	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	**Algebraic Thinking**						**Place Value and Proportion**					
	Sequences		Understand and use algebraic notation		Equality and equivalence		Place value and ordering integers and decimals			Fraction, decimal and percentage equivalence		
Spring	**Applications of Number**						**Directed Number**			**Fractional Thinking**		
	Solving problems with addition & subtraction		Solving problems with multiplication and division			Fractions & percentages of amounts	Operations and equations with directed number			Addition and subtraction of fractions		
Summer	**Lines and Angles**						**Reasoning with Number**					
	Constructing, measuring and using geometric notation			Developing geometric reasoning			Developing number sense		Sets and probability		Prime numbers and proof	

Sequences

Small Steps

- Describe and continue a sequence given diagrammatically
- Predict and check the next term(s) of a sequence
- Represent sequences in tabular and graphical forms
- Recognise the difference between linear and non-linear sequences
- Continue numerical linear sequences
- Continue numerical non-linear sequences
- Explain the term-to-term rule of numerical sequences in words
- **Find missing numbers within sequences** H

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Understand and use notation

Small Steps

- Given a numerical input, find the output of a single function machine
- Use inverse operations to find the input given the output
- Use diagrams and letters to generalise number operations
- Use diagrams and letters with single function machines
- Find the function machine given a simple expression
- Substitute values into single operation expressions
- Find numerical inputs and outputs for a series of two function machines
- Use diagrams and letters with a series of two function machines
- Find the function machines given a two-step expression
- Substitute values into two-step expressions
- Generate sequences given an algebraic rule
- Represent one- and two-step functions graphically

Equality and Equivalence

Small Steps

- Understand the meaning of equality
- Understand and use fact families, numerically and algebraically
- Solve one-step linear equations involving +/− using inverse operations
- Solve one-step linear equations involving ×/÷ using inverse operations
- Understand the meaning of like and unlike terms
- Understand the meaning of equivalence
- Simplify algebraic expressions by collecting like terms, using the ≡ symbol

Place Value

Small Steps

- Recognise the place value of any number in an integer up to one billion
- Understand and write integers up to one billion in words and figures
- Work out intervals on a number line
- Position integers on a number line
- Round integers to the nearest power of ten
- Compare two numbers using $=, \neq, <, >, \leq, \geq$
- Order a list of integers
- Find the range of a set of numbers
- Find the median of a set of numbers
- Understand place value for decimals
- Position decimals on a number line
- Compare and order any number up to one billion

Place Value

Small Steps

- Round a number to 1 significant figure
- **Write 10, 100, 1000 etc. as powers of ten** H
- **Write positive integers in the form A x 10^n** H
- **Investigate negative powers of ten** H
- **Write decimals in the form A x 10^n** H

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FDP Equivalence

Small Steps

- Represent tenths and hundredths as diagrams
- Represent tenths and hundredths on number lines
- Interchange between fractional and decimal number lines
- Convert between fractions and decimals – tenths and hundredths
- Convert between fractions and decimals – fifths and quarters
- **Convert between fractions and decimals – eighths and thousandths** (H)
- Understand the meaning of percentage using a hundred square
- Convert fluently between simple fractions, decimals and percentages
- Use and interpret pie charts

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FDP Equivalence

Small Steps

- Represent any fraction as a diagram
- Represent fractions on number lines
- Identify and use simple equivalent fractions
- Understand fractions as division
- Convert fluently between fractions, decimals and percentages
- **Explore fractions above one, decimals and percentages** (H)

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Addition and Subtraction

Small Steps

- Properties of addition and subtraction
- Mental strategies for addition and subtraction
- Use formal methods for addition of integers
- Use formal methods for addition of decimals
- Use formal methods for subtraction of integers
- Use formal methods for subtraction of decimals
- Choose the most appropriate method: mental strategies, formal written or calculator
- Solve problems in the context of perimeter
- Solve financial maths problems

Addition and Subtraction

Small Steps

- Solve problems involving tables and timetables
- Solve problems with frequency trees
- Solve problems with bar charts and line charts
- Add and subtract numbers given in standard form (H)

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Multiplication and Division

Small Steps

- Properties of multiplication and division
- Understand and use factors
- Understand and use multiples
- Multiply and divide integers and decimals by powers of 10
- **Multiply by 0.1 and 0.01** H
- Convert metric units
- Use formal methods to multiply integers
- Use formal methods to multiply decimals
- Use formal methods to divide integers
- Use formal methods to divide decimals

Multiplication and Division

Small Steps

- Understand and use order of operations
- Solve problems using the area of rectangles and parallelograms
- Solve problems using the area of triangles
- **Solve problems using the area of trapezia** (H)
- Solve problems using the mean
- **Explore multiplication and division in algebraic expressions** (H)

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Fractions & Percentages of Amounts

Small Steps

- Find a fraction of a given amount
- Use a given fraction to find the whole and/or other fractions
- Find a percentage of a given amount using mental methods
- Find a percentage of a given amount using a calculator
- **Solve problems with fractions greater than 1 and percentages greater than 100%** (H)

