experiment several times it is likely that you have different outcomes each time

Recognise equations, expressions and identities
Use the equals sign correctly
Understand and use the distributive law
Work out expressions in arithmetic or algebra using the correct order of operations
Understand powers with positive whole numbers
Understand basic rule of powers (index laws)
Simplify expressions that include powers
Multiply out a bracket
Simplify an expression by multiplying out brackets and collecting like terms
Factorise by taking out a number as a factor
Factorise by taking out an algebraic factor
Substitute a positive or negative whole number into an expression with one or more brackets, involving small powers
Substitute numbers into formulae

Realise that predictions made from the results of an experiment become more reliable the more times you do it.
Review ways of identifying all possible outcomes for an experiment
Appreciate that results of experiments in reality seldom fit in with the theory exactly
Know that, in some situations, experimental data is the only basis for making estimates for the probability of an event
Use theoretical probability to make games 'fair' but appreciate that a game may not be fair every time.
Use lists, two way tables or tree diagrams to identify the number of outcomes
Use the idea that probabilities sum to 1 to solve probability problems
Know how reliable probability estimates are when they have been based on experimental data

Write formulae

Number

Express one number as a fraction of another

Convert between fractions and decimals

Compare and order fractions

Add and subtract fractions with the same and different denominators

Add and subtract mixed numbers

Use inverse operations to check fraction calculations

Calculate fractions of quantities and measurement

Multiply and divide integers by fractions and fractions by fractions

Know that percentages is the number of parts per 100

Find percentages of quantities

Express one number as a percentage of another

Find the outcome of a percentage increase or decrease

Recognise equivalent fractions, decimals and percentages

Convert between fractions, decimals and percentages

Use the equivalence of fractions, decimals and percentages to compare proportions

Use known facts to derive unknown facts

Multiply and divide mentally Carry out mental calculations with fractions, decimals and percentages		
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Year 8

Autumn	Spring	Summer
<p>Algebra</p> <p>Link equations to descriptions Write expressions and form equations Solve simple equations Represent equations using area diagrams Solve equations which have the unknown on one side only and where the solutions might be positive or negative, or a whole number or a fraction Recognise equivalent equations Given an equation with x on both sides, generate an equivalent equation which has x on one side only Solve an equation with x on both sides Write an equation involving brackets Solve an equation with brackets on one or both sides Solve an equation which involves multiplying a bracket by a negative number Substitute values into a formula and use</p>	<p>Algebra</p> <p>Read and plot coordinates in all four quadrants Generate coordinate pairs that satisfy a linear rule Recognise straight line graphs which are parallel to the x or y axis Plot graphs of linear functions in all four quadrants where y is given in the form $y = mx + c$ Recognise linear functions Rearrange linear functions into the form $y = mx + c$ Plot graphs of linear functions using ICT Understand what it means for two variables to be in direct proportion Use graphs to solve problems involving direct proportion Understand that if variables are in direct proportion, then the ratios of</p>	<p>Space, shape and measures</p> <p>Deduce properties of 3-D shapes from 2-D representations Know and use geometric properties of cuboids and shapes made from cuboids Visualise and use a wide range of 2-D representations or 3-D objects Analyse 3-D shapes through 2-D representations Begin to use plans and elevations Analyse 3-D shapes through cross sections, plans and elevations Identify nets of 3-D shapes Use a rule and protractor to construct simple nets of 3-D shapes Use a ruler and protractor to construct triangles Use a ruler and compass to construct</p>

