

Maths Key Stage 3

Long curriculum plan





1. Philosophy

Six underlying attributes at the heart of Oak's curriculum and lessons.

Lessons and units are **knowledge and vocabulary rich** so that pupils build on what they already know to develop powerful knowledge.

Knowledge is **sequenced** and mapped in a **coherent** format so that pupils make meaningful connections.

Our **flexible** curriculum enables schools to tailor Oak's content to their curriculum and context.

Our curriculum is **evidence informed** through rigorous application of best practice and the science of learning.

We prioritise creating a **diverse** curriculum by committing to diversity in teaching and teachers, and the language, texts and media we use, so all pupils feel positively represented.

Creating an **accessible** curriculum that addresses the needs of all pupils is achieved to accessibility guidelines and requirements.



2. Units



KS3 Maths is formed of 53 units and this is the recommended sequence:

Unit Title	Recommended year group	Number of lessons
1 Numbers and numerals	Year 7	4
2 Axioms and arrays	Year 7	8
3 Factors and multiples	Year 7	8
4 Order of operations	Year 7	4
5 Positive and negative numbers	Year 7	12
6 Expressions, equations and inequalities	Year 7	12
7 Angles	Year 7	8
8 Classifying 2-D shapes	Year 7	8
9 Constructing triangles and quadrilaterals	Year 7	8



10 Coordinates	Year 7	8
11 Area of 2-D shapes	Year 7	8
12 Transforming 2-D figures	Year 7	8
13 Prime factor decomposition	Year 7	8
14 Conceptualising and comparing fractions	Year 7	8
15 Manipulating and calculating with fractions	Year 7	12
16 Ratio	Year 7	8
17 Percentages	Year 7	8
18 Different number systems	Year 7	4
19 Sequences	Year 8	8
20 Forming and solving equations	Year 8	8
21 Forming and solving inequalities	Year 8	8



22 Linear graphs	Year 8	12
23 Accuracy and estimation	Year 8	8
24 Algebra and problem solving	Year 8	4
25 Ratio (8.6a)	Year 8	4
26 Ratio, real life graphs, and rates of change	Year 8	8
27 Direct and indirect proportion	Year 8	12
28 Univariate data	Year 8	12
29 Bivariate data	Year 8	8
30 Famous maths problems	Year 8	4
31 Angles and parallel lines	Year 8	4
32 Angles in polygons	Year 8	12
33 Bearings	Year 8	8



34 Volume and surface area of prisms	Year 8	12
35 Area review	Year 8	4
36 Circles	Year 8	8
37 FDP review (9.1a)	Year 9	4
38 Probability	Year 9	12
39 Sets and Venn Diagrams	Year 9	8
40 Solving linear simultaneous equations algebraically	Year 9	16
41 Solving linear simultaneous equations graphically	Year 9	8
42 Angle review (9.5a)	Year 9	4
43 Constructions, congruence, and loci	Year 9	8
44 Pythagoras's theorem	Year 9	8
45 Famous maths problems	Year 9	4



46 Ratio review (9.7a)	Year 9	4
47 Similarity and enlargement	Year 9	8
48 Surds and trigonometry	Year 9	12
49 Quadratic expressions (9.9)	Year 9	12
50 Quadratic equations (9.10)	Year 9	12
51 Indices and standard form	Year 9	12
52 Growth and decay	Year 9	8
53 Finance	Year 9	4



3. Lessons

Unit 1 Numbers and numerals

4 Lessons

Lesson number	Lesson question	Pupils will learn
1.	Representing Number	<ul style="list-style-type: none">In this lesson, we will explore the Base 10 number system in greater detail.
2.	Base 10 and Base 5	<ul style="list-style-type: none">In this lesson, we will discover the differences between our Base 10 number system, and the Base 5 number system.
3.	Indian Number System	<ul style="list-style-type: none">In this lesson, we will discover the differences between our Base 10 number system, and the Indian number system.
4.	Mayan numbers	<ul style="list-style-type: none">In this lesson, we will discover the differences between our Base 10 number system, and the Mayan number system.



Lesson number	Lesson question	Pupils will learn
1.	Models of multiplication	<ul style="list-style-type: none">In this lesson, we will explore different representations and models of multiplication.
2.	Array models	<ul style="list-style-type: none">In this lesson, we will use arrays to show the commutative property of multiplication.
3.	Multiplication and division	<ul style="list-style-type: none">In this lesson, we will look at different forms of multiplication and division, and model solutions to word problems.
4.	Associativity	<ul style="list-style-type: none">In this lesson, we will learn about the associative property and how it can make calculations easier.
5.	The distributive property	<ul style="list-style-type: none">In this lesson, we will learn about the distributive property and how it can make calculations easier.

6. Multiplication facts

- In this lesson, we will use the associative and distributive property to calculate multiplication facts.

7. Number pyramids

- In this lesson, we will have the opportunity to make conjectures and generalise about number pyramids.

8. Number talks

- In this lesson, we will use the axioms to find efficient methods to solve multiplication calculations by using distributive, associative and commutative properties.
-





Lesson number	Lesson question	Pupils will learn
1.	Factors and primes	<ul style="list-style-type: none">• In this lesson, we will be investigating factors, factor pairs and prime numbers.
2.	Prime factors	<ul style="list-style-type: none">• In this lesson, we will be investigating the properties and definition of prime factors of numbers, and how to calculate them.
3.	Square numbers	<ul style="list-style-type: none">• In this lesson, we will be exploring some properties of square numbers.
4.	Representing integers	<ul style="list-style-type: none">• In this lesson, we will be exploring different ways of representing integers that highlight their factors and prime factors.
5.	Exposing factors	<ul style="list-style-type: none">• In this lesson, we will be looking at how different representations of numbers can help us expose factors of numbers.

6. Factor polygons

- In this lesson, we will be looking at representing factors of numbers using polygons.

7. Common multiples

- In this lesson, we will be looking at how to find common multiples of numbers.

8. Number grids

- In this lesson, we will be looking at how to write different multiples of a number using algebraic expressions.
-





Lesson number	Lesson question	Pupils will learn
1.	Equal and non-equal priority	<ul style="list-style-type: none">• In this lesson, we will be looking at priority of operation in different calculations. We will use function machines to explore the order of operations.
2.	Writing calculations	<ul style="list-style-type: none">• In this lesson, we will be looking at writing calculations from function machines.
3.	Order of operations and arrays	<ul style="list-style-type: none">• In this lesson, we will be looking at writing calculations whilst obeying the order of operations, using arrays.
4.	Calculations with variables	<ul style="list-style-type: none">• In this lesson, we will look at writing calculations that include algebraic terms.



Lesson number	Lesson question	Pupils will learn
1.	Negative numbers in context	<ul style="list-style-type: none">In this lesson, we will interpret negative numbers in a variety of contexts and explore movement on an 'extended' number line.
2.	Order and absolute value	<ul style="list-style-type: none">In this lesson, we will learn to interpret the absolute value of a number and understand how to order negative numbers using inequality notation.
3.	Modelling Addition	<ul style="list-style-type: none">In this lesson, we will be able to model addition of a positive number as a translation on the number line and use this model to develop strategies for addition.
4.	Further Addition	<ul style="list-style-type: none">In this lesson, we will learn how to model addition of a negative number as a translation on the number line and explore what happens when two additive inverses are added together.



5. Subtracting positive numbers

- In this lesson, we will explore the relationship between subtracting positive numbers and adding additive inverses.
-

6. Subtracting negative Numbers

- In this lesson, we will explore subtracting negative numbers as the addition of the additive inverse.
-

7. Multiplication as scaling

- In this lesson, we will explore multiplication involving at least one positive number and learn how it is possible to visualise multiplication as a stretch by a scale factor.
-

8. Negative scale factors

- In this lesson, we will learn about negative scale factors and explore the commutativity of multiplication.
-

9. Further multiplication

- In this lesson, we will investigate how to find the product of two negative numbers.
-

10. Division

- In this lesson, we will explore a model for division involving counting backwards and analysing a number line.
-

11. Further division

- In this lesson, we will derive further division facts using 'fact families'.



12. Axioms and negative numbers

- In this lesson, we will practise negative number calculations, linking them to axioms like commutativity and associativity.
-



Lesson number	Lesson question	Pupils will learn
1.	Algebraic expressions	<ul style="list-style-type: none">• In this lesson, we will be introduced to algebraic notation and learn how to evaluate and substitute into expressions.
2.	Collecting like terms	<ul style="list-style-type: none">• In this lesson, we will learn to collect together terms that are alike and manipulate linear expressions.
3.	Distributivity and expanding	<ul style="list-style-type: none">• In this lesson, we will use the distributive property to expand brackets with linear expressions.
4.	Factorising expressions	<ul style="list-style-type: none">• In this lesson, we will learn how to factorise basic linear expressions using area models.
5.	Forming and exploring equations	<ul style="list-style-type: none">• In this lesson, we will learn the concept of an equation and use models to form equations.



- | | | |
|------------|-------------------------------|--|
| 6. | Exploring equality | <ul style="list-style-type: none">• In this lesson, we will form equations and explore how to ensure equality is preserved. |
| 7. | Inequalities | <ul style="list-style-type: none">• In this lesson, we will use bar modelling to identify and form inequalities. |
| 8. | Further inequalities | <ul style="list-style-type: none">• In this lesson, we will learn how to form inequalities related to a known equation. |
| 9. | Perimeter expressions | <ul style="list-style-type: none">• In this lesson, we will learn how to form expressions using algebraic lengths and draw shapes given expressions for the perimeter. |
| 10. | Perimeter inequalities | <ul style="list-style-type: none">• In this lesson, we will learn how to establish inequalities from perimeter expressions. |
| 11. | Counting strategies | <ul style="list-style-type: none">• In this lesson, we will generalise counting strategies algebraically for repeating patterns. |
| 12. | Growing tree patterns | <ul style="list-style-type: none">• In this lesson, we will learn how to generalise counting strategies algebraically for different repeating patterns. |



Lesson number	Lesson question	Pupils will learn
1.	Describing and comparing angles	<ul style="list-style-type: none">In this lesson, we will learn how to compare angles by classifying and estimating them.
2.	Measuring and drawing angles	<ul style="list-style-type: none">In this lesson, we will learn how to use a protractor to measure and be able to draw angles.
3.	Partitioning angles	<ul style="list-style-type: none">In this lesson, we will learn how to find missing angles that partition a known angle.
4.	Finding unknown angles	<ul style="list-style-type: none">In this lesson, we will learn how to use the term 'vertically opposite' and solve more angle problems.
5.	Exploring intersections	<ul style="list-style-type: none">In this lesson, we will learn how to understand the properties of parallel lines.

