Big Ideas of Mathematics, Reception

Number	Quantities 1, 2 and 3 can be perceptually subitized (recognised as one group without counting) Quantities 4 and 5 can be conceptually subitized (the quantity recognised without counting, possibly by combining two groups) Quantities within 10 can be recognised without counting within a 10-frame—number bond facts to 10 can be recalled Fingers are used to represent quantities (quantities 2-5 can be represented using both hands) Numbers 1-10 can be recognised in different ways: items, words, numerals, position on number line
Number: place value	Ten is made of ten 1s, e.g. 12 is one 10 and 2 ones; it is also 12 ones One item can be used to represent more than one object, e.g. a 2p coin Quantities can be represented by a position on a number line
Number: addition and subtraction	Addition is combining two groups to make a whole Children can see parts and the whole in familiar contexts e.g. boys, girls, children Children explore subtraction as counting back and they compare quantities, using language of difference (more/less) Sometimes we need to count to compare quantities Equipment and mark-making can be used to support calculation
Pre-fractions	Can recognise 'fair share' and 'not fair share' of an item (e.g. a banana) or a set of objects (e.g. some grapes).
Measurement	Measurement shows equivalence e.g. a table is how many hands long? You can measure different properties of an item e.g. the length or weight of a parcel Appropriately sized non-standard measures are chosen to measure different sizes of items Can think of simple ways to measure time Can use the language of time: units (hours, days, minutes, seconds) and order (before, after)
Geometry: properties, position and direction	2D shapes can be made from the faces on a 3D shapes Regular and irregular shapes can be categorised and ordered in different ways e.g. size, number of sides A shape doesn't change when it's in a different orientation e.g. a rotated square Shapes can be made by combining different shapes

Big Ideas of Mathematics, Year 1

Number: place value	Ten is made of ten 1s, e.g. 15 is one 10 and 5 ones; it is also 15 ones Number names don't always show place value, e.g. 'twelve' doesn't indicate ten and two One item can be used to represent more than one object, e.g. a 5p coin The position of a digit in a number determines its value, e.g. 21 is more than 12 Quantities can be represented by a position on a number line
Number: addition and subtraction	Numbers can be added in any order, e.g. 2+3 is the same as 3+2 = means 'the same as', e.g. 5=2+3 and 4+1=3+2 Part whole relationships link addition and subtraction, e.g. 2+4=6 and 6-4=2 Subtraction can be done by counting up to find the difference or by counting back A number fact can be derived from another, e.g. if I know 10+5=15 then 9+5 is one less than 15
Number: multiplication and division	One item can represent more than one object, e.g. a group of five objects can be treated as one unit of five Counting sequences follow a repeating pattern Multiplication is adding the same number Multiplication is commutative, e.g. 5x2=2x5 (can be shown by arrays)
Number: fractions	Fractions are equal parts of a whole. The property that is equal may differ e.g. area, length or quantity A fraction of an area can be equal without being the same shape
Measurement	Measurement shows equivalence e.g. a table is the same length as how many cubes? Different measurements describe different properties of an item e.g. you may measure the length or weight of a parcel We need different sized units to measure different sized objects An object is equivalent to more of a smaller unit and less of a larger unit A clock is a circular number line - the hands move gradually around this number line The hour hand shows the approximate time in the day, unlike the minute hand
Geometry: properties, position and direction	2D shapes exist in the real-world as faces on 3D shapes Shapes have defining characteristics e.g. number of sides and non-defining characteristics e.g. size, colour A shape doesn't change when it's in a different orientation e.g. a rotated square Shapes can be made by combining different shapes It is possible to mentally visualise the transformation of a shape