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Directed Number

Small Steps

- Understand and use representations of directed numbers
- Order directed numbers using lines and appropriate symbols
- Perform calculations that cross zero
- Add directed numbers
- Subtract directed numbers
- Multiplication of directed numbers
- Multiplication and division of directed numbers
- Use a calculator for directed number calculations
- Evaluate algebraic expressions with directed number
- Introduction to two-step equations

Directed Number

Small Steps

- Solve two-step equations
- Use order of operations with directed numbers
- **Roots of positive numbers** H
- **Explore higher powers and roots** H

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Fractional Thinking

Small Steps

- Understand representations of fractions
- Convert between mixed numbers and fractions
- Add and subtract unit fractions with the same denominator
- Add and subtract fractions with the same denominator
- Add and subtract fractions from integers expressing the answer as a single fraction
- Understand and use equivalent fractions
- Add and subtract fractions where denominators share a simple common multiple
- Add and subtract fractions with any denominator
- Add and subtract improper fractions and mixed numbers
- Use fractions in algebraic contexts
- Use equivalence to add and subtract decimals and fractions
- **Add and subtract simple algebraic fractions** H

Fractional Thinking

Small Steps

- Use fractions in algebraic contexts
- Use equivalence to add and subtract decimals and fractions
- **Add and subtract simple algebraic fractions** H

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Construction and Measuring

Small Steps

- Understand and use letter and labelling conventions including those for geometric figures
- Draw and measure line segments including geometric figures
- Understand angles as a measure of turn
- Classify angles
- Measure angles up to 180°
- Draw angles up to 180°
- Draw and measure angles between 180° and 360°
- Identify perpendicular and parallel lines
- Recognise types of triangle
- Recognise types of quadrilateral

Construction and Measuring

Small Steps

- Identify polygons up to a decagon
- Construct triangles using SSS
- Construct triangles using SSS, SAS and ASA
- Construct more complex polygons
- Interpret simple pie charts using proportion
- Interpret pie charts using a protractor
- Draw pie charts

Geometric Reasoning

Small Steps

- Understand and use the sum of angles at a point
- Understand and use the sum of angles on a straight line
- Understand and use the equality of vertically opposite angles
- Know and apply the sum of angles in a triangle
- Know and apply the sum of angles in a quadrilateral
- Solve angle problems using properties of triangles and quadrilaterals
- Solve complex angle problems

Geometric Reasoning

Small Steps

- Find and use the angle sum of any polygon (H)
- Investigate angles in parallel lines (H)
- Understand and use parallel line angle rules (H)
- Use known facts to obtain simple proofs. (H)

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Developing Number Sense

Small Steps

- Know and use mental addition and subtraction strategies for integers
- Know and use mental multiplication and division strategies for integers
- Know and use mental arithmetic strategies for decimals
- Know and use mental arithmetic strategies for fractions
- Use factors to simplify calculations
- Use estimation as a method for checking mental calculations
- Use known number facts to derive other facts
- Use known algebraic facts to derive other facts
- Know when to use a mental strategy, formal written method or a calculator

Sets and Probability

Small Steps

- Identify and represent sets
- Interpret and create Venn diagrams
- Understand and use the intersection of sets
- Understand and use the union of sets
- **Understand and use the complement of a set** (H)
- Know and use the vocabulary of probability

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Sets and Probability

Small Steps

- Generate sample spaces for single events
- Calculate the probability of a single event
- Understand and use the probability scale
- Know that the sum of probabilities of all possible outcomes is 1

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Prime Numbers and Proof

Small Steps

- Find and use multiples
- Identify factors of numbers and expressions
- Recognise and identify prime numbers
- Recognise square and triangular numbers
- Find common factors of a set of numbers including the HCF
- Find common multiples of a set of numbers including the LCM
- Write a number as a product of its prime factors
- **Use a Venn diagram to calculate the HCF and LCM** H
- Make and test conjectures
- Use counterexamples to disprove a conjecture

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	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	**Proportional Reasoning**						**Representations**					
	Ratio and scale		Multiplicative change		Multiplying and dividing fractions		Working in the Cartesian plane			Representing data		Tables & Probability
Spring	**Algebraic techniques**						**Developing Number**					
	Brackets, equations and inequalities				Sequences	Indices	Fractions and percentages			Standard index form		Number sense
Summer	**Developing Geometry**						**Reasoning with Data**					
	Angles in parallel lines and polygons			Area of trapezia and circles		Line symmetry and reflection	The data handling cycle				Measures of location	

Ratio and Scale

Small Steps

- Understand the meaning and representation of ratio
- Understand and use ratio notation
- Solve problems involving ratios of the form $1 : n$ (or $n : 1$)
- Solve proportional problems involving the ratio $m : n$
- Divide a value into a given ratio
- Express ratios in their simplest integer form
- Express ratios in the form $1 : n$ (H)
- Compare ratios and related fractions
- Understand π as the ratio between diameter and circumference
- Understand gradient of a line as a ratio (H)

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Multiplicative Change

Small Steps

- Solve problems involving direct proportion
- Explore conversion graphs
- Convert between currencies
- Explore direct proportion graphs (H)
- Explore relationships between similar shapes
- Understand scale factors as multiplicative representations
- Draw and interpret scale diagrams
- Interpret maps using scale factors and ratios

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Multiplying & Dividing Fractions