6. Transversal angles

- In this lesson, we will learn how to explore intersections formed with two lines and a transversal, and understand how to identify vertically opposite angles.



7. Alternate angles

- In this lesson, we will learn how to identify alternate angles, and the equality of alternate angles for parallel lines.

8. Corresponding and allied angles

- In this lesson, we will learn how to identify corresponding and allied angles.
-



Lesson number	Lesson question	Pupils will learn
1.	Rotational Symmetry	<ul style="list-style-type: none">In this lesson, we will learn what rotational symmetry is and also the way to work out the order of rotational symmetry for a given shape.
2.	Lines of symmetry	<ul style="list-style-type: none">In this lesson, we will learn about lines of symmetry and the way to determine how many lines of symmetry a shape has.
3.	Classifying triangles	<ul style="list-style-type: none">In this lesson, we learn how to describe the properties of scalene, isosceles and equilateral triangles. We will also learn how to identify and classify triangles inscribed in circles.
4.	Angles in a triangle	<ul style="list-style-type: none">In this lesson, we will understand that the interior angles in a triangle sum to 180°. We will also solve problems involving unknown angles in triangles.



5. Comparing quadrilaterals

- In this lesson, we will recap our knowledge on quadrilaterals and compare quadrilaterals by comparing symmetry, side length, parallel sides and angles.
-

6. Diagonals in quadrilaterals

- In this lesson, we will compare the properties of diagonals in quadrilaterals.
-

7. Internal angles in a quadrilateral

- In this lesson, we will be able to use triangles to deduce the sum of the interior angles in a quadrilateral. We will also be able to find unknown angles in quadrilaterals.
-

8. Tessellating quadrilaterals

- In this lesson, we will use the properties of triangles and quadrilaterals to create and describe tessellation patterns.
-



Lesson number	Lesson question	Pupils will learn
1.	Exploring circles	<ul style="list-style-type: none">In this lesson, we will learn to name the basic features of circles and reasoning using their reasoning using their properties. We will also draw circles using pair of compasses.
2.	Constructing triangles	<ul style="list-style-type: none">In this lesson, we will learn how to construct triangles using a pair of compasses and ruler given the length of the sides. We will need a pair of compasses, pencil and ruler for this lesson.
3.	Impossible triangles	<ul style="list-style-type: none">In this lesson, we will determine when it is impossible to construct a triangle given three lengths.
4.	Drawing Similar Triangles	<ul style="list-style-type: none">In this lesson, we will learn to draw triangles with the same interior angles using a protractor. We will also discuss the properties of similar triangles.
5.	Triangle constructions	<ul style="list-style-type: none">In this lesson, we will learn how to construct triangles given two sides and an angle.

6. **Quadrilaterals in circles**

- In this lesson, we will learn to form quadrilaterals using the properties of circles. We will also learn to use symmetrical properties of special quadrilaterals.



7. **Constructing quadrilaterals**

- In this lesson, we will learn to construct kite and rhombuses and identify symmetry in constructions

8. **Further constructions**

- In this lesson, we will learn to explore diagonals and symmetry in constructions.
-



Lesson number	Lesson question	Pupils will learn
1.	The 2-D coordinate axis	<ul style="list-style-type: none">In this lesson, we will learn how to describe positions on a coordinate grid.
2.	Line segments	<ul style="list-style-type: none">In this lesson, we will learn to identify and compare line segments and use horizontal and vertical lengths of line segments.
3.	Finding midpoints	<ul style="list-style-type: none">In this lesson, we will learn how to find midpoints of line segments.
4.	Solving geometric problems	<ul style="list-style-type: none">In this lesson, we will learn how to solve problems involving midpoints.
5.	Forming shapes from midpoints	<ul style="list-style-type: none">In this lesson, we will be finding and using midpoints to solve various shape problems.



6. Forming shapes from diagonals

- In this lesson, we will be comparing line segment lengths and use this to solve shape problems involving diagonals.
-

7. Equations of lines

- In this lesson, we will learn how to draw horizontal and vertical lines on a coordinate grid.
-

8. Exploring horizontal and vertical lines

- In this lesson, we will solve problems involving horizontal and vertical lines.
-



Lesson number	Lesson question	Pupils will learn
1.	Describing perimeters	<ul style="list-style-type: none">In this lesson, we will use different units of length to describe perimeter; calculate the perimeter of polygons and estimate the perimeter of 'curved' shapes.
2.	Describing areas	<ul style="list-style-type: none">In this lesson, we will use different square units to describe area and use informal counting strategies to calculate area.
3.	Cutting and combining shapes	<ul style="list-style-type: none">In this lesson, we will analyse the effect of cutting, moving and combining shapes on area and perimeter.
4.	Exploring rectangles	<ul style="list-style-type: none">In this lesson, we will explore the perimeter and area of rectangles as the dimensions change.
5.	Rectilinear shapes	<ul style="list-style-type: none">In this lesson, we will learn to calculate the area (and perimeter) of rectilinear shapes by 'combining' rectangles.



6. Area of parallelograms

- In this lesson, we will learn to calculate the area of parallelograms by rearranging rectangles and we will arrive at a formula for the area of a parallelogram.
-

7. Area of triangles

- In this lesson, we will learn to calculate the area of triangles and link the area of triangles to the area of parallelograms.
-

8. Further triangles

- In this lesson, we will solve further problems involving area of triangles.
-



Lesson number	Lesson question	Pupils will learn
1.	Translation	<ul style="list-style-type: none">In this lesson, we will learn how to translate shapes and describe translations using column vectors.
2.	Rotation	<ul style="list-style-type: none">In this lesson, we will learn about rotating shapes about a point and describing rotations. In this lesson it would be helpful if you had some extra scrap paper ready.
3.	Reflection	<ul style="list-style-type: none">In this lesson, we will reflect shapes in lines, describe horizontal and vertical lines with their equations and observe the effect on the reflected images when the 'original' shape is translated.
4.	Mixed Transformations	<ul style="list-style-type: none">In this lesson, we will explore when we can describe transformations in different ways.
5.	Combining Reflections	<ul style="list-style-type: none">In this lesson, we will explore when combining reflections can be written as a single transformation.



6. Combining Translations and Reflections

- In this lesson, we will explore combinations of translations and reflections.
-

7. Enlargements

- In this lesson, we will learn how to draw and describe enlargements, observing the effects on the perimeters.
-

8. Enlargements and Area

- In this lesson, we will describe and draw enlargements, observing the effect on the area.
-

Unit 13 Prime factor decomposition

8 Lessons



Lesson number	Lesson question	Pupils will learn
1.	Indices	<ul style="list-style-type: none">In this lesson, we will introduce indices as a way of representing "lots of lots of".
2.	Prime Building Blocks	<ul style="list-style-type: none">In this lesson, we will "build" numbers by considering their products and factors. We will also rewrite numbers as a product of factors in different ways.
3.	Prime Factorisation	<ul style="list-style-type: none">In this lesson, we will investigate how to write a number as a product of its prime factors. We investigate the concept of prime factorisation
4.	Prime Deductions	<ul style="list-style-type: none">In this lesson, we will use our knowledge of prime factorisation to deduce the factors of numbers.
5.	Highest common factor	<ul style="list-style-type: none">In this lesson, we will revisit factors and learn about highest common factors.



6. Highest common factors and prime factors

- In this lesson, we will use venn diagrams to sort prime factors and to help in identifying highest common factors.
-

7. Lowest common multiple

- In this lesson, we will learn to calculate the lowest common multiple through listing the multiples of a number.
-

8. Lowest common multiple and prime factors

- In this lesson, we will use prime factorisation to identify common multiples and the lowest common multiple. We will also use Venn diagrams to sort prime factors.
-

Unit 14 Conceptualising and comparing fractions

8 Lessons



Lesson number	Lesson question	Pupils will learn
1.	Equal parts of a whole	<ul style="list-style-type: none">In this lesson, we will look at fractions by exploring equal parts of a whole and express fractions greater than one as a mixed number and as a single fraction.
2.	Fractions and units of measure	<ul style="list-style-type: none">In this lesson, we will look at fractions as a unit of measure and explore problems involving quantities.
3.	Fair shares	<ul style="list-style-type: none">In this lesson, we will experience fractions as a division of two integers and explore different ways to divide integers into fractional parts.
4.	Equivalent fractions	<ul style="list-style-type: none">In this lesson, we will use pictorial and multiplicative techniques to find equivalent fractions.
5.	Comparing fractions (Part 1)	<ul style="list-style-type: none">In this lesson, we will use reasoning to compare fractions and write statements about the relative size of each fraction.



6. Comparing fractions (Part 2)

- In this lesson, we will use common denominators to compare fractions and create comparative statements.
-

7. Ordering decimal fractions

- In this lesson, we will convert fractions to decimals and use decimals to compare numbers.
-

8. Mixed Comparisons

- In this lesson, we will combine and compare the different methods we have used to order fractions.
-



Lesson number	Lesson question	Pupils will learn
1.	Multiplying unit fractions with integers	<ul style="list-style-type: none">In this lesson, we will look at what happens when we multiply a unit fraction by an integer.
2.	Multiplying non-unit fractions with integers	<ul style="list-style-type: none">In this lesson, we will look at what happens when we multiply a non-unit fraction by an integer.
3.	Using area models to multiply fractions	<ul style="list-style-type: none">In this lesson, we will look at how we can use area models to multiply fractions together.
4.	Applying decimals and percentages to area multiplication	<ul style="list-style-type: none">In this lesson, we will look at how we can use area models to multiply decimals.
5.	Dividing a fraction by an integer	<ul style="list-style-type: none">In this lesson, we will look at interpreting bar modelling methods to divide a fraction by an integer.
6.	Modelling fractions by division (Part 1)	<ul style="list-style-type: none">In this lesson, we will look at how we can create a bar model to help us to divide fractions.



