Maths Year 6 Curriculum

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Phase 1

Domain: **Place Value** – Numbers up to 10,000,000 (Spine 1.30 and 2.29)

Revision Year 5:

- **I can read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit.**
- **I can count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000**
- **I can round any number up to 1,000,000 to the nearest 10, 100, 1000, 10,000 and 100,000**
- **I can solve number problems and practical problems that involve all of the above read Roman numerals to 1000 (M) and recognise years written in Roman numerals**

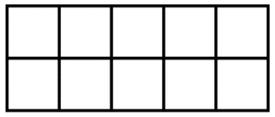
- I know that 10 tenths are equivalent to 1 one and that 1 is 10 times the size of 0.1

New learning- KPIs:

- **I can read, write, order and compare numbers to at least 10,000,000 and determine the value of each digit**
- **Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000**
- **I can round any number up to 10,000 000 to the nearest 10, 100, 1,000, 10,000, 100,000 and 1,000,000.**
- **I can solve number problems and practical problems that involve all of the above.**
- **I can use negative numbers in context and calculate intervals across zero.**

- I can see patterns in other powers of 10 can be extended to the unit of 1,000,000.
- I can understand the relationship between powers of 10 from 1/100 to 10 million and use this to make a given number 10, 100, 1,000, 1/10, 1/100 or 1/1000 times the size (multiplying and dividing by powers of 10).
- I can compose and decompose the digits in a number to indicate its structure (standard and non-standard partitioning) including decimal fractions of amounts.
- I can use unitising to cross boundaries up to and across million boundaries.
- I can use knowledge of rounding to give an estimate or average.
- I can reason about the location of any number up to 10 million, including decimal fractions, in a linear number system and round as appropriate (including in contexts).
- I can divide powers of 10 into 2, 4, 5 and 10 equal parts and read scales/number lines with labelled intervals.
- I can convert measures from using to another using my knowledge of multiplying and dividing by powers of 10.

Resources to support learning:



Tens frames with **place value counters** to support children to understand that 10 of something fit into…

Dienes to show children the relationship between numbers and what 'ten times bigger' looks like

Number lines to show children the position of numbers including negative numbers and how to round to the nearest multiple of…

Common misconceptions:

- Finding the multiple before or after the number which needs rounding for example multiple of 100 before 549 is 400 if rounding to the nearest 100.
- Thinking that negative numbers with a larger digit have a higher value than a positive number with a lower digit for example -6 is a larger number than 2
- Decimal numbers with more digits have a higher value e.g. 3.48 is larger than 3.5
- Reading decimal numbers as two separate numbers for example 3.15 as three point fifteen rather than three point one five
- Positioning of decimals on a number line between wholes and knowing that 0.5 is equivalent to half of a whole and 0.05 is half of a tenth

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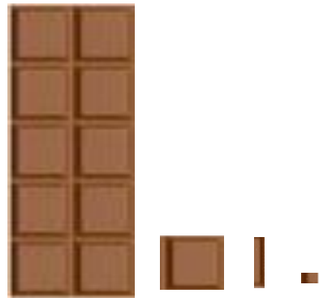
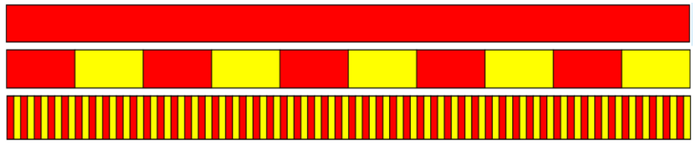
- I know that 100 hundredths are equivalent to 1 one and that 1 is 100 times the size of 0.01
- I know that 10 hundredths are equivalent to 1 tenth and that 1 is 100 times the size of 0.01
- I recognise the value of each digit in numbers with up to 2 decimal places and can compose and decompose numbers with up to 2 decimal places using standard and non-standard partitioning
- I can reason about the location of any number with up to 2 decimal places in the linear number system, including identifying the previous and next multiple of 1 and 0.1
- I can round any number with 2 decimal number to the nearest tenth and one

Visualisation:

- Chocolate bar split into ten equal **pieces**, ten pieces split into ten equal **slithers**, ten slithers cut into ten equal **crumbs**



Magenetic dienes or bar models using Mathsbot.com

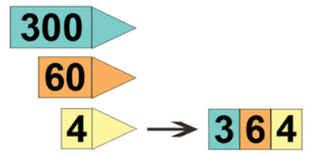


10,000	20,000	30,000	40,000	50,000
1000	2000	3000	4000	5000
100	200	300	400	500
1	2	3	4	5
0.1	0.2	0.3	0.4	0.5
0.01	0.02	0.03	0.04	0.05
0.001	0.002	0.003	0.004	0.005