Small Steps

- Represent multiplication of fractions
- Multiply a fraction by an integer
- Find the product of a pair of unit fractions
- Find the product of a pair of any fractions
- Divide an integer by a fraction
- Divide a fraction by a unit fraction
- Understand and use the reciprocal
- Divide any pair of fractions

Multiplying & Dividing Fractions

Small Steps

- Multiply and divide improper and mixed fractions (H)
- Multiply and divide algebraic fractions (H)

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Working in the Cartesian Plane

Small Steps

- Work with coordinates in all four quadrants
- Identify and draw lines that are parallel to the axes
- Recognise and use the line $y = x$
- Recognise and use lines of the form $y = kx$
- Link $y = kx$ to direct proportion problems
- **Explore the gradient of the line $y = kx$** (H)
- Recognise and use lines of the form $y = x + a$
- Explore graphs with negative gradient $(y = -kx, y = a - x, x + y = a)$

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Working in the Cartesian Plane

Small Steps

- Link graphs to linear sequences
- Plot graphs of the form $y = mx + c$
- **Explore non-linear graphs** H
- **Find the midpoint of a line segment** H

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Representing Data

Small Steps

- Draw and interpret scatter graphs
- Understand and describe linear correlation
- Draw and use line of best fit
- Identify non-linear relationships
- Identify different types of data
- Read and interpret ungrouped frequency tables
- Read and interpret grouped frequency tables
- Represent grouped discrete data
- Represent continuous data grouped into equal classes
- Represent data in two-way tables

Tables and Probability

Small Steps

- Construct sample spaces for 1 or more events
- Find probabilities from a sample space
- Find probabilities from two-way tables
- Find probabilities from Venn diagrams
- **Use the product rule for finding the total number of possible outcomes** H

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Brackets, Equations & Inequalities

Small Steps

- Form algebraic expressions
- Use directed number with algebra
- Multiply out a single bracket
- Factorise into a single bracket
- Expand multiple single brackets and simplify
- **Expand a pair of binomials** (H)
- Solve equations, including with brackets
- Form and solve equations with brackets
- Understand and solve simple inequalities

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Brackets, Equations & Inequalities

Small Steps

- Form and solve inequalities
- **Solve equations and inequalities with unknowns on both sides** (H)
- **Form and solve equations and inequalities with unknowns on both sides** (H)
- Identify and use formulae, expressions, identities and equations

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Sequences

Small Steps

- Generate sequences given a rule in words
- Generate sequences given a simple algebraic rule
- Generate sequences given a complex algebraic rule
- **Find the rule for the n^{th} term of a linear sequence** (H)

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Indices

Small Steps

- Adding and subtracting expressions with indices
- Simplifying algebraic expressions by multiplying indices
- Simplifying algebraic expressions by dividing indices
- Using the addition law for indices
- Using the addition and subtraction law for indices
- **Exploring powers of powers** H

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Fractions and Percentages

Small Steps

- Convert fluently between key fractions, decimals and percentages R
- Calculate key fractions, decimals and percentages of an amount without a calculator R
- Calculate fractions, decimals and percentages of an amount using calculator methods R
- Convert between decimals and percentages greater than 100%
- Percentage decrease with a multiplier
- Calculate percentage increase and decrease using a multiplier
- Express one number as a fraction or a percentage of another without a calculator
- Express one number as a fraction or a percentage of another using calculator methods

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Fractions and Percentages

Small Steps

- Work with percentage change
- Choose appropriate methods to solve percentage problems
- **Find the original amount given the percentage less than 100%** H
- **Find the original amount given the percentage greater than 100%** H
- **Choose appropriate methods to solve complex percentage problems** H

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Standard Form

Small Steps

- Investigate positive powers of 10
- Work with numbers greater than 1 in standard form
- Investigate negative powers of 10
- Work with numbers between 0 and 1 in standard form
- Compare and order numbers in standard form
- Mentally calculate with numbers in standard form
- Add and subtract numbers in standard form
- Multiply and divide numbers in standard form
- Use a calculator to work with numbers in standard form

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Standard Form

Small Steps

- Understand and use negative indices (H)
- Understand and use fractional indices (H)

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Number Sense

Small Steps

- Round numbers to powers of 10, and 1 significant figure (R)
- Round numbers to a given number of decimal places
- Estimate the answer to a calculation
- **Understand and use error interval notation** (H)
- Calculate using the order of operations (R)
- Calculate with money
- Covert metric measures of length
- Convert metric units of weight and capacity

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Number Sense

Small Steps

- **Convert metric units of area** H
- **Convert metric units of volume** H
- Solve problems involving time and the calendar

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Angles in parallel lines & polygons

Small Steps

- Understand and use basic angles rules and notation R
- Investigate angles between parallel lines and the transversal
- Identify and calculate with alternate and corresponding angles
- Identify and calculate with co-interior, alternate and corresponding angles
- Solve complex problems with parallel line angles
- Construct triangles and special quadrilaterals R
- Investigate the properties of special quadrilaterals
- Identify and calculate with sides and angles in special quadrilaterals

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Angles in parallel lines & polygons

Small Steps

- **Understand and use the properties of diagonals of quadrilaterals** H
- Understand and use the sum of exterior angles of any polygon
- Calculate and use the sum of the interior angles in any polygon
- Calculate missing interior angles in regular polygons
- **Prove simple geometric facts** H
- **Construct an angle bisector** H
- **Construct a perpendicular bisector of a line segment** H