7. Modelling fractions by division (Part 2)

- In this lesson, we will develop our models for dividing fractions to look for patterns and solve more difficult problems.
-

8. Dividing Fractions in Mixed Contexts

- In this lesson, we will look at different contexts for dividing fractions including worded problems.
-

9. Adding and Subtracting Fractions (Part 1)

- In this lesson, we will introduce the concept of adding and subtracting fractions.
-

10. Adding and Subtracting Fractions (Part 2)

- In this lesson, we will start to develop our understanding of adding and subtracting fractions using a fraction wall to help us.
-

11. Adding and Subtracting Fractions (Part 3)

- In this lesson, we will look at adding and subtracting fractions with different denominators and investigate the concept using a fraction wall.
-

12. Fractions and Distributivity

- In this lesson, we will look at how we can use the laws of distribution to solve problems with fractions.
-



Lesson number	Lesson question	Pupils will learn
1.	Groups	<ul style="list-style-type: none">• In this lesson, we will learn to use ratio notation to describe the composition of different groups.
2.	In the same ratio	<ul style="list-style-type: none">• In this lesson, we will learn to scale up from one group to 'many' groups and use multiplicative relationships to calculate unknown values in the 'many' groups.
3.	Equivalent ratios	<ul style="list-style-type: none">• In this lesson, we will learn how to represent ratios pictorially and use these representations to justify the equivalence of ratios.
4.	The rule of four	<ul style="list-style-type: none">• In this lesson, we will identify multiplicative relationships between 'times tables' and use patterns to solve problems in direct proportion contexts.
5.	Ratio and proportion in geometry I	<ul style="list-style-type: none">• In this lesson, we will compare the side lengths of triangles, one of which is an enlargement of the other, and calculate the ratios of the lengths of corresponding sides.



6. Ratio and proportion in geometry II

- In this lesson, we will divide oblique line segments into specified ratios by dividing the segment's horizontal and vertical displacements in the same ratio.
-

7. Dividing into a ratio I

- In this lesson, we will divide a quantity into a ratio of the form $a : b$ and compare the relative sizes of the parts to each other and to the whole.
-

8. Dividing into a ratio II

- In this lesson, we will divide a quantity into a ratio of the form $a : b : c$ and compare the relative sizes of the parts to each other and to the whole.
-



Lesson number	Lesson question	Pupils will learn
1.	Percentages on a number line	<ul style="list-style-type: none">In this lesson, we will learn where percentages are placed on a number line compared with fractions and decimals.
2.	Converting to decimals	<ul style="list-style-type: none">In this lesson, we will learn how to convert between decimals and percentages.
3.	Converting from fractions to percentages	<ul style="list-style-type: none">In this lesson, we will learn how to convert between fractions and percentages.
4.	Percentages of amount	<ul style="list-style-type: none">In this lesson, we will learn how to find the percentage of an amount using a bar model.
5.	Percentages of amount (Part 2)	<ul style="list-style-type: none">In this lesson, we will learn how to find the percentage of an amount by first finding 10% or 1%, and then scaling to find other percentages.

6. **Decimal Multipliers**

- In this lesson, we will learn how to find the percentage of an amount by finding the decimal multiplier.

7. **Increase by a percentage**

- In this lesson, we will learn how to increase an amount by a percentage, by using a decimal multiplier.

8. **Decrease by a percentage**

- In this lesson, we will learn how to decrease an amount by a percentage, by using a decimal multiplier.
-



Unit 18 Different number systems

4 Lessons



Lesson number	Lesson question	Pupils will learn
1.	Number systems: Writing numbers in different bases	<ul style="list-style-type: none">• In this lesson, we will be looking at writing numbers in different bases and how to convert them.
2.	Number systems: Rounding in different bases	<ul style="list-style-type: none">• In this lesson, we will be looking at rounding in different bases.
3.	Number systems: Operations in different bases	<ul style="list-style-type: none">• In this lesson, we will be looking at adding and subtracting numbers in different bases.
4.	Number systems: Binary - the language of computers	<ul style="list-style-type: none">• In this lesson, we will be exploring the binary code and its use in computing.



Lesson number	Lesson question	Pupils will learn
1.	Number grid sequences	<ul style="list-style-type: none">In this lesson, we will learn about finding sequences in number grids using multiples.
2.	Tracking Calculations	<ul style="list-style-type: none">In this lesson, we will learn about how to use tracking calculations to find numbers in number grid sequences.
3.	Generalising arithmetic sequences through tracking calculations	<ul style="list-style-type: none">In this lesson, we will learn to use tracking calculations to generalise arithmetic sequences.
4.	The n th term rule: Position-to-term for arithmetic sequences	<ul style="list-style-type: none">In this lesson, we will learn to find and understand the nth term rule for arithmetic sequences.
5.	Descending arithmetic sequences	<ul style="list-style-type: none">In this lesson, we will learn to find the nth term rule for descending arithmetic sequences using tables.



6. Dot chain sequences

- In this lesson, we will learn how to group dot chains and generalise to find n-chains. We formulate calculations that represent dot chains.
-

7. Growing pattern sequences

- In this lesson, we will learn how to find terms in growing pattern sequences using squares and dots.
-

8. Finding the term-to-term rule

- In this lesson we will learn how to find the term-to-term rule for a sequence.
-



Lesson number	Lesson question	Pupils will learn
1.	Expressions and variables	<ul style="list-style-type: none">• In this lesson, we will look at the different values that expressions can take, and how changing a variable can change the value of the expressions.
2.	Equations and identities	<ul style="list-style-type: none">• In this lesson, we will look at the difference between an equation and an identity.
3.	Forming and solving linear equations 1	<ul style="list-style-type: none">• In this lesson, we will look at how we can form linear equations, and solve them.
4.	Forming and solving linear equations (Part 2)	<ul style="list-style-type: none">• In this lesson, we will look at using different methods for forming and solving linear equations.
5.	Equating linear expressions	<ul style="list-style-type: none">• In this lesson, we will form equations for perimeters and equate them.

6. Solving further linear equations

- In this lesson, we will look at more difficult linear equations and solve them using algebraic methods.

7. Solving geometric problems using linear equations

- In this lesson, we will use our knowledge of geometry and angle facts to form and solve linear equations.

8. Forming and solving equations from descriptions

- In this lesson, we will form linear equations from worded descriptions, and then solve them.
-





Lesson number	Lesson question	Pupils will learn
1.	Representing inequalities	<ul style="list-style-type: none">In this lesson, we will discuss what different inequalities mean, and we will see an example of where we might see inequalities used in context.
2.	Inequalities and substitution (Part 1)	<ul style="list-style-type: none">In this lesson, we will substitute different values into an algebraic inequality to see if it is true or false.
3.	Inequalities and substitution (Part 2)	<ul style="list-style-type: none">In this lesson, we will continue our work on substituting into inequalities, this time considering negative numbers in more detail.
4.	Solving inequalities	<ul style="list-style-type: none">In this lesson, we will use the balancing method to solve inequalities. We balance the inequality by completing inverse operations to simplify the expressions.
5.	Forming and solving inequalities (Part 1)	<ul style="list-style-type: none">In this lesson, we will set up and solve inequalities in the context of area and perimeter of rectangles.



6. Forming and solving inequalities (Part 2)

- In this lesson, we will set up and solve inequalities in the context of word problems.
-

7. Manipulating inequalities

- In this lesson, we will investigate the relationship between different inequalities using bar models and "always, sometimes, never" statements.
-

8. Manipulating equations and inequalities

- In this lesson, we will continue to investigate the relationships between inequalities and equations. We determine truth statements based upon a given inequality.
-



Lesson number	Lesson question	Pupils will learn
1.	Coordinates recap	<ul style="list-style-type: none">In this lesson, we will be looking at plotting coordinates onto a Cartesian plane and exploring the distance between different coordinates.
2.	Horizontal and vertical lines	<ul style="list-style-type: none">In this lesson, we will be looking at the equations of horizontal and vertical lines.
3.	Inequalities	<ul style="list-style-type: none">In this lesson, we will be looking at representing inequalities on a Cartesian plane.
4.	Inequalities (Part 2)	<ul style="list-style-type: none">In this lesson, we will be looking at representing inequalities on a Cartesian plane and on a number line.
5.	Naming straight line graphs	<ul style="list-style-type: none">In this lesson, we will be looking at plotting coordinates onto a grid and simple notation for labelling straight line graphs.



6. Linear and non-linear graphs

- In this lesson, we will be looking at the relationship between x-ordinates and y-ordinates for linear and non-linear graphs.
-

7. Gradient 1

- In this lesson, we will be looking at determining the gradient of linear graphs.
-

8. Gradient (Part 2)

- In this lesson, we will be looking at how the gradient of a line is determined using the equation of the line.
-

9. Comparing gradients

- In this lesson, we will be exploring the relationship between the gradients of perpendicular and parallel lines.
-

10. $y = mx + c$

- In this lesson, we will explore the general form of the equation of a line.
-

11. Equations of lines

- In this lesson, we will explore finding equations of lines and writing them in the form $y = mx + c$.
-

12.

Equivalent lines

- In this lesson, we will investigate the equations of equivalent lines, using some algebraic manipulation to check equality.
-





Lesson number	Lesson question	Pupils will learn
1.	Rounding numbers using a number line	<ul style="list-style-type: none">In this lesson, we will learn how to use a number line to decide when to round up or down.
2.	Rounding from a calculator: Approximating	<ul style="list-style-type: none">In this lesson, we will learn about approximation and how to use that to approximate answers to calculations.
3.	Rounding to significant figures (Part 1)	<ul style="list-style-type: none">In this lesson, we will be introduced to significant figures and understand the concept of degrees of accuracy. We will also learn how to round whole numbers to a given significant figure.
4.	Rounding to significant figures (Part 2)	<ul style="list-style-type: none">In this lesson, we will learn how to round decimal numbers to a given significant figure.
5.	Rounding and Range	<ul style="list-style-type: none">In this lesson, we will learn about range when it comes to rounding numbers. We will investigate what range a number could be in based upon how it was rounded.

6. Upper and Lower Bound

- In this lesson, we will learn what upper and lower bound mean and how this links with range.

7. Solving Problems with Rounding

- In this lesson, we will learn how to solve problems working with lower and upper bounds to find maximum and minimum values.

8. Estimation

- In this lesson, we will learn how to estimate and solve problems using estimation.
-





Lesson number	Lesson question	Pupils will learn
1.	One Thousand and Eighty Nine	<ul style="list-style-type: none">In this lesson, we will investigate some number problems, especially focusing on the number 9, and the rules of divisibility by 9.
2.	Pick a number	<ul style="list-style-type: none">In this lesson, we will look at how different operations can affect the properties of a number. We will calculate a number of different operations using written worded instructions.
3.	Odd or even?	<ul style="list-style-type: none">In this lesson, we will investigate the algebraic representations of odd and even numbers.
4.	Algebraic Proof	<ul style="list-style-type: none">In this lesson, we will look at how we can use algebra to prove what happens to calculations with odd and even numbers.