Big Ideas of Mathematics, Year 2

Number: place value	Each ten in a number is made of ten 1s, e.g. 30 is 3 tens; 30 is 30 ones; 30 is one ten and 20 ones. One hundred is made of ten 10s One item can be used to represent more than one object, e.g. a 20p coin The position of a digit in a number determines its value, e.g. 21 is more than 12 Quantities can be represented by a position on a number line
Number: addition and subtraction	Numbers can be added in any order, e.g. 5+4+5 is the same as 5+5+4 = means 'the same as', e.g. 5=7-2 and 4+1=8-3 Addition and subtraction are linked (part whole relationships) e.g. 9+7=16 and 16-9=7 Subtraction can be done by counting up to find the difference or by counting back Number facts can be approximated or calculated by replacing numbers with other numbers, e.g. 29+8 as one less than 30+8 Numbers can be broken down to calculate e.g. 8+7 is the same as 8+2+5 The same number sentence can describe different situations, AND different number sentences can describe the same situation
Number: multiplication and division	Multiplication is adding the same number Multiplication and division are inverse operations (shown with arrays) Division can be carried out by sharing e.g. 15÷3 as 15 shared into 3 sets or grouping 15÷3 as how many 3s in 15? There are connections between times tables, e.g. the 10x table is double the 5x table
Number: fractions	Fractions are equal parts of a whole. The property that is equal may differ e.g. area, length or quantity A fraction of an area can be equal without being the same shape Fractions can be used when each share gives less than one or where the item measured is smaller than the measuring unit
Measurement	Measurement shows equivalence e.g. a table is the same length as how many cubes? Different measurements describe different properties of an item e.g. the length, weight or size of a parcel An object is equivalent to more of a smaller unit and less of a larger unit We need standard units of measure, and different sized measures, to compare and describe items accurately On an analogue clock the hour hand shows the approximate time in the day and the minute hand shows a more exact time
Geometry: properties, position and direction	2D shapes exist in the real-world as faces on 3D shapes Shapes have defining characteristics e.g. number of sides and non-defining characteristics e.g. size, colour A shape doesn't change when it's in a different orientation e.g. a rotated square Shapes can be made by combining different shapes It is possible to mentally visualise the transformation of a shape
Statistics	Data is collected with a specific purpose in mind, e.g. which areas of the playground are most popular? Tally charts are used to collect data over time, e.g. insects in a nature area Graphs and charts are used as ways to show information clearly

Big Ideas of Mathematics, Year 3

Number: place value	The position of a digit in a number determines its value, e.g. 210 is more than 120 Units of the same size can be added together e.g. 54+32=50+30+4+2 10 tens is the same as one hundred, e.g. 210 can be made with 2 hundreds and 1 ten; 210 can be made with 21 tens. Quantities can be represented by a position on a number line
Number: addition and subtraction	= means 'the same as', e.g. 160=120+40 and 14+6=30-10 Number facts can be approximated or calculated by adjusting numbers, e.g. 39+19 using 40+20 Numbers can be broken down to calculate e.g. 28+7 is the same as 28+2+5 Subtraction can be done by counting up or counting back - we can choose the easier strategy The same question can be represented by addition or subtraction number sentences e.g. 17+___=25 or 25-17=___ Written methods make it easier to answer certain questions
Number: multiplication and division	Multiplication is repeated adding of the same number Times tables facts are related e.g. 6×4 is double the 3×4; 3×3 + 3×2 = 3×5 (shown by 2-colour arrays); 5×3 is used to calculate 50×3 Multiplication and division are inverse operations (shown by arrays) - division calculations use multiplication facts Division is sometimes easier to do by sharing e.g. 80÷4 and sometimes easier to do by grouping e.g. 15÷5
Number: fractions	Fractions are equal parts of a whole e.g. of an area, length or quantity and are therefore linked to division A fraction of an area can be equal without being the same shape Fractions are numbers and can be shown by their position on a number line e.g. to show age The size of a unit fraction is inversely related to the size of the denominator Our base-10 counting/decimal system can be described using tenths (this explains why 1/2 ≠ 0.2)
Measurement	Some units are more appropriate than others to measure different objects An object is equivalent to more of a smaller unit and less of a larger unit Benchmark measures help when estimating e.g. I am 120cm tall so my brother is about… a bag of sugar is 1kg so… Time is displayed in different ways depending on the context On an analogue clock the hour hand shows the approximate time in the day and the minute hand shows a more exact time
Geometry: properties, position and direction	Shapes have a range of different defining characteristics e.g. number of sides/angles, types of angles, symmetry Only certain changes alter the characteristic of a shape e.g. the orientation and size of a shape doesn't alter it's characteristics Angles are a measurement of turn which is not affected by the length of the lines The 2D faces from 3D shapes can be visualised is individual 2D shapes
Statistics	Data is collected with a specific purpose in mind, e.g. which areas of the playground are most popular? Tally charts are used to collect data over time, e.g. insects in a nature area Graphs and charts are used to communicate information effectively