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Area of Trapezia and Circles

Small Steps

- Calculate the area of triangles, rectangles and parallelograms (R)
- Calculate the area of a trapezium
- Calculate the perimeter and area of compound shapes (1)
- Investigate the area of a circle
- Calculate the area of a circle and parts of a circle without a calculator
- Calculate the area of a circle and parts of a circle with a calculator
- Calculate the perimeter and area of compound shapes (2)

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Line symmetry and reflection

Small Steps

- Recognise line symmetry
- Reflect a shape in a horizontal or vertical line 1 (shapes touching the line)
- Reflect a shape in a horizontal or vertical line 2 (shapes not touching the line)
- Reflect a shape in a diagonal line 1 (shapes touching the line)
- Reflect a shape in a diagonal line 2 (shapes not touching the line)

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The Data Handling Cycle

Small Steps

- Set up a statistical enquiry
- Design and criticise questionnaires
- Draw and interpret pictograms, bar charts and vertical line charts (R)
- Draw and interpret multiple bar charts
- Draw and interpret pie charts (R)
- Draw and interpret line graphs
- Choose the most appropriate diagram for given set of data
- Represent and interpret grouped quantitative data

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The Data Handling Cycle

Small Steps

- Find and interpret the range
- Compare distributions using charts
- Identify misleading graphs

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Measures of Location

Small Steps

- Understand and use the mean, median and mode
- Choose the most appropriate average
- **Find the mean from an ungrouped frequency table** H
- **Find the mean from an grouped frequency table** H
- Identify outliers
- Compare distributions using averages and the range

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	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	**Reasoning with Algebra**						**Constructing in 2 and 3 Dimensions**					
	Straight line graphs		Forming and solving equations		Testing conjectures		Three-dimensional shapes			Constructions and congruency		
Spring	**Reasoning with Number**						**Reasoning with Geometry**					
	Numbers		Using percentages		Maths and money		Deduction		Rotation and translation		Pythagoras' Theorem	
Summer	**Reasoning with Proportion**						**Representations and Revision**					
	Enlargement and similarity		Solving ratio & proportion problems		Rates		Probability		Algebraic representation		Revision	

Straight line graphs

Small Steps

- Lines parallel to the axes, $y = x$ and $y = -x$ R
- Using tables of values R
- Compare gradients
- Compare intercepts
- Understand and use $y = mx + c$
- **Write an equation in the form $y = mx + c$** H
- Find the equation of a line from a graph
- Interpret gradient and intercepts of real-life graphs

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Straight line graphs

Small Steps

- Model real-life graphs involving inverse proportion (H)
- Explore perpendicular lines (H)

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Forming and solving equations

Small Steps

- Solve one- and two-step equations and inequalities R
- Solve one- and two-step equations and inequalities with brackets R
- Inequalities with negative numbers
- Solve equations with unknowns on both sides
- Solve inequalities with unknowns on both sides
- Solving equations and inequalities in context
- Substituting into formulae and equations
- Rearrange formulae (one-step)

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Forming and Solving Equations

Small Steps

- Rearrange formulae (two-step)
- **Rearrange complex formulae including brackets and squares** H

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Testing conjectures

Small Steps

- Factors, Multiples and Primes (R)
- True or False?
- Always, Sometimes, Never true
- Show that
- Conjectures about number
- Expand a pair of binomials
- Conjectures with algebra
- Explore the 100 grid

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Testing conjectures

Small Steps

- **Expand three binomials** H

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Three-dimensional shapes

Small Steps

- Know names of 2-D and 3-D shapes
- Recognise prisms
- Accurate nets of cuboids and other 3-D shapes
- Sketch and recognise nets of cuboids and other 3-D shapes
- Plans and elevations
- Find area of 2-D shapes R
- Surface area of cubes and cuboids
- Surface area of triangular prisms

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Three-dimensional shapes

Small Steps

- Surface area of a cylinder
- Volume of cubes and cuboids
- Volume of other 3-D shapes – prisms and cylinders
- **Explore volumes of cones, pyramids and spheres** (H)

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Constructions & congruency

Small Steps

- Draw and measure angles R
- Construct and interpret scale drawings R
- Locus of distance from a point
- Locus of distance from a straight line/shape
- Locus equidistant from two points
- Construct a perpendicular bisector
- Construct a perpendicular from a point
- Construct a perpendicular to a point

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Constructions & congruency

Small Steps

- Locus of distance from two lines
- Construct an angle bisector
- Construct triangles from given information R
- Identify congruent figures
- Explore congruent triangles
- Identify congruent triangles

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Numbers

Small Steps

- Integers, real and rational numbers
- **Understand and use surds** (H)
- Work with directed number (R)
- Solve problems with integers
- Solve problems with decimals
- HCF and LCM (R)
- Adding and subtracting fractions (R)
- Multiplying and dividing fractions (R)

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Numbers

Small Steps

- Solving problems with fractions
- Numbers in standard form R

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Using percentages

Small Steps

1	Use the equivalence of fractions, decimals and percentages	R
2	Calculate percentage increase and decrease	R
3	Express a change as a percentage	R
4	Solve 'reverse' percentage problems	
5	Recognise and solve percentage problems (non-calculator)	
6	Recognise and solve percentage problems (calculator)	R
7	**Solve problems with repeated percentage change**	H