Lesson number	Lesson question	Pupils will learn
1.	Representing ratio	<ul style="list-style-type: none">In this lesson, we will learn about different representations of ratio, including the relationship between fractions and ratio.
2.	Enlargement	<ul style="list-style-type: none">In this lesson, we will learn how ratio relates to enlargements of shapes.
3.	Double number lines	<ul style="list-style-type: none">In this lesson, we will understand how to use double number lines to represent proportion problems.
4.	The rule of four	<ul style="list-style-type: none">In this lesson, we will learn how to calculate proportion problems using a table.



Lesson number	Lesson question	Pupils will learn
1.	Understanding rate	<ul style="list-style-type: none">In this lesson, we will learn about the term 'rate' and apply it to problems that provide a given rate and need scaling.
2.	Conversion rates	<ul style="list-style-type: none">In this lesson, we will learn about conversion rates that are in the same ratio, and those that change. We will model problems and solutions involving conversion rates.
3.	Exchange rates with graphs	<ul style="list-style-type: none">In this lesson, we will learn how to use and interpret conversion graphs to represent rates.
4.	Density as rate	<ul style="list-style-type: none">In this lesson, we will learn how to describe a rate of two specific variables as density.
5.	Speed as rate (distance-time graphs)	<ul style="list-style-type: none">In this lesson, we will learn that we can describe a rate of two specific variables as speed. We will also look at distance-time graphs.



6. Calculating speed, distance and time

- In this lesson, we will learn to calculate and interpret speed, distance and time.
-

7. Displacement-time graphs (Part 1)

- In this lesson, we will learn the difference between distance-time and displacement-time graphs.
-

8. Displacement-time graphs (Part 2)

- In this lesson, we will think further about displacement-time graphs and when the relationship may or may not be linear.
-

Unit 27 Direct and indirect proportion

12 Lessons



Lesson number	Lesson question	Pupils will learn
1.	Looking at proportional relationships	<ul style="list-style-type: none">In this lesson, we will look at proportional relationships, in particular the unitary method whereby we calculate proportion as a ratio of 1:n.
2.	Looking at proportional relationships	<ul style="list-style-type: none">In this lesson, we will look at proportional relationships in familiar real world worded problem contexts.
3.	Direct proportion (Part 1)	<ul style="list-style-type: none">In this lesson, we will explore real life scenarios involving direct proportion and model solutions.
4.	Direct proportion (Part 2)	<ul style="list-style-type: none">In this lesson, we will learn how to recognise when two quantities are directly proportional to each other.
5.	Direct proportion (Part 3)	<ul style="list-style-type: none">In this lesson, we will solve worded problems involving direct proportion and model solutions using tables.



-
- | | | |
|-----------|---|---|
| 6. | Graphs of proportional relationships | <ul style="list-style-type: none">• In this lesson, we will recognise and interpret the graphical representation of a proportional relationships. |
|-----------|---|---|
-
- | | | |
|-----------|--|--|
| 7. | The constant of proportionality | <ul style="list-style-type: none">• In this lesson, we will learn about the the term 'constant of proportionality' and how it relates to how proportion works. |
|-----------|--|--|
-
- | | | |
|-----------|------------------------------|--|
| 8. | Proportion in context | <ul style="list-style-type: none">• In this lesson, we will investigate word proportion problems involving exchange rates, and cost scaling. We will then model their solutions. |
|-----------|------------------------------|--|
-
- | | | |
|-----------|---------------------------|---|
| 9. | Inverse proportion | <ul style="list-style-type: none">• In this lesson, we will explore when two quantities are inversely proportional to each other. We will learn about the term inverse proportion and how to identify an inversely proportional relationship. |
|-----------|---------------------------|---|
-
- | | | |
|------------|--------------------------------------|--|
| 10. | Inverse proportion in context | <ul style="list-style-type: none">• In this lesson, we will interpret, solve and model solutions to inverse proportion problems. |
|------------|--------------------------------------|--|
-
- | | | |
|------------|--|--|
| 11. | Graphs of inverse proportion problems | <ul style="list-style-type: none">• In this lesson, we will learn to recognise and distinguish the graphical representation of inverse proportion. |
|------------|--|--|
-

12.

Direct or inverse proportion?

- In this lesson, we will solve a variety of direct and inverse proportion problems. We will learn how to identify when a problem is about direct or inverse proportion.
-





Lesson number	Lesson question	Pupils will learn
1.	The data handling cycle	<ul style="list-style-type: none">• In this lesson, we will learn about the data handling cycle, and will classify data into different categories.
2.	Forming and testing a hypothesis	<ul style="list-style-type: none">• In this lesson, we will learn how to write a suitable hypothesis, and the difference between primary and secondary data sources.
3.	Sampling	<ul style="list-style-type: none">• In this lesson, we will discuss the difference between a sample and a census, and how to avoid bias in sampling.
4.	Survey questions	<ul style="list-style-type: none">• In this lesson, we will discuss how to ask appropriate survey questions, and how to give appropriate answer options to those questions.
5.	Finding the mean	<ul style="list-style-type: none">• In this lesson, we will learn how to find the mean from a set of data.



6. Problem solving with the Mean

- In this lesson, we will solve different types of problems requiring us to calculate the mean, and problems where we need to determine numbers that have a provided mean value.
-

7. Median, Mode and Range

- In this lesson, we will learn how to find the mode, median and range from a set of data.
-

8. Comparing data

- In this lesson, we will interpret differences between the mean, median, mode and range.
-

9. Interpreting frequency tables

- In this lesson, we will learn how to sort data into a frequency table.
-

10. Mean from frequency tables

- In this lesson, we will learn how to find the mean from a frequency table.
-

11. Median from frequency tables

- In this lesson, we will learn how to find the median from a frequency table.
-

12. Interpreting bar charts

- In this lesson, we will interpret bar charts, including finding the mean from a bar chart.
-



Lesson number	Lesson question	Pupils will learn
1.	Univariate and bivariate data	<ul style="list-style-type: none">In this lesson, we will look at the difference between univariate and bivariate data.
2.	Representing bivariate data	<ul style="list-style-type: none">In this lesson, we will explore examples of scatter graphs to represent bivariate data.
3.	Correlation	<ul style="list-style-type: none">In this lesson, we will investigate different kinds of correlation and interpret them from scatter graphs.
4.	Lines of best fit	<ul style="list-style-type: none">In this lesson, we will learn how to draw lines of best fit on scatter graphs, and we will investigate the purpose of lines of best fit.
5.	Correlation and Causation	<ul style="list-style-type: none">In this lesson, we will investigate the relationship between causation and correlation.

6. Truncating axes

- In this lesson, we will discuss the benefits and potential problems of truncating axes.

7. Data in tables

- In this lesson, we will discuss whether data in tables fit our hypotheses or not.

8. Choosing the right graph

- In this lesson, we will discuss which graph is the appropriate to display for a hypothesis.
-



Unit 30 Famous maths problems

4 Lessons



Lesson number	Lesson question	Pupils will learn
1.	Goldbach's conjecture	<ul style="list-style-type: none">• In this lesson, we will learn about a famous unsolved maths problem called Goldbach's conjecture.
2.	The Collatz conjecture	<ul style="list-style-type: none">• In this lesson, we will learn about a famous unsolved maths problem called The Collatz conjecture.
3.	Gabriel's problem	<ul style="list-style-type: none">• In this lesson, you will learn about a famous maths problem called Gabriel's problem.
4.	The Happy Caterpillar Problem	<ul style="list-style-type: none">• In this lesson, you will complete Happy Caterpillars - a visual game of repeated operations.



Lesson number	Lesson question	Pupils will learn
1.	Angles on parallel lines review: Revisiting intersections	<ul style="list-style-type: none">• In this lesson, we will be reviewing intersection points and the ways in which changing to transversal angles will change the position of the intersection point.
2.	Angles on parallel lines review: Revisiting transversal angles	<ul style="list-style-type: none">• In this lesson, we will be looking at transversal angles and what they have to be so that the lines do not intersect.
3.	Angles on parallel lines review: Revisiting alternate and corresponding angles	<ul style="list-style-type: none">• In this lesson, we will be looking at identifying alternate and corresponding angles on parallel lines.
4.	Angles on parallel lines review: Finding missing angles	<ul style="list-style-type: none">• In this lesson, we will be calculating missing angles using transversals and parallel lines.



Lesson number	Lesson question	Pupils will learn
1.	Interior angles in a triangle	<ul style="list-style-type: none">In this lesson, we will learn about the interior angles in a triangle, and how to find unknown angles in various types of triangles.
2.	Categorising and defining polygons	<ul style="list-style-type: none">In this lesson, we will learn about the key terminology involved in describing polygons, and begin to categorise polygons, based on certain properties.
3.	Building shapes from triangles (Part 1)	<ul style="list-style-type: none">In this lesson, we will learn how to arrange triangles to form polygons as part of an investigation into the internal angles of polygons. This represents part 1 of a two-part lesson.
4.	Building shapes from triangles (Part 2)	<ul style="list-style-type: none">In this lesson, we will learn how to arrange triangles to form polygons as part of an investigation into the internal angles of polygons. This represents part 2 of a two-part lesson.



5. Polygons and triangles

- In this lesson, we will learn that the sum of the interior angles of a polygon can be found using triangles.
-

6. Generalising angles in polygons (Part 1)

- In this lesson, we will learn how to generalise the sum of the interior angles in an n-sided polygon.
-

7. Generalising angles in polygons (Part 2)

- In this lesson, we will learn how to apply the generalisation of the total interior angles in an n-sided polygon.
-

8. Finding missing angles in polygons

- In this lesson, we will learn how to find an unknown angle in a polygon.
-

9. Exterior angles

- In this lesson, we will learn about exterior angles, and how they sum to 360 degrees.
-

10. Regular interior and exterior angles (and mean of irregular)

- In this lesson, we will learn how to calculate the mean interior and exterior angles of n-sided polygons, and solve problems based on these formulae.
-

11. Generalising and comparing generalisations

- In this lesson, we will combine everything learnt so far about angles in polygons to compare how specific examples relate to generalised cases.