Big Ideas of Mathematics, Year 4

Number: place value	In our number system the position of a digit in a number determines its value, unlike many historic number systems Numbers can be broken down in different ways, e.g. 532 into 500+30+2 or 400+130+2 (ten tens is equal to one hundred) Quantities can be represented by a position on a number line, with larger numbers further right (including for negative numbers) Rounding is used to show an approximate number, although how a number is rounded depends on the context
Number: addition and subtraction	= means 'the same as'e.g. 460=220+240 and 34+16=60-10 Number facts can be approximated or calculated by adjusting numbers, e.g. 398+195 using 400+200 The most appropriate method for calculation can differ depending on the numbers involved Using estimates or different calculation strategies reduce the likelihood of errors
Number: multiplication and division	Multiplication facts can be derived in different ways e.g. the 12× table is double the 6× table; 6×5 + 3×5 = 9×5 Numbers can be partitioned in different ways to multiply, e.g. 28×5 = 20×5 + 8×5 **or** 25×5 + 3×5 Numbers can be adjusted to calculate or make approximations e.g. 28×5 = 14×10; 49×6 = 50×6 - 6 The best method for dividing can differ depending on the numbers involved e.g. sharing, grouping or using inverse-facts
Number: fractions	Fractions help us to solve problems where the answer lies between two whole numbers Fractions are equal parts of a whole e.g. an area, a position on a number line or a quantity of an amount The size of a unit fraction is inversely related to the size of the denominator Fractions that are different in their symbolic notation can be equivalent - this also applies to fraction and decimal equivalence
Measurement	An object is equivalent to more of a smaller unit and less of a larger unit Benchmark measures help when estimating e.g. I am 120cm tall so my brother is about… a bag of sugar is 1kg so… Perimeter is a measurement of length whereas area is a measurement of space Conversion between units of time are more difficult than conversions between metric units because of the number systems
Geometry: properties, position and direction	Shapes have a range of different defining characteristics e.g. number of sides/angles, types of angles, symmetry Only certain changes alter the characteristic of a shape e.g. the orientation and size of a shape doesn't alter it's characteristics Angles are a measurement of turn which is not affected by the length of the lines Shapes can belong to more than one classification e.g. a square is a rhombus and a rectangle
Statistics	Graphs and charts are used to communicate information effectively The type of graph used will depend on the type of data being shown e.g. bar charts can be used for discrete data (information counted in set groups); line graphs can be used to show continuous data (information measured where 'in-between' values exist)