<p>the correct order of operations Use a formula written in words or algebraically using letters Use a formula and find the value of a letter which is not the subject of the formula Substitute using the correct order of operations Work backwards, for example, from the area of a circle and its radius Generalise, using a letter for a value which can change Write formulae</p>	<p>corresponding values are equal Use algebra to solve problems involving variables that are in direct proportion Construct and solve linear equations with integer coefficients, where the unknown may be on both sides Solve simple equations involving x^2 Write and solve equations involving brackets and division Find alternative ways of solving equations Solve problems involving number and algebra Break complex problems into simpler steps Choose and use efficient techniques for algebraic manipulation Use trial and improvement methods where a more efficient method is not obvious</p>	<p>triangles Draw diagrams to scale Use scale in maps and plans Use and interpret maps and scale drawings Use a protractor to draw angles to the nearest degree Understand and use the language associated with bearings Use bearings to specify location Draw diagrams to scale Read and plot coordinates in all four quadrants Find the mid point of a line segment Describe familiar routes Draw loci Draw shapes and paths using the description of loci Solve problems using shape, space and measures Use logical argument</p>
<p>Handling Data Identify sources from which data can be collected and identify factors that</p>	<p>Number Understand the relationship between ratio and proportion</p>	<p>Handling Data Record data in a grouped frequency table</p>

<p>may effect the collection of data</p> <p>Choose a suitable sample size for an investigation</p> <p>Describe possible methods for collecting primary and secondary data</p> <p>Read data from two way tables</p> <p>Calculate the mean for a small set of discrete data</p> <p>Work out the mean from a frequency table</p> <p>Know when it is best to use the mean, median or mode</p> <p>Draw a stem and leaf diagram and use it to find averages and the range</p> <p>Group data in equal class intervals</p> <p>Construct and interpret compound and comparative bar charts</p> <p>Draw line graphs on paper or using ICT</p> <p>Interpret line graphs</p> <p>Draw pie charts</p> <p>Interpret pie charts</p>	<p>Understand and use ratio and proportion to solve problems</p> <p>Use the unitary method to solve word problems involving ratio and direct proportion</p> <p>Reduce a ratio to its simplest form</p> <p>Simplify a ratio expressed in fractions or decimals</p> <p>Compare ratios by changing them into the form 1:m or m:1</p> <p>Divide a quantity into a number of parts to solve problems</p> <p>Use ratio to solve problems in different contexts</p> <p>Solve problems</p> <p>Use logical argument to establish whether a statement is true or untrue</p> <p>Solve problems involving number and measures</p> <p>Break complex problems into simpler steps</p> <p>Solve increasingly demanding problems and evaluate solutions</p> <p>Investigate in a range of contexts</p>	<p>Select an appropriate level of accuracy for data</p> <p>Use inequalities to describe class intervals</p> <p>Collect data using a questionnaire</p> <p>Calculate the mean using an assumed mean</p> <p>Find the modal class for grouped data</p> <p>Know when it is appropriate to use the modal class</p> <p>Construct and interpret frequency diagrams</p> <p>Interpret population pyramids</p> <p>Read information from bar charts, frequency diagrams, pie charts, stem and leaf diagrams and line graphs</p> <p>Compare distributions</p> <p>Compare two sets of data using an average and the range</p> <p>Choose which type of graph is appropriate for a given situation</p> <p>Describe whether a graph is misleading and explain why</p> <p>Complete a data collection sheet</p>
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	<p>Find the necessary information to solve a problem</p> <p>Evaluate solutions to find the best one</p>	
<p>Number</p> <p>Add and subtract fractions by writing them with a common denominator</p> <p>Add and subtract mixed number fractions</p> <p>Calculate fractions of quantities</p> <p>Multiply and divide an integer by a fraction</p> <p>Multiply and divide fractions</p> <p>Make and justify estimates and approximations of calculations</p> <p>Multiply and divide any number by 0.1 and 0.01 and multiples of them</p> <p>Multiply and divide both sides of an inequality by a negative number</p> <p>Generalise inequalities</p> <p>Understand the effects of multiplying and dividing positive numbers and fractions by less than 1</p> <p>Know and use the order of operations</p>		

Do mental calculations with squares, square roots, cubes and cube roots
Simplify expressions containing powers
Mentally multiply integers and decimals
Do mental calculations with fractions, decimals and percentages
Use written methods for addition, subtraction, multiplication and division
Recognise and use metric units of measurements and convert between metric units
Solve problems involving metric and imperial units
Enter numbers and interpret the display of a calculator in different contexts
Do mental calculations with time
Solve problems involving money and measure