12. Angle notation and problem solving

- In this lesson, we will learn about how to problem solve with angles in polygons, along with learning notations for referring to angles.
-



Lesson number	Lesson question	Pupils will learn
1.	Bearings and compass points	<ul style="list-style-type: none">In this lesson, we will learn about the bearings on compass points and the standard notation used to write bearings.
2.	Bearings on the Cartesian plane	<ul style="list-style-type: none">In this lesson, we will further develop our skills on bearings, in particular, focusing on the importance of starting location.
3.	Bearings on Polar Grids	<ul style="list-style-type: none">In this lesson, we will look at bearings at angles other than multiples of 45. Using polar coordinates, angles presented are multiples of 15.
4.	Bearings on isometric grids	<ul style="list-style-type: none">In this lesson, we will look at bearings on isometric paper and explore using bearings and distances to make directions.
5.	Bearings with angle facts	<ul style="list-style-type: none">In this lesson, we will use basic angle facts to solve problems with bearings.



6. Bearings within parallel lines

- In this lesson, we will use angles in parallel lines to solve problems with bearings.
-

7. Bearings: Rotating scalene triangles

- In this lesson, we will apply lots of different angle facts to tackle bearings problems in scalene triangles.
-

8. Bearings within regular polygons

- In this lesson, we will apply knowledge of angles in regular polygons to solve problems with bearings.
-



Lesson number	Lesson question	Pupils will learn
1.	3-D Shapes	<ul style="list-style-type: none">In this lesson, we will learn about the properties of 3D shapes using their names and identifying the number of vertices, faces and edges.
2.	Prisms and cylinders	<ul style="list-style-type: none">In this lesson, we will be able to identify prisms and cylinders using their properties and associated vocabulary.
3.	Nets of cubes	<ul style="list-style-type: none">In this lesson, we will practise visualising the nets of cubes as 3D shapes.
4.	Nets of prisms	<ul style="list-style-type: none">In this lesson, we will learn about nets of prisms, how to identify them and how they relate to the properties of 3D shapes.
5.	Counting cubes (Part 1)	<ul style="list-style-type: none">In this lesson, we will explore different strategies to count the number of cubes a solid shape is made from.



6. Counting cubes (Part 2)

- In this lesson, we will learn what volume is, and you will use informal counting strategies to find the volume of different solid shapes.
-

7. Cuboids

- In this lesson, we will learn how to calculate the volume of a cuboid.
-

8. Volume of prisms and cylinders

- In this lesson, we will learn how to calculate the volume of prisms and cylinders.
-

9. Surface area introduction

- In this lesson, we will be introduced to the concept of surface area, and how to calculate it.
-

10. Surface area conjectures

- In this lesson, we will explore patterns related to surface area and form conjectures based on your findings.
-

11. Surface area of cuboids

- In this lesson, we will learn how to calculate the surface area of cuboids.
-

12. Surface area of cylinders

- In this lesson, we will learn how to calculate the surface area of cylinders.
-



Lesson number	Lesson question	Pupils will learn
1.	Revisiting area: Rectangles and triangles	<ul style="list-style-type: none">In this lesson, we will be comparing the areas of rectangles and triangles. We will then draw triangles with identical areas to given rectangles.
2.	Revisiting area: Compound shapes	<ul style="list-style-type: none">In this lesson, we will be working out the area of compound shapes that can be deconstructed into triangles and quadrilaterals.
3.	Revisiting area: Circles	<ul style="list-style-type: none">In this lesson, we will be working out the area of circles when provided with a given radius.
4.	Revisiting area: Working out side lengths when given area	<ul style="list-style-type: none">In this lesson, we will be looking at working out side lengths of various quadrilaterals and triangles when only given the area and 1 other measure of a shape.



Lesson number	Lesson question	Pupils will learn
1.	Parts of a circle	<ul style="list-style-type: none">In this lesson, we will learn about the different parts of a circle and the relationship between the diameter and the radius.
2.	Circumference of a circle	<ul style="list-style-type: none">In this lesson, we will learn about the relationship between the circumference and the diameter.
3.	Fractions of a circle	<ul style="list-style-type: none">In this lesson, we will learn how to calculate the arc length for fractions of circles.
4.	Compound Perimeter	<ul style="list-style-type: none">In this lesson, we will calculate the perimeter of shapes involving fractions of circles.
5.	Area of a circle	<ul style="list-style-type: none">In this lesson, we will learn to calculate the area of a circle using a radius or diameter. We will also learn how to work backwards from the area of a circle to determine the radius and diameter.

6. Finding a formula

- In this lesson, we will look at different formulas for area of a circle and combine your knowledge with the work on circumference.



7. Area of sectors

- In this lesson, we will learn how to find the areas of sectors using a radius or diameter.

8. Compound area problems

- In this lesson, we will learn how to calculate the area of compound shapes involving circles.
-



Lesson number	Lesson question	Pupils will learn
1.	Representing fractions, decimals, and percentages	<ul style="list-style-type: none">• In this lesson, we will recap converting fractions, decimals, and percentages, and use the conversions to make comparisons.
2.	Representing recurring decimals	<ul style="list-style-type: none">• In this lesson, we will convert fractions into recurring decimals and percentages, and look at how we can use the links between them to solve problems quickly.
3.	Reviewing addition and subtraction	<ul style="list-style-type: none">• In this lesson, we will review how to add and subtract fractions, including different denominators and mixed number fractions.
4.	Reviewing multiplication and division	<ul style="list-style-type: none">• In this lesson, we will review how to multiply and divide fractions using geometrical examples.



Lesson number	Lesson question	Pupils will learn
1.	Representing probability	<ul style="list-style-type: none">• In this lesson, we will look at how we can represent probabilities as words and numbers.
2.	Complementary events	<ul style="list-style-type: none">• In this lesson, we will look at how we can calculate probabilities for complementary events.
3.	Calculating probabilities	<ul style="list-style-type: none">• In this lesson, we will look at calculating probabilities and putting events in order of likelihood. We will then calculate probabilities using spinners and number cards.
4.	Theoretical probability and relative frequency	<ul style="list-style-type: none">• In this lesson, we will look at calculating theoretical probabilities and relative frequencies using spinners and dice as our examples.
5.	Theoretical probability and relative frequency (Part 2)	<ul style="list-style-type: none">• In this lesson, we will look in more detail at calculating theoretical probabilities and relative frequencies using spinners and worded problems.



6.	Comparing probabilities	<ul style="list-style-type: none">• In this lesson, we will compare the probabilities of different events to see which is most likely.
7.	Combined events and sample spaces (Part 1)	<ul style="list-style-type: none">• In this lesson, we will represent the probabilities of combined events in a sample space.
8.	Combined events and sample spaces (Part 2)	<ul style="list-style-type: none">• In this lesson, we will look in more detail at how we can represent combined events and sample spaces.
9.	Frequency trees	<ul style="list-style-type: none">• In this lesson, we will look at how we can represent combined events as frequency trees.
10.	Calculating the probability of combined events	<ul style="list-style-type: none">• In this lesson, we will look at how we can use area maps to calculate probabilities of combined events.
11.	Combined Events and Tree Diagrams (Part 1)	<ul style="list-style-type: none">• In this lesson, we will look at how we can represent combined events in a tree diagram.
12.	Combined events and tree diagrams (Part 2)	<ul style="list-style-type: none">• In this lesson, we will look at examples of when a tree diagram is more useful for combined events than a sample space diagram.



Lesson number	Lesson question	Pupils will learn
1.	Venn diagrams	<ul style="list-style-type: none">In this lesson, we will look at Venn diagrams, how to fill them in and draw your own.
2.	Set notation 1	<ul style="list-style-type: none">In this lesson, we will learn how to interpret a Venn diagram further and know what union, intersection and complement mean.
3.	Overlapping circles (Part 1)	<ul style="list-style-type: none">In this lesson, we will learn about subsets in Venn diagrams. We will then learn new terminology for Venn diagrams and interpret them using set notation.
4.	Overlapping circles (Part 2)	<ul style="list-style-type: none">In this lesson, we will learn how to classify numbers in a set and those that are not. We will place numbers from sets into a Venn diagram.



5. Venn Diagram and probability

- In this lesson, we will look at finding the probability of events happening from Venn diagrams. We will also briefly look at probability trees and how we can fill in a Venn diagram from the information on a probability tree.
-

6. Drawing Venn Diagrams

- In this lesson, we will learn how to draw and populate Venn diagrams with the information you have been provided.
-

7. Using Venn diagrams for conditional probability

- In this lesson, we will learn how to use Venn diagrams to work out conditional probability.
-

8. Mixed questions with Venn Diagrams

- In this lesson, we will recap everything we have learnt in this unit on Venn diagrams.
-



Lesson number	Lesson question	Pupils will learn
1.	Reviewing solving equations	<ul style="list-style-type: none">In this lesson, we will review how to solve equations. We will then convert worded operations into algebraic terms to make them easier to solve.
2.	Equivalent equations	<ul style="list-style-type: none">In this lesson, we will explore equations and develop our ability to be able to identify equivalent equations in a list.
3.	Linear relationships	<ul style="list-style-type: none">In this lesson, we will learn how to use relationships between linear sequences to find new sequences.
4.	Combining algebraic relationships	<ul style="list-style-type: none">In this lesson, we will learn to use equivalence to combine algebraic relationships.
5.	Exploring expressions with two variables	<ul style="list-style-type: none">In this lesson, we will explore expressions with two variables and how to interpret them. We will also look at examples involving spending money on combinations of pens and pencils.



6. Exploring systems of equations

- In this lesson, we will explore systems of equations. We will also use arithmagons to derive a system of equations that can be solved.
-

7. Solving simultaneous equations

- In this lesson, we will solve a word simultaneous equation. We will then interpret the problem and create two equations from it and model a solution.
-

8. Writing simultaneous equations algebraically

- In this lesson, we will learn to write word simultaneous equations algebraically. We will then interpret worded problems and write two algebraic equations based on the information provided, then solve them.
-

9. Checking the solution of simultaneous equations

- In this lesson, we will learn to check the solutions to simultaneous equations by a method of substitution.
-

10. Solving a simultaneous equation algebraically

- In this lesson, we will learn to solve simultaneous equations algebraically. We will interpret pictorial representations of equations and write them as simultaneous algebraic equations.
-



11. Eliminating a variable

- In this lesson, we will determine how to eliminate a variable by adding or subtracting one equation to or from the other.
-

12. Manipulating systems of equations

- In this lesson, we will manipulate systems of equations in order to eliminate an unknown. We will look at cases where one equation can be altered to enable elimination by addition or subtraction.
-

13. Solving word problems

- In this lesson, we will use the techniques learned in this unit using simultaneous equations to investigate and model solutions to word problems.
-

14. Using substitution to solve simultaneous equations

- In this lesson, we will introduce solving simultaneous equations using the method of substitution.
-

15. Substitution or Elimination

- In this lesson, we will compare the different ways to solve simultaneous equations. We will determine when and where to use different strategies, and develop a sense of the advantages and disadvantages of each method.
-

16.