Big Ideas of Mathematics, Year 5

Number: place value	In our number system the position of a digit in a number determines its value, unlike Roman Numerals where symbols are added Numbers can be broken down in different ways, e.g. 4000 can be described as 4 thousands or 40 hundreds or 400 tens Large numbers are read in a pattern of 3 digits Large quantities are hard to estimate - benchmarks can help e.g. 60 000 people went to the match; 3 million people live in Wales
Number: addition and subtraction	Number facts can be approximated or calculated by adjusting numbers, e.g. 3415-2996 is equivalent to 3419-3000 The most appropriate method for calculation can differ depending on the numbers involved Using estimates or different calculation strategies reduce the likelihood of errors
Number: multiplication and division	= means 'the same as'e.g. 8×4 = 320÷10 Some calculations involving large numbers can be done mentally; others require written methods Many new number facts can be derived from a number sentence e.g. 24×16 = 384 **so** 12×32 = 384 **and** 24×8 = 192 Multiplication and division is used in a range of areas of mathematics e.g. calculating fractions, finding prime numbers
Number: fractions	The size of a fraction is inversely related to the size of the denominator and directly related to the size of the numerator Fractions can be compared using benchmarks e.g. how far they are from 0, 1/2 or 1. Different fraction questions use the same ideas and skills e.g. finding fractions of quantities and finding an equivalent fractions
Measurement	Measurements can be compared when they are are converted into the same unit Benchmark measures help when estimating e.g. the park is 1km away so... a bag of sugar is 1kg so… Perimeter is a measurement of length whereas area is a measurement of space The relationship between the area and perimeter of a shape is complex e.g. doubling the area doesn't double the perimeter
Geometry: properties, position and direction	The transformation of a 2D net into a 3D shape can be visualised Shapes with different numbers of sides and verticas can still share other characteristics Shapes can belong to more than one classification e.g. a square is a rhombus and a rectangle Properties of shapes are interdependent e.g. a rectangle has parallel lines because it has four right-angles
Statistics	Graphs can be used to make inferences and deductions as well as for retrieving information The type of graph used will depend on the type of data being shown e.g. bar charts can be used for discrete data (information counted in set groups); line graphs can be used to show continuous data (information measured where 'in-between' values exist)

Big Ideas of Mathematics, Year 6

Number: place value	Numbers can be ordered based on the number of digits but this does not apply to decimal numbers For numbers with the same number of digits or decimals, we order based on the size of the most significant digits Numbers can be broken down in different ways, e.g. 4000 can be described as 4 thousands or 40 hundreds or 400 tens Large quantities are hard to estimate - benchmarks can help e.g. 60 000 people went to the match; 3 million people live in Wales Numbers can be rounded in different ways and not always to powers of 10 e.g. 374 rounded to the nearest 50 is 350
Number: addition and subtraction	Number facts can be approximated or calculated by adjusting numbers, e.g. 3415-2996 is equivalent to 3419-3000 The most appropriate method for calculation can differ depending on the numbers involved Using estimates or different calculation strategies reduce the likelihood of errors
Number: multiplication and division	Some calculations involving large numbers can be done mentally; others require written methods Many new number facts can be derived from a number sentence e.g. 24×16 = 384 **so** 12×32 = 384 **and** 24×8 = 192 Multiplication and division is used in a range of areas of mathematics e.g. calculating fractions, finding prime numbers
Number: fractions	The size of a fraction is inversely related to the size of the denominator and directly related to the size of the numerator Fractions can be compared using benchmarks e.g. how far they are from 0, 1/2 or 1 or by finding equivalent fractions Different fraction questions use the same ideas and skills e.g. finding fractions of quantities and ratio
Algebra	= means 'the same as' e.g. 4a = 20-b Letters or symbols are used for unknown values Equations can be used to represent problems more simply Sequences follow patterns which can be represented in different ways e.g. in pictures, with words, with formulae
Measurement	Measurements can be compared when they are are converted into the same unit Benchmark measures help when estimating e.g. the park is 1km away so... a bag of sugar is 1kg so… The relationship between the area and perimeter of a shape is complex e.g. doubling the area doesn't double the perimeter
Geometry: properties, position and direction	The transformation of a 2D net into a 3D shape can be visualised Shapes with different numbers of sides and verticas can still share other characteristics Shapes can belong to more than one classification e.g. a square is a rhombus and a rectangle Properties of shapes are interdependent e.g. a rectangle has parallel lines because it has four right-angles
Statistics	Graphs can be used to make inferences and deductions as well as for retrieving information The type of graph used will depend on the type of data being shown e.g. bar charts can be used for discrete data (information counted in set groups); line graphs can be used to show continuous data (information measured where 'in-between' values exist) When displaying discrete data, pie charts show relative proportions whereas bar graphs show quantities