Gattengo charts to the value of each digit in a 4-digit number; this resource helps children to build numbers and understand the value of the digits in the number

Millions			Thousands			Ones		
100s	10s	1s	100s	10s	1s	100s	10s	1s
								1
							1	0
						1	0	0
					1	0	0	0
				1	0	0	0	0
			1	0	0	0	0	0
		1	0	0	0	0	0	0

Powers of 10 place value chart to show the different powers of ten and patterns



Place Value Arrow cards to show the value of each digit in a number

Vocabulary:
Units of, ones, tens, hundreds, thousands, tens of thousands, hundreds of thousands, millions, tens of million digit, one-, two- or three-digit number, 'teens' number place, place value, stands for, represents, regroup, the same number as, as many as, equal to

Of two objects/amounts:
greater, more, larger, bigger, less, fewer, smaller

Of three or more objects/amounts:
greatest, most, biggest, largest, least, fewest, smallest
--- ones more/less, ---tens more/less, --- hundreds more/less, --- thousand more/less, ---- ten thousand more/less, --- hundred thousand more/less, --- million more/less one less, compare, order, size, first, second, third… tenth… twentieth, twenty-first, twenty-second…
last, last but one, before, after, next, between, half-way between above, below

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Domain: **Addition and subtraction -** Calculating using knowledge of structures (Spines 1.28 and 1.29 from Y5 and 1.30 from Y6)

Revision year 5:

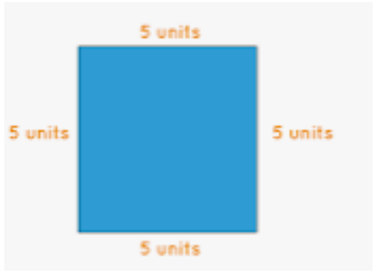
- **I can add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)**
- **I can add and subtract numbers mentally with increasingly large numbers**
- **I can use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy**
- **I can solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why**
- I can add and subtract decimal numbers using a formal column method
- I can interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero

New learning- KPIs:

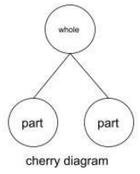
- **I can solve addition and subtraction multi-step problems in contexts; deciding which operations and methods to use and why.**
- I can understand that two numbers can be related additively and quantify additive relationships.
- I can use a given additive calculation to derive or complete a related calculation using arithmetic properties, inverse relationships and place value understanding.
- I can use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.

Visualisation and context:

- **Money** as a real-life context for adding and subtracting decimal numbers
- **Addition** to find the perimeter of all 2D regular shapes



- **Part part whole relationship and structure**



cherry diagram

Whole	
Part	Part

Bar model

- **Bar model structure**

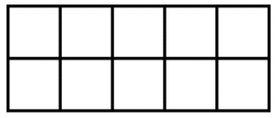
This diagram encapsulates all of the following relationships;

a = b + c ; a = c + b ; a – b = c ; a – c = b

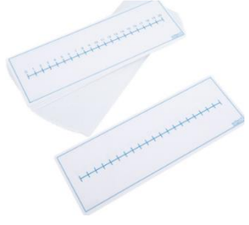
Resources to support learning:

Dienes to support children to understand regrouping e.g. 10 ones becoming 1 ten (see Y3 & Y4 MTPs for using dienes with partitioning to support regrouping).

Place value counters to practise the skill of adding and subtracting



Tens frame to support children in understanding how to bridge through 10



Double sided number line whiteboards/ unstructured number lines to show children the position of numbers including negative numbers and how to round to the nearest multiple of…

Common misconceptions:

- Understanding how to regroup when addition crosses place value columns
- Knowing how to represent regrouping in a formal strategy and what the value of these digits represents
- Understanding how to regroup in subtraction in a formal method so that they don't subtract a value from the **subtrahend** instead of the **minuend**.

2 3 4 6 7 2 3 3	For example, taking 4 away from 7 and 3 away from 6

- Lining up the digits inaccurately and not adding the regrouping digits into the correct column

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Vocabulary:

Addition:

add, addition, more, plus, make, sum, total, altogether, double, near double, one more, two more... ten more... one hundred more,
How many more to make…? How many more is… than…? How much more is…?
subtract, subtraction, take (away), minus, leave, difference, one less, two less… ten less… one hundred less
How many are left/left over how many fewer is… than…? How much less is…?
difference between, half, halve
equals, sign, is the same as
tens boundary, hundreds boundary, unitise

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Domain: **Multiplication and division** (Spines 1.26 and 2.18 (Y5), 2.23, 2.24 and 2.25 (Y6))