Simultaneous equations by trial and error

- In this lesson, we will learn how to solve simultaneous equations by a method of trial and error.
-





Lesson number	Lesson question	Pupils will learn
1.	Review of linear graphs	<ul style="list-style-type: none">In this lesson, we will revisit equations for linear graphs and coordinates and investigate the relationship between solving simultaneous equations, and their appearance when plotted.
2.	Points of intersection	<ul style="list-style-type: none">In this lesson, we will learn to identify points of intersection from linear equations as a precursor to solving simultaneous equations graphically.
3.	Representing simultaneous equations graphically (Part 1)	<ul style="list-style-type: none">In this lesson, we will learn how to solve simultaneous equations graphically by plotting them and identifying their point of intersection.
4.	Representing simultaneous equations graphically (Part 2)	<ul style="list-style-type: none">In this lesson, we will learn to recognise simultaneous equations with no solutions by representing the equations on a graph.



5. Comparing algebraic and graphical methods for solving simultaneous equations

- In this lesson, we will learn about the benefits of using graphical or algebraic methods to solve simultaneous equations.

6. Solving inequalities graphically (Part 1)

- In this lesson, we will learn how to represent inequalities on a graph and what coordinates will satisfy these inequalities.

7. Shading regions to satisfy a set of inequalities

- In this lesson, we will learn how to shade regions between plotted lines to satisfy a set of inequalities.

8. Solving inequalities graphically (Part 2)

- In this lesson, we will learn how to solve more complex inequalities graphically, linking multiple straight-line graphs.
-



Lesson number	Lesson question	Pupils will learn
1.	Angles in triangles	<ul style="list-style-type: none">In this lesson, we will review that the internal angles in a triangle sum to 180 degrees.
2.	Angles in polygons	<ul style="list-style-type: none">In this lesson, we will review that the total interior angles of polygons are made up of many triangles, and that this relationship is determined by the number of sides the polygon has.
3.	Straight line angles and angles around a point	<ul style="list-style-type: none">In this lesson, we will review how straight line angles sum to 180 degrees, and how angles around a point sum to 360 degrees.
4.	Angles in parallel lines	<ul style="list-style-type: none">In this lesson, we will review the various angle facts that appear with a transversal and parallel lines.



Lesson number	Lesson question	Pupils will learn
1.	Introducing loci	<ul style="list-style-type: none">In this lesson, we will be exploring drawing loci that are equidistant between two points.
2.	Perpendicular bisectors	<ul style="list-style-type: none">In this lesson, we will be looking at how to draw perpendicular bisectors on a coordinate grid.
3.	Angle bisectors	<ul style="list-style-type: none">In this lesson, we will learn how to draw angle bisectors using a compass and ruler.
4.	Triangle centres	<ul style="list-style-type: none">In this lesson, we will be looking at different ways of finding triangle centres using construction techniques such as angle bisectors and perpendicular line construction.
5.	Plan problems	<ul style="list-style-type: none">In this lesson, we will be practising how to use perpendicular and angle bisectors to find different regions in a diagram.



6. Congruence

- In this lesson, we will learn what is meant by congruent shapes and we investigate how to identify shapes that are and are not congruent.
-

7. Congruence and triangles (Part 1)

- In this lesson, we will start learning the conditions that make triangles congruent.
-

8. Congruence and triangles (Part 2)

- In this lesson, we will develop our skills in being able to identify whether a pair of triangles are, or are not congruent.
-



Lesson number	Lesson question	Pupils will learn
1.	Tilted squares	<ul style="list-style-type: none">In this lesson, we will explore how to find the area of tilted squares using subtraction of triangles.
2.	Surds from tilted squares	<ul style="list-style-type: none">In this lesson, we will explore how to express side lengths of squares in surd form by working backwards from their area.
3.	Finding the length of a line from tilted squares	<ul style="list-style-type: none">In this lesson, we will learn how to find the length of a line by using triangles and tilted squares.
4.	Right-angled triangles and tilted squares	<ul style="list-style-type: none">In this lesson, we will explore how to find side lengths of triangles which lie on tilted squares.
5.	Generalising: Pythagoras's theorem	<ul style="list-style-type: none">In this lesson, we will develop an understanding of Pythagoras' theorem by drawing upon our tilted squares knowledge.



6. Pythagorean triples

- In this lesson, we will learn about the term "Pythagorean triples" and how to recognise them.
-

7. Pythagoras: Finding right-angled triangles

- In this lesson, we will learn how to use Pythagoras's theorem to find the height of triangles with and without right angles.
-

8. Pythagoras's theorem on the Cartesian plane

- In this lesson, we will learn how to use Pythagoras's theorem on the Cartesian plane to help you find the distance between two given points.
-

Unit 45 Famous maths problems

4 Lessons



Lesson number	Lesson question	Pupils will learn
1.	Four colour map theorem	<ul style="list-style-type: none">In this lesson, we will think about a famous, long-standing, maths problem that has been recently solved known as the four colour theorem.
2.	The twin prime conjecture	<ul style="list-style-type: none">In this lesson, we will learn about a famous unsolved maths problem called the twin prime conjecture.
3.	3D Coordinates	<ul style="list-style-type: none">In this lesson, we will introduce the 3D coordinate planes, and solve problems involving 3D coordinates.
4.	The Painted Cube	<ul style="list-style-type: none">In this lesson, we will look at the painted cube problem.



Lesson
number

Lesson question

Pupils will learn

1.	Representing ratio	<ul style="list-style-type: none">• In this lesson, we will learn about different representations of ratio, including the relationship between fractions and ratio. These are mostly seen in the context of shape.
2.	Ratio and proportion in geometry	<ul style="list-style-type: none">• In this lesson, we will divide oblique line segments into specified ratios by dividing the segment's horizontal and vertical displacements in the same ratio.
3.	Dividing into a ratio	<ul style="list-style-type: none">• In this lesson, we will review how to divide amounts into a ratio and find part or whole amounts from given information.
4.	Ratio problems	<ul style="list-style-type: none">• In this lesson, we will solve problems involving ratio, fractions and percentages.



Lesson number	Lesson question	Pupils will learn
1.	Enlargement by an integer scale factor	<ul style="list-style-type: none">In this lesson, we will learn what is meant by enlargement and how to enlarge shapes by an integer scale factor. It would be helpful if you could have squared paper and a ruler for this lesson.
2.	Enlargement by a non-integer scale factor	<ul style="list-style-type: none">In this lesson, we will learn how to enlarge shapes by a non-integer scale factor. It would be helpful if you could have squared paper and a ruler for this lesson.
3.	Enlargement from a given point	<ul style="list-style-type: none">In this lesson, we will learn how to enlarge a shape from a given point. It would be helpful if you could have squared paper and a ruler for this lesson.
4.	Enlargement by a negative scale factor	<ul style="list-style-type: none">In this lesson, we will learn how to enlarge a shape by a negative scale factor. It would be helpful if you could have squared paper and a ruler for this lesson.



5. Describing enlargements

- In this lesson, we will learn how to describe an enlargement using the terms centre of enlargement and scale factor.
-

6. Similar triangles

- In this lesson, we will learn to define similarity and apply your understanding to similar triangles. We will also draw an enlargement.
-

7. Nested triangles

- In this lesson, we will apply your understanding of similarity to nested triangles to calculate missing sides and angles.
-

8. Area of similar shapes

- In this lesson, we will identify similar shapes and subsequently work out areas of similar shapes using our knowledge of scale factors.
-



Lesson number	Lesson question	Pupils will learn
1.	Rational and irrational numbers	<ul style="list-style-type: none">In this lesson, we will explore the concept of rationality and irrationality in numbers, and learn how to classify rational and irrational numbers.
2.	Introduction to Surds	<ul style="list-style-type: none">In this lesson, we will learn what a surd is and we will explore how to accurately estimate the value of a surd.
3.	Surds and triangles	<ul style="list-style-type: none">In this lesson, we will recap how to use Pythagorean theorem to find the length of missing sides in triangles leaving the answers in surd form.
4.	Manipulating surds	<ul style="list-style-type: none">In this lesson, we will look at basic surd rules in particular multiplication and division.
5.	Varying the ratio of side lengths in right angle triangles	<ul style="list-style-type: none">In this lesson, we will learn about the ratio of side lengths in right angle triangles.



-
- | | | |
|-----------|--------------------------------------|--|
| 6. | The case of 30 and 60 degrees | <ul style="list-style-type: none">• In this lesson, we will look at the special cases of 30 and 60 degrees right angled-triangles. |
|-----------|--------------------------------------|--|
-
- | | | |
|-----------|-----------------------|--|
| 7. | The sine ratio | <ul style="list-style-type: none">• In this lesson, we will develop an understanding of trigonometric ratios focusing on sine. |
|-----------|-----------------------|--|
-
- | | | |
|-----------|-----------------------------------|---|
| 8. | The sine and cosine ratios | <ul style="list-style-type: none">• In this lesson, we will explore trigonometric ratios focusing on sine and cosine. |
|-----------|-----------------------------------|---|
-
- | | | |
|-----------|---|--|
| 9. | The sine and cosine ratios for 30 and 60 degrees | <ul style="list-style-type: none">• In this lesson, we will learn how to find missing sides and angles in triangles using sine and cosine for 30 and 60 degrees. |
|-----------|---|--|
-
- | | | |
|------------|--|--|
| 10. | Finding missing sides using sine and cosine for any angle | <ul style="list-style-type: none">• In this lesson, we will learn how to find missing sides using sine and cosine for any angle in a triangle. |
|------------|--|--|
-
- | | | |
|------------|---|--|
| 11. | Using inverse sine and cosine to find missing angles | <ul style="list-style-type: none">• In this lesson, we will use inverse sine and cosine to find missing angles in triangles. |
|------------|---|--|
-
- | | | |
|------------|-------------------------------|--|
| 12. | Sine and cosine graphs | <ul style="list-style-type: none">• In this lesson, we will look at the graphs made by the sine and cosine functions and compare them to highlight similarities and differences. |
|------------|-------------------------------|--|
-

Unit 49 Quadratic expressions (9.9)

12 Lessons



Lesson number	Lesson question	Pupils will learn
1.	Recognising linear and non-linear graphs	<ul style="list-style-type: none">In this lesson, we will learn to recognise the difference between linear and nonlinear graphs.
2.	Plotting quadratics (Part 1)	<ul style="list-style-type: none">In this lesson, we will learn about the shape of a quadratic graph and begin plotting graphs of quadratic equations.
3.	Plotting quadratics (Part 2)	<ul style="list-style-type: none">In this lesson, we will identify the features of quadratic graphs. We will also practice plotting quadratic graphs.
4.	Quadratic contexts	<ul style="list-style-type: none">In this lesson, we will explore different situations that can be modelled by quadratics.
5.	Maximum and minimum area	<ul style="list-style-type: none">In this lesson, we will explore how we can use quadratic graphs to solve maximum and minimum problems.