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Maths and Money

Small Steps

- Solve problems with bills and bank statements
- Calculate simple interest
- Calculate compound interest
- Solve problems with Value Added Tax
- Calculate wages and taxes
- Solve exchange rates
- Solve unit pricing problems

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Deduction

Small Steps

- Angles in parallel lines (R)
- Solving angles problems (using chains of reasoning)
- Angles problems with algebra
- Conjectures with angles
- Conjectures with shapes
- **Link constructions and geometrical reasoning** (H)

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Rotation and Translation

Small Steps

- Identify the order of rotational symmetry of a shape
- Compare and contrast rotational symmetry with line symmetry
- Rotate a shape about a point on a shape
- Rotate a shape about a point not on a shape
- Translate points and shapes by a given vector
- Compare rotation and reflection of shapes
- **Find the result of a series of transformations** H

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Pythagoras' Theorem

Small Steps

- Squares and square roots (R)
- Identify the hypotenuse of a right-angled triangle
- Determine whether a triangle is right-angled
- Calculate the hypotenuse of a right-angled triangle
- Calculate missing sides in right-angled triangles
- Use Pythagoras theorem on coordinate axes
- Explore proofs of Pythagoras' theorem
- **Use Pythagoras' theorem in 3-D shapes** (H)

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Enlargement and Similarity

Small Steps

- Recognise enlargement and similarity
- Enlarge a shape by a positive integer scale factor
- Enlarge a shape by a positive integer scale factor from a point
- Enlarge a shape by a positive fractional scale factor
- **Enlarge a shape by a negative scale factor** H
- Work out missing sides and angles in a pair of given similar shapes
- **Solve problems with similar triangles** H
- **Explore ratios in right-angled triangles** H

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Ratio and Proportion

Small Steps

- Solve problems with direct proportion (R)
- Direct proportion and conversion graphs (R)
- Solve problems with inverse proportion
- **Graphs of inverse relationships** (H)
- Solve ratio problems given the whole or a part (R)
- Solve 'best buy' problems
- **Solve problems ratio and algebra** (H)

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Rates

Small Steps

- Solve speed, distance and time problems without a calculator
- Solve speed, distance and time problems with a calculator
- Use distance/time graphs
- Solve problems with density, mass and volume
- Solve flow problems and their graphs
- Rates of change and their units
- **Convert compound units** H

H denotes higher strand and not necessarily content for Higher Tier GCSE

R denotes "review step" – content should have been covered earlier in KS3

Probability

Small Steps

- Single event probability (R)
- Relative frequency – include convergence
- Expected outcomes
- Independent events
- **Use tree diagrams** (H)
- **Use tree diagrams to solve 'without replacement' problems** (H)
- Use diagrams to work out probabilities

(H) denotes higher strand and not necessarily content for Higher Tier GCSE

(R) denotes "review step" – content should have been covered earlier in KS3

Algebraic representation

Small Steps

- Draw and interpret quadratic graphs
- Interpret graphs, including reciprocal and piece-wise
- **Investigate graphs of simultaneous equations** H
- Represent inequalities

H denotes higher strand and not necessarily content for Higher Tier GCSE

R denotes "review step" – content should have been covered earlier in KS3

Revision

Suggestions

The content for the last three weeks of Year 9 is not specified.

You can use their assessment of students' progress over Key Stage to identify any key areas that need to be addressed and focus on these before embarking on KS4.

Below are some suggestions of topic areas that might be useful to revise as some of the content has not been covered for some time, but this list is neither intended as prescriptive nor exhaustive.

Representing Number	Representing Data	Algebraic Representations	Representing Problems
• Standard form • Product of primes • Error intervals	• Scatter graphs • Statistical graphs • Measures • Tables and timetables • Data handling project	• Find the rule for the n^{th} term of a sequence • Investigating algebraic proof	• Using graphs, equations, tables etc. to solve complex word problems

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	**Similarity**						**Developing Algebra**					
	Congruence, similarity and enlargement			Trigonometry			Representing solutions of equations and inequalities			Simultaneous equations		
Spring	**Geometry**						**Proportions and Proportional Change**					
	Angles & bearings		Working with circles		Vectors		Ratios & fractions		Percentages and Interest		Probability	
Summer	**Delving into data**				**Using number**						**Expressions**	
	Collecting, representing and interpreting data				Non-calculator methods		Types of number and sequences		Indices and Roots		Manipulating expressions	

Congruence, Similarity and Enlargement

Small Steps

- Enlarge a shape by a positive integer scale factor (R)
- Enlarge a shape by a fractional scale factor (R)
- **Enlarge a shape by a negative scale factor** (H)
- Identify similar shapes
- Work out missing sides and angles in a pair given similar shapes (R)
- Use parallel line rules to work out missing angles
- Establish a pair of triangles are similar

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Congruence, Similarity and Enlargement

Small Steps

- Explore areas of similar shapes (H)
- Explore volumes of similar shapes (H)
- Solve mixed problems involving similar shapes (H)
- Understand the difference between congruence and similarity
- Understand and use conditions for congruent triangles
- Prove a pair of triangles are congruent (H)