6. Distributive property

- In this lesson, we will learn more about applying the distributive property of multiplication with variables. We will use area models to visualise the process.

7. Expanding double brackets

- In this lesson, we will learn more about expanding double brackets. We will use area models to visualise the process.

8. Difference of two squares

- In this lesson, we will learn about the difference of two squares. We will investigate the pattern of results when considering multiplying out brackets of the general form $(x+a)(x-a)$.

9. Factorising quadratics (Part 1)

- In this lesson, we will learn how we can factorise quadratics using an array.

10. Factorising quadratics (Part 2)

- In this lesson, we will further develop your ability to factorise quadratics by spotting factors of terms.

11. Sketching quadratics

- In this lesson, we will learn how to sketch quadratics using intercepts of the y and x axis.
-

12.

Interesting quadratic patterns

- In this lesson, we will explore different patterns related to quadratics and square numbers.
-





Lesson number	Lesson question	Pupils will learn
1.	Forming quadratic equations I	<ul style="list-style-type: none">In this lesson, we will be introduced to quadratic equations and have to form them from I think of a number problem.
2.	Forming quadratic equations II	<ul style="list-style-type: none">In this lesson, we will form quadratic equations in the context of area and pythagoras.
3.	Solving pure quadratic equations	<ul style="list-style-type: none">In this lesson, we will solve pure quadratic equations in the form $ax^2 + c$. We will investigate patterns of behaviour with these specific cases.
4.	Number of solutions	<ul style="list-style-type: none">In this lesson, we will look at the number of possible solutions for quadratic equations and investigate patterns linking the form of an equation and the number of real solutions it has.
5.	Solving quadratic simultaneous equations graphically	<ul style="list-style-type: none">In this lesson, we will solve pairs of simultaneous equations graphically where one is linear and one is quadratic.



- | | | |
|------------|--|--|
| 6. | Solving quadratic equations graphically | <ul style="list-style-type: none">• In this lesson, we will use graphs and transformations of graphs to solve quadratic equations. |
| 7. | Rearranging quadratic equations | <ul style="list-style-type: none">• In this lesson, we will rearrange quadratic equations to get one side equal to zero. |
| 8. | Solving adfected quadratic equations (Part 1) | <ul style="list-style-type: none">• In this lesson, we will solve quadratic equations when in factorised form. |
| 9. | Solving adfected quadratic equations (Part 2) | <ul style="list-style-type: none">• In this lesson, we will solve quadratic equations that first need to be factorised. |
| 10. | Solving adfected quadratic equations (Part 3) | <ul style="list-style-type: none">• In this lesson, we will solve quadratic equations that first need to be rearranged. |
| 11. | Sketching quadratic graphs (Part 1) | <ul style="list-style-type: none">• In this lesson, we will learn how to determine the shape, roots and y-intercept of a graph from an equation. |
| 12. | Sketching quadratic graphs (Part 2) | <ul style="list-style-type: none">• In this lesson, we will use the shape, roots and y-intercept to sketch the graph. |



Lesson number	Lesson question	Pupils will learn
1.	Indices and Radicals	<ul style="list-style-type: none">In this lesson, we will recap our knowledge of surds. We will rewrite surds in their simplest form and recall how to rationalise the denominator. We will also practise organising surds in order of ascending size.
2.	Indices and power of 0	<ul style="list-style-type: none">In this lesson, we will recap our knowledge of basic indices. We will explore the power of zero, and carry out calculations involving low power values.
3.	Expressing powers of in different bases	<ul style="list-style-type: none">In this lesson, we will learn that some powers can be expressed as different powers of different base numbers.
4.	Laws of indices	<ul style="list-style-type: none">In this lesson, we will investigate some of the laws of indices and how they are derived. We will look specifically at multiplying and dividing numbers with the same base.



5. Fractional Indices (Part 1)

- In this lesson, we will begin to work with fractional indices and learn how to evaluate calculations with fractional indices.

6. Fractional Indices (Part 2)

- In this lesson, we will continue working with fractional indices and we will investigate fractional index problems and model their solutions,.

7. Negative indices

- In this lesson, we will build on our knowledge of fractional indices and work with negative indices.

8. Powers of 10

- In this lesson, we will work with powers of 10 with both integers and decimal numbers. We will calculate these numbers as a starting point to investigate standard form.

9. Sorting large numbers

- In this lesson, we will learn how to write large numbers in standard form and write numbers given in standard form as an ordinary number.

10. Multiplying and dividing in standard form

- In this lesson, we will learn how to multiply and divide numbers that are presented in standard form.
-

11. Addition and Subtraction in standard form

- In this lesson, we will learn to add and subtract numbers written in standard form, giving your answer as both ordinary numbers and in standard form.



12. Mixed problems with standard form

- In this lesson, we will recap our knowledge of working with standard form and perform calculations with mixed operations.
-



Lesson number	Lesson question	Pupils will learn
1.	Percentage recap	<ul style="list-style-type: none">In this lesson, we will recap percentage of amounts using multipliers. We will practise and model finding percentages of amounts.
2.	Percentage change	<ul style="list-style-type: none">In this lesson, we will learn about percentage change. We will investigate how to increase or decrease an amount by a given percentage.
3.	Finding 100%	<ul style="list-style-type: none">In this lesson, we will learn about how useful 100% is, and how we use it to solve various percentage problems.
4.	Repeated percentage change	<ul style="list-style-type: none">In this lesson, we will learn about the cumulative effect of repeated percentage changes.
5.	Compound appreciation and depreciation (Part 1)	<ul style="list-style-type: none">In this lesson, we will learn about elements of compound appreciation and depreciation.

6. Compound appreciation and depreciation (Part 2)

- In this lesson, we will learn about more elements of compound appreciation and depreciation.

7. To the power of n

- In this lesson, we will learn about 'to the power of n'. We will investigate patterns of exponential growth as the value of n increases for any given base.

8. Exponential growth

- In this lesson, we will learn about the exponential function and how it relates to powers of n.
-





Lesson number	Lesson question	Pupils will learn
1.	Income Tax	<ul style="list-style-type: none">• In this lesson, we will learn about how income tax in the UK is calculated and used.
2.	Mortgages	<ul style="list-style-type: none">• In this lesson, we will learn about the general principles of mortgages and mortgage loan repayment.
3.	Savings	<ul style="list-style-type: none">• In this lesson, we will learn how savings grow over time. We will investigate how to calculate the amount of time it would take to save a given amount with regular small deposits, and the concepts of simple and compound interest.
4.	Payday Loans	<ul style="list-style-type: none">• In this lesson, we will learn about how payday loans work. We will investigate the risks involved in high interest loans and calculate regular repayment plans including comparing total repayment costs to original loan amounts.

4. Learn More



Contents

Section number	Section content
1.	Introduction to Oak's key stage 3 maths curriculum
2.	Coherence and flexibility
3.	Knowledge organisation
4.	Knowledge selection
5.	Inclusive and ambitious
6.	Pupil engagement
7.	Motivation through learning
8.	Unit prior knowledge requirements

1. Introduction to Oak's key stage 3 maths curriculum

As mathematics teachers we want our pupils to reach fluency in what we are teaching them. In mathematics, fluency requires a deep understanding of concepts and the ability to apply them flexibly and with automaticity. The mathematics curriculum



uses multiple representations to help make connections across concepts to help build a deep conceptual understanding. By making consistent use of the same core representations we will scaffold pupils' thinking to help them understand abstract mathematical concepts. The curriculum will also include intelligent practice that is designed to help pupils develop automaticity in their mathematics.

We also aim for our pupils to be able to use the precise language of mathematics, that is distinct from everyday language. The curriculum will do this by explicitly teaching mathematical vocabulary and introducing core sentence structures with which to communicate, express, connect, reason with and apply mathematical structures and ideas.

Finally, we also aim for our pupils to be able to think mathematically. The tasks and activities used in the curriculum teach pupils the components of mathematical thinking: to sort and classify, compare and contrast, specialise and generalise, to make conjectures and to prove them.

Below are the set of principles we have used to build this curriculum, with these ambitions for our pupils in mind:

2. Coherence and flexibility

We strive to support schools by offering a maths curriculum that can fit alongside a range of existing structures. However, complete flexibility over unit ordering is impossible due to the cumulative nature of mathematics and the importance of prior knowledge.

We have grouped lessons into units: coherent sequences of 5 or more lessons. Although each lesson can be accessed individually, explicit connections are made to earlier lessons and later lessons in the same unit. This is because the connections between mathematical concepts are so vital to deepening understanding.

3. Knowledge organisation

The units in the maths curriculum are grouped as appropriate for each key stage, with a suggested route organised within year groups.

4. Knowledge selection

Our mathematics lessons cover the full scope of the National Curriculum. We have given more time (both in number of lessons and number of units) to those concepts within the National Curriculum that the evidence tells us are foundational to

success in maths.

5. Inclusive and ambitious

We know the difference it makes when children believe they “can do” maths. We are guided by the principles of the National Curriculum to ensure that every pupil, regardless of starting point, develops their fluency, reasoning and problem solving. Our activities are scaffolded so all children can succeed. Pupils are offered frequent opportunities to be and feel successful in their maths education.

We develop conceptual understanding by always building new understanding on what pupils already know, by representing concepts in different ways, and by making connections between concepts. The mathematics curriculum makes consistent use of the same core representations across year groups to help pupils connect prior learning to new learning. These representations are selected to make key mathematical structures and ideas accessible to all pupils, no matter what their starting points.

To support every child to communicate mathematically, pupils are introduced to core sentence structures with which to express, connect, reason with and apply mathematical structures and ideas.

6. Pupil engagement

You learn maths by thinking about maths. Our lessons include mathematical tasks which have multiple solutions. Mathematical thinking is woven into the units using scaffolds and prompts such as ‘what is the same and what’s different?’, ‘is it sometimes, always or never true?’ and ‘which could be the odd one out?’. Throughout the curriculum, all pupils have opportunities to sort and classify, compare and contrast, specialise and generalise, to make conjectures and to prove them.

7. Motivation through learning

We believe that mathematics is inherently interesting and that all children are entitled to a genuine experience of mathematics. The tasks and activities that pupils engage with harness innate ways of thinking and develop the habits of mind that are drawn upon when being mathematical. Problem solving is at the heart of every lesson with opportunities to investigate, explore and reason.

8. Unit prior knowledge requirements



Number



Unit title

Prior knowledge required

7.1 Numbers and numerals

N/A

7.2 Axioms and arrays

N/A

7.3 Factors and multiples

7.2 Axioms and arrays

- Understanding of the relationship between division and multiplication
- Use of arrays to represent integers as a product of two numbers

7.4 Order of operations

7.2 Axioms and arrays

- Understanding of the relationship between division and multiplication
- Use of arrays to represent integers as a product of two numbers
- Understanding of commutativity, associativity and distributivity

Positive and negative numbers

7.2 Axioms and arrays

- Understanding of the relationship between division and multiplication



- Use of arrays to represent integers as a product of two numbers
- Understanding of commutativity, associativity and distributivity

7.4 Order of operations

- Understanding and applying the hierarchy of operations

Prime factor decomposition

7.2 Axioms and arrays

- Understanding of the relationship between division and multiplication
- Use of arrays to represent integers as a product of two numbers

7.3 Factors and multiples

- Expressing integers as a product of two factors
- Finding a common multiple of two numbers
- Geometric representations of integers

Conceptualising and comparing fractions 7.2 Axioms and arrays:

N/A

- Understanding of the relationship between division and multiplication
- Use of arrays to represent integers as a product of two numbers
- Use of diagrams to represent multiplication and division



Manipulating and calculating with fractions

7.2:

- Understanding of the relationship between division and multiplication
- Use of arrays to represent fractions

7.14:

- Knowledge of the different contexts in which a fraction can result
- Equivalent fractions

Percentages

7.14 Conceptualising and comparing fractions

- Knowledge of the different contexts in which a fraction can result
- Representing fractions including on a number line
- Equivalent fractions

7.15 Manipulating and calculating with fractions

- Calculating with fractions using all four operations

Accuracy and estimation

7.14 Conceptualising and comparing fractions

- Decimal notation
- Representing fractions and decimals on a number line

Surds and trigonometry

7.3 Factors and multiples:



- Square numbers

7.4 Order of operations

- Applying the square root function

Indices and standard form

7.4

- Using index notation up to a power of 3

7.14

- Representing fractions and decimals on a number line

Algebra

Unit title

Prior knowledge required

Axioms and arrays

N/A

Order of operations

7.2 Axioms and arrays Understanding of the relationship between division and multiplication Use of arrays to represent integers as a product of two numbers Commutativity, associativity and distributivity

Positive and negative numbers

7.2 Axioms and arrays

- Understanding of the relationship between division and multiplication
- Use of arrays to represent integers as a product of two numbers



- Commutativity, associativity and distributivity

7.4 Order of operations

- Understanding and applying the hierarchy of operations
-

Expressions, equations and inequalities

7.2 Axioms and arrays

- Understanding of the relationship between division and multiplication
- Use of arrays to represent integers as a product of two numbers
- Commutativity, associativity and distributivity

7.4 Order of operations

- Understanding and applying the hierarchy of operations

Sequences

7.6 Expressions, equations and inequalities

- Using algebraic notation in different contexts
- Generating sequences from geometric patterns

Forming and solving equations

7.2 Axioms and arrays

- Use of arrays to represent integers as a product of two numbers
- Commutativity, associativity and distributivity

7.6 Expressions, equations and inequalities



- Using algebraic notation in different contexts

7.11 Area of 2-D shapes

- Area and perimeter of rectilinear shapes

Forming and solving inequalities

7.6 Expressions, equations and inequalities

- Using algebraic notation in different contexts, including inequality notation

8.2 Forming and solving equations

- Forming and solving linear equations derived from different contexts

Linear graphs

8.1 Sequences

- Expressing position to term rules algebraically

7.10 Coordinates

- Using (x,y) notation to describe position on a coordinate grid

Solving linear simultaneous equations algebraically

8.2 Forming and solving equations

- Solving linear equations

8.4 Linear graphs

- Plotting, sketching and interpreting graphs of linear functions

Solving linear simultaneous equations graphically

Quadratic expressions

Quadratic equations

Ratio and proportion

9.3 Solving linear simultaneous equations algebraically

- Using algebraic methods to solve simultaneous equations

7.2 Axioms and arrays

- Applying the distributive property

7.6 Expressions, equations and inequalities

- Using algebraic notation in different contexts, including inequality notation

7.10 Coordinates

- Using (x,y) notation to describe position on a coordinate grid

8.4 Linear graphs

- Plotting, sketching and interpreting graphs of linear functions

9.10 Quadratic expressions

- Manipulating quadratic expressions

8.3 Forming and solving equations

- Forming and solving linear equations derived from different contexts



Unit title

Prior knowledge required



Axioms and arrays

N/A

Conceptualising and comparing fractions

7.2 Axioms and arrays

- Understanding of the relationship between division and multiplication
- Use of arrays to represent integers as a product of two numbers
- Use of diagrams to represent multiplication and division

Manipulating and calculating with fractions

7.2: Axioms and arrays

- Understanding of the relationship between division and multiplication
- Use of arrays to represent fractions

7.14: Conceptualising and comparing fractions

- Knowledge of the different contexts in which a fraction can result
- Equivalent fractions

Ratio

7.14 Conceptualising and comparing fractions

- Knowledge of the different contexts in which a fraction can result
- Equivalent fractions



Percentages

7.15 Manipulating and calculating with fractions

- Calculating with fractions using all four operations

7.14 Conceptualising and comparing fractions

- Knowledge of the different contexts in which a fraction can result
- Representing fractions including on a number line
- Equivalent fractions

7.15 Manipulating and calculating with fractions

- Calculating with fractions using all four operations

Ratio, real life graphs and rates of change

7.16 Ratio

- Ratio notation

8.4 Linear graphs

- Finding the gradient and y-intercept of a linear graph

Direct and inverse proportion

7.16 Ratio

- Ratio notation

8.4 Linear graphs

- Finding the gradient and y-intercept of a linear graph

Similarity and enlargement

7.12 Transforming 2-D figures



- Enlarging a shape by a given scale factor

7.16 Ratio

- Expressing multiplicative relationships using fractions

Surds and trigonometry

7.3 Factors and multiples

- Square numbers

7.4 Order of operations:

- Square root function

Growth and decay

7.17 Percentages

- Calculating with percentages
- Percentage increase and decrease

9.11 Indices and standard form

- Use index notation and apply index rules

Geometry

Unit title

Prior knowledge required

Angles

N/A

Classifying 2-D shapes

7.7 Angles



Constructing triangles and quadrilaterals

- Angle rules including angles around a point, angles in a straight line and angles in parallel lines

7.7 Angles

- Angle rules including angles around a point, angles in a straight line and angles in parallel lines

7.8 Classifying 2-D shapes

- Properties of special triangles and quadrilaterals

Coordinates

7.5 Positive and negative numbers

- Representing negative numbers using a number line

7.8 Classifying 2-D shapes

- Properties of special triangles and quadrilaterals

Area of 2-D shapes

7.2 Axioms and arrays

- Representing integers as a product of two factors using an array

7.8 Classifying 2-D shapes

- Properties of special triangles and quadrilaterals

Transforming 2-D figures

7.7 Angles

- Understand angle as a measure of turn

7.10 Coordinates



Angles in straight edges

- Plotting points on a coordinate grid in all four quadrants

7.7 Angles

- Angle rules including angles around a point, angles in a straight line and angles in parallel lines

7.8 Classifying 2-D shapes

- Properties of special triangles and quadrilaterals

Bearings

7.7 Angles

- Angle rules including angles around a point, angles in a straight line and angles in parallel lines

7.8 Classifying 2-D shapes

- Properties of special triangles and quadrilaterals

Circles

7.11 Area of 2-D shapes

- Area as a measure of surface

Volume and surface area of prisms

7.11 Area of 2-D shapes

- Area as a measure of surface

Constructions, congruence and loci

7.8 Classifying 2-D shapes

- Properties of special triangles and quadrilaterals

7.9 Constructing triangles and quadrilaterals



Pythagoras's Theorem

- Use ruler, compasses and protractor to construct triangles and quadrilaterals

Similarity and enlargement

7.11 Area of 2-D shapes

- Finding the area of triangles and rectilinear shapes

7.12 Transforming 2-D figures

- Enlarging a shape by a given scale factor

7.16 Ratio

- Expressing multiplicative relationships using fractions

Surds and trigonometry

7.16 Ratio

- Expressing multiplicative relationships using fractions

Statistics and probability

Unit title

Prior knowledge required

Conceptualising and comparing fractions

7.2 Axioms and arrays

- Understanding of the relationship between division and multiplication
- Use of arrays to represent integers as a product of two numbers
- Use of diagrams to represent multiplication and division

Manipulating and calculating using fractions

7.2 Axioms and arrays

- Understanding of the relationship between division and multiplication
- Use of arrays to represent fractions

7.14 Conceptualising and comparing fractions:

- Knowledge of the different contexts in which a fraction can result
- Equivalent fractions

Ratio

7.14 Conceptualising and comparing fractions

- Knowledge of the different contexts in which a fraction can result
- Equivalent fractions

7.15 Manipulating and calculating with fractions

- Calculating with fractions using all four operations

Percentages

7.14 Conceptualising and comparing fractions

- Knowledge of the different contexts in which a fraction can result
- Representing fractions including on a number line
- Equivalent fractions

7.15 Manipulating and calculating with fractions





Univariate data

- Calculating with fractions using all four operations

7.15 Manipulating and calculating with fractions

- Calculating with fractions using all four operations

7.16 Ratio

- Expressing multiplicative relationships using fractions

Bivariate data

8.4 Linear graphs

- Plotting, sketching and interpreting graphs of linear functions

8.8 Univariate data

- Calculating statistical measures of univariate data including mean, mode, median and range

Probability

7.14 Conceptualising and comparing fractions

- Knowledge of the different contexts in which a fraction can result
- Representing fractions including on a number line
- Equivalent fractions

7.15 Manipulating and calculating with fractions

- Calculating with fractions using all four operations

Sets and Venn diagrams

9.1 Probability

- Expressing the probability of a single event and combined events using fractional notation