(H) denotes Higher Tier GCSE content

(R) denotes 'review step' – content should have been covered at KS3

Trigonometry

Small Steps

- Explore ratio in similar right-angled triangles
- Work fluently with the hypotenuse, opposite and adjacent sides
- Use the tangent ratio to find missing side lengths
- Use the sine and cosine ratio to find missing side lengths
- Use sine, cosine and tangent to find missing side lengths
- Use sine, cosine and tangent to find missing angles
- Calculate sides in right-angled triangles using Pythagoras' Theorem R
- Select the appropriate method to solve right-angled triangle problems

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Trigonometry

Small Steps

- Work with key angles in right-angled triangles
- **Use trigonometry in 3-D shapes** H
- **Use the formula $\frac{1}{2}ab\sin C$ to find the area of a triangle** H
- **Understand and use the sine rule to find missing lengths** H
- **Understand and use the sine rule to find missing angles** H
- **Understand and use the cosine rule to find missing lengths** H
- **Understand and use the cosine rule to find missing angles** H
- **Choosing and using the sine and cosine rules** H

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Equations and Inequalities

Small Steps

- Understand the meaning of a solution
- Form and solve one-step and two-step equations R
- Form and solve one-step and two-step inequalities R
- Show solutions to inequalities on a number line
- Interpret representations on number lines as inequalities
- **Represent solutions to inequalities using set notation** H
- Draw straight line graphs R
- Find solutions to equations using straight line graphs

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Equations and Inequalities

Small Steps

- **Represent solutions to single inequalities on a graph** H
- **Represent solutions to multiple inequalities on a graph** H
- Form and solve equations with unknowns on both sides R
- Form and solve inequalities with unknowns on both sides
- Form and solve more complex equations and inequalities
- **Solve quadratic equations by factorisation*** (*Also Foundation tier. Higher cover now, Core will cover in Year 11) H
- **Solve quadratic inequalities in one variable** H

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Simultaneous Equations

Small Steps

- Understand that equations can have more than one solution
- Determine whether a given (x, y) is a solution to a pair of linear simultaneous equations
- Solve a pair of linear simultaneous equations by substituting a known variable
- Solve a pair of linear simultaneous equations by substituting an expression
- Solve a pair of linear simultaneous equations using graphs
- Solve a pair of linear simultaneous equations by subtracting equations
- Solve a pair of linear simultaneous equations by adding equations
- Use a given equation to derive related facts R

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Simultaneous Equations

Small Steps

- Solve a pair of linear simultaneous equations by adjusting one equation
- Solve a pair of linear simultaneous equations by adjusting both equations
- Form a pair of linear simultaneous equations from given information
- Form and solve pair of linear simultaneous equations from given information
- **Determine whether a given (x, y) is a solution to both a linear and quadratic equation** H
- **Solve a pair of simultaneous equations (one linear, one quadratic) using graphs** H
- **Solve a pair of simultaneous equations (one linear, one quadratic) algebraically** H
- **Solve a pair of simultaneous equations involving a third unknown** H

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Angles and Bearings

Small Steps

- Use cardinal directions and related angles (R)
- Draw and interpret scale diagrams (R)
- Understand and represent bearings
- Measure and read bearings
- Make scale drawings using bearings
- Calculate bearings using angles rules
- Solve bearings problems using Pythagoras and trigonometry
- **Solve bearings problems using the sine and cosine rules** (H)

(H) denotes Higher Tier GCSE content

(R) denotes 'review step' – content should have been covered at KS3

Working with Circles

Small Steps

1	Recognise and label parts of a circle	R
2	Calculate fractional parts of a circle	
3	Calculate the length of an arc	
4	Calculate the area of a sector	
5	**Circle theorem: Angles at the centre and circumference**	H
6	**Circle theorem: Angles in a semicircle**	H
7	**Circle theorem: Angles in the same segment**	H
8	**Circle theorem: Angles in a cyclic quadrilateral**	H

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Working with Circles

Small Steps

- Understand and use the volume of a cylinder and cone
- Understand and use the volume of a sphere
- Understand and use the surface area of a sphere
- Understand and use the surface area of a cylinder and cone
- **Solve area and volume problems involving similar shapes** R H

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Vectors

Small Steps

- Understand and represent vectors
- Use and read vector notation
- Draw and understand vectors multiplied by a scalar
- Draw and understand addition of vectors
- Draw and understand addition and subtraction of vectors
- **Explore vector journeys in shapes** H
- **Explore quadrilaterals using vectors** H
- **Understand parallel vectors** H

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Vectors

Small Steps

- Explore collinear points using vectors (H)
- Use vectors to construct geometric arguments and proofs (H)

(H) denotes Higher Tier GCSE content

(R) denotes 'review step' – content should have been covered at KS3

Ratios and Fractions

Small Steps

- Compare quantities using a ratio (R)
- Link ratios and fractions (R)
- Share in a ratio (given total or one part) (R)
- Use ratios and fractions to make comparisons
- Link ratios and graphs (R)
- Solve problems with currency conversion
- Link ratios and scales (R)
- Use and interpret ratios of the form $1 : n$ and $n : 1$
- Solve 'best buy' problems
- Combine a set of ratios

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Ratios and Fractions

Small Steps

- Link ratio and algebra
- **Ratio in area problems** H
- **Ratio in volume problems** H
- Mixed ratio problems

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Percentages & Interest

Small Steps

- Convert and compare fractions, decimals and percentages (R)
- Work out percentages of amounts (with and without a calculator) (R)
- Increase and decrease by a given percentage (R)
- Express one number as a percentage of another (R)
- Calculate simple and compound interest
- Repeated percentage change
- Find the original value after a percentage change (R)
- Solve problems involving growth and decay

(H) denotes Higher Tier GCSE content

(R) denotes 'review step' – content should have been covered at KS3

Percentages & Interest

Small Steps

- **Understand iterative processes** (H)
- Solve problems involving percentages, ratios and fractions

(H) denotes Higher Tier GCSE content

(R) denotes 'review step' – content should have been covered at KS3

Probability

Small Steps

1	Know how to add, subtract and multiply fractions	R
2	Find probabilities using equally likely outcomes	R
3	Use the property that probabilities sum to 1	R
4	Using experimental data to estimate probabilities	
5	Find probabilities from tables, Venn diagrams and frequency trees	
6	Construct and interpret sample spaces for more than one event	R
7	Calculate probability with independent events	
8	Use tree diagrams for independent events	

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Probability

Small Steps

- Use tree diagrams for dependent events
- **Construct and interpret conditional probabilities (Tree diagrams)** H
- **Construct and interpret conditional probabilities (Venn diagrams and two-way tables)** H

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Delving into data

Small Steps

- Understand populations and samples
- **Construct a stratified sample** H
- Primary and secondary data
- Construct and interpret frequency tables and frequency polygons
- Construct and interpret two-way tables R
- Construct and interpret line and bar charts (including composite bar charts)
- Construct and interpret pie charts R
- Criticise charts and graphs

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Delving into data

Small Steps

Construct histograms	H
Interpret histograms	H
Find and interpret averages from a list	R
Find and interpret averages from a table	R
Construct and interpret time series graphs	R
Construct and interpret stem-and-leaf diagrams	
Construct and interpret cumulative frequency diagrams	H
Use cumulative frequency diagrams to find measures	H

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Delving into data

Small Steps

- **Construct and interpret box plots** H
- Compare distributions using charts and measures
- **Compare distributions using complex charts and measures** H
- Construct and interpret scatter graphs R
- Draw and use a line of best fit R
- Understand extrapolation

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Non-calculator methods

Small Steps

Mental/written methods of integer/decimal addition and subtraction	R
Mental/written methods of integer/decimal multiplication and division	R
The four rules of fraction arithmetic	R
Exact answers	
Rational and irrational numbers (convert recurring decimals here)	H
Understand and use surds	H
Calculate with surds	H
Rounding to decimal places and significant figures	R

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Non-calculator methods

Small Steps

- Estimating answers to calculations R
- Understand and use limits of accuracy
- **Upper and lower bounds** H
- Use number sense
- Solve financial maths problems
- Break down and solve multi-step problems

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Types of Number and Sequences

Small Steps

Understand the difference between factors and multiples	R
Understand primes and express a number as a product of its prime factors	R
Find the HCF and LCM of a set of numbers	R
Describe and continue arithmetic and geometric sequences	
Explore other sequences	
Describe and continue sequences involving surds	H
Find the rule for the n^{th} term of a linear sequence	R
Find the rule for the n^{th} term of a quadratic sequence	H

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Indices and Roots

Small Steps

- Square and Cube numbers (R)
- Calculate higher powers and roots
- Powers of ten and standard form (R)
- The addition and subtraction rules for indices (R)
- Understand and use the power zero and negative indices
- Work with powers of powers
- **Understand and use fractional indices** (H)
- Calculate with numbers in standard form (R)

(H) denotes Higher Tier GCSE content

(R) denotes 'review step' – content should have been covered at KS3

Manipulating expressions

Small Steps

- Simplify algebraic expressions (R)
- Use identities
- **Add and subtract simple algebraic fractions** (H)
- **Add and subtract complex algebraic fractions** (H)
- **Multiply and divide simple algebraic fractions** (H)
- **Multiply and divide complex algebraic fractions** (H)
- Form and solve equations and inequalities with fractions
- **Solve equations with algebraic fractions** (H)

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Manipulating expressions

Small Steps

- Represent numbers algebraically
- Algebraic arguments and proof

H denotes Higher Tier GCSE content

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	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	**Graphs**						**Algebra**					
	Gradients & lines		Non-linear graphs		Using graphs		Expanding & factorising		Changing the subject		Functions	
Spring	**Reasoning**						**Revision and Communication**					
	Multiplicative		Geometric		Algebraic		Transforming& constructing			Listing & describing	Show that…	
Summer	**Revision**						**Examinations**					

Gradients & lines

Small Steps

- Equations of lines parallel to the axis R
- Plot straight line graphs R
- Interpret $y = mx + c$ R
- Find the equation of a straight line from a graph (1) R
- Find the equation of a straight line from a graph (2)
- Equation of a straight-line graph given one point and gradient
- Equation of a straight-line graph given two points
- Determine whether a point is on a line

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Gradients & lines

Small Steps

- Solve linear simultaneous equations graphically R
- **Recognise when straight lines are perpendicular** H
- **Find the equations of perpendicular lines** H

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Non-linear graphs

Small Steps

- Plot and read from quadratic graphs
- Plot and read from cubic graphs
- Plot and read from reciprocal graphs
- Recognise graph shapes
- Identify and interpret roots and intercepts of quadratics
- **Understand and use exponential graphs** H
- **Find and use the equation of a circle centre (0, 0)** H
- **Find the equation of the tangent to any curve** H

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Using graphs

Small Steps

- Reflect shapes in given lines (R)
- Construct and interpret conversion graphs (R)
- Construct and interpret other real-life straight line graphs (R)
- Interpret distance/time graphs
- Construct distance/time graphs
- Construct and interpret speed/time graphs
- Construct and interpret piece-wise graphs
- Recognise and interpret graphs that illustrate direct and inverse proportion

(H) denotes Higher Tier GCSE content

(R) denotes 'review step' – content should have been covered at KS3

Using graphs

Small Steps

- Find approximate solutions to equations using graphs
- **Estimate the area under a curve** H

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Expanding and factorising

Small Steps

- Expand and factorise with a single bracket (R)
- Expand binomials (R)
- Factorise quadratic expressions
- **Factorise complex quadratic expressions** (H)
- Solve equations equal to 0
- Solve quadratic equations by factorisation
- **Solve complex quadratic expressions by factorisation** (H)
- **Complete the square** (H)

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Expanding and factorising

Small Steps

- **Solve quadratic equations using the quadratic formula** H

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Changing the subject

Small Steps

- Solve linear equations (R)
- Solve inequalities (R)
- Form and solve equations and inequalities in the context of shape
- Change the subject of a simple formula (R)
- Change the subject of a known formula
- Change the subject of a complex formula
- **Change the subject where the subject appears more than once** (H)
- **Solve equations by iteration** (H)

(H) denotes Higher Tier GCSE content

(R) denotes 'review step' – content should have been covered at KS3

Functions

Small Steps

- Use function machines (R)
- Substitute into expressions and formulae (R)
- Use function notation
- **Work with composite functions**
- **Work with inverse functions**
- Graphs of quadratic functions
- **Solve quadratic inequalities** (R) (H)
- Understand and use trigonometric functions (R)

(H) denotes Higher Tier GCSE content

(R) denotes 'review step' – content should have been covered at KS3

Multiplicative Reasoning

Small Steps

- Use scale factors (R)
- Understand direct proportion
- **Construct complex direct proportion equations** (H)
- Calculate with pressure and density
- Understand inverse proportion
- **Construct inverse proportion equations**
- Ratio problems (R)

(H) denotes Higher Tier GCSE content

(R) denotes 'review step' – content should have been covered at KS3

Geometric Reasoning

Small Steps

Angles at points	R
Angles in parallel lines and shapes	R
Exterior and interior angles of polygons	
Proving geometric facts	
Solve problems involving vectors	
The first four circle theorems	R H
Angle between a radius and a chord	H
Angle between a radius and a tangent	H

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Geometric Reasoning

Small Steps

- **Two tangents from a point** H
- **Alternate segment theorem** H
- Pythagoras' theorem and trigonometrical ratios R

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Algebraic Reasoning

Small Steps

- Simplify complex expressions
- Find the rule for the n^{th} term of a linear sequence R
- **Find the rule for the n^{th} term of a quadratic sequence** R H
- Use rules for sequences
- Solve linear simultaneous equations R
- Solve simultaneous equations with one quadratic R H
- **Formal algebraic proof**
- **Inequalities in two variables** H

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Transforming and Constructing

Small Steps

- Perform and describe line symmetry and reflection (R)
- Perform and describe rotation/rotational symmetry (R)
- Perform and describe translations of shapes (R)
- Perform and describe enlargements of shapes (R)
- **Perform and describe negative enlargements of shapes** (R) (H)
- Identify transformations of shapes (R)
- Perform and describe a series of transformations of shapes
- **Identify invariant points and lines** (H)

(H) denotes Higher Tier GCSE content

(R) denotes 'review step' – content should have been covered at KS3

Transforming and Constructing

Small Steps

- Perform standard constructions using ruler and protractor or ruler and compasses (R)
- Solve loci problems
- **Understand and use trigonometrical graphs** (H)
- **Sketch and identify translations of the graph of a given function** (H)
- **Sketch and identify reflections of the graph of a given function** (H)

(H) denotes Higher Tier GCSE content

(R) denotes 'review step' – content should have been covered at KS3

Listing and Describing

Small Steps

Work with organised lists	
Sample spaces and probability	R
Use the product rule for counting	H
Complete and use Venn diagrams	R
Construct and interpret plans and elevations	R
Use data to compare distributions	R
Interpreting scatter diagrams	R

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3

Show that

Small Steps

- "Show that" with number
- "Show that" with algebra
- "Show that" with shape
- "Show that" with angles
- "Show that" with data
- **"Show that" with vectors** H
- "Show that" with congruent triangles
- **Formal proof with congruent triangles** H

H denotes Higher Tier GCSE content

R denotes 'review step' – content should have been covered at KS3