Revision year 5:

- **I know and can use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers**
- **I can establish whether a number up to 100 is prime and recall prime numbers up to 19**
- **I can identify multiples and factors, including finding all factor pairs of a number, and common factors of 2 numbers**
- I can multiply any whole number with up to 4 digits by any one-digit number using a formal written method
- I can divide a number with up to 4 digits by a one-digit number using a formal written method and interpret remainders appropriately for the context given
- I can multiply and divide whole numbers and those involving decimals by 10, 100 and 1,000
- I can multiply any two-digit number with a number with up to 3 digits by using a formal written method

New learning- KPIs:

- **I can compose and calculate multiples of 1,000 up to 1, 000,000.**
- **I can identify common factors, common multiples and prime numbers.**
- **I can multiply multi-digit (upto 4-digit) numbers by two-digit whole numbers using formal written long multiplication methods.**
- **I can divide up to 4-digit numbers by two-digit whole numbers using formal written long division methods.**
- **I can interpret remainders as whole numbers, fractions or by rounding as appropriate for the context.**

Spine 2.23

- I can multiply two numbers that are multiples of 10, 100 or 1,000 by multiplying the number of tens, hundreds or thousands and adjusting the product using place value.
- I can partition one of the factors in two or three-digit multiplication calculations in order to calculate partial products and then adding these together to find the total product.
- I can use the long multiplication algorithm to support the multiplication of two numbers with two or more digits.
- Where one factor is a composite number, I can multiply one factor and then the other factor.

Spine 2.24

- I can skip count in multiples of the divisor (where the quotient is <10) and use the short or long division algorithms to record my steps (where the dividend is a two or three-digit number.
- I can use short or long division algorithms to divide three and four-digit dividends by a two-digit divisor.
- I can express remainders as whole numbers, a proper fraction or a decimal fraction as part of the quotient.

Spine 2.25

- For multiplication, I can explain and reason that if there is a chance to one factor, the product changes by the same scale factor.
- For division, I can explain and reason that if there is a multiplicative change to the dividend and the divisor remains the same, the quotient changes by the same scale factor.
- For division, I can explain and reason that if there is a multiplicative increase to the divisor and the dividend remains the same, the quotient decreases by the same scale factor. If there is a

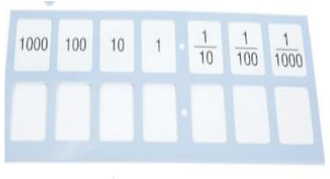
Resources to support learning:

Times table flash cards/ playing cards for rapid recall games

Magnetic bar model set to show how many equal groups fit into a whole

Red and yellow counting stick to count up in multiples of and to help children identify patterns in times table families

Place value counters for children who need to build arrays or to show 'groups of' in division



Sliding place value charts when teaching how numbers change when multiplying and dividing by powers of 10

Common misconceptions:

- Thinking that 1 is a prime number even though it only has one factor (not two)
- Thinking that 2 is a composite number because it is even
- Understanding the difference between factors and multiples and accurately using this terminology (Moving on from factor and product)
- To make a number ten times bigger you add a 0
- Understanding that multiplication using a formal strategy requires unitising 4 x 3, 4 x 3 tens, 4 x 6 hundreds, 4 x 8 thousands

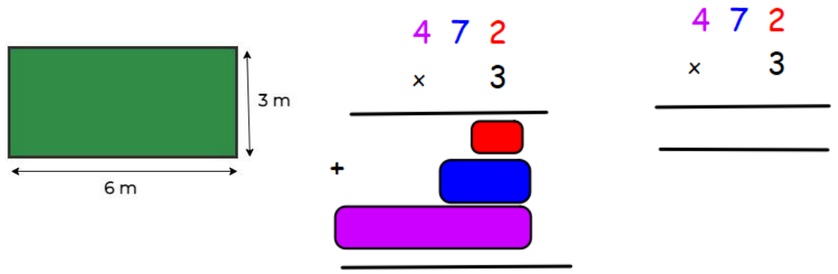
- I can multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
- I can compare areas and calculate the area of rectangles and apply my knowledge of multiplying and diving by 10, 100 and 1000 to convert between different units of measure

multiplicative decrease to the divisor and the dividend remains the same, the quotient increases by the same scale factor.

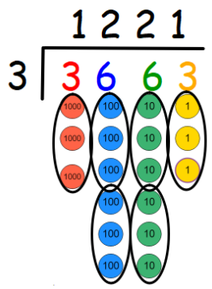
Visualisation and context:

- **Bar model**

- **Expanded and compact** methods of multiplication must be taught alongside one another (see example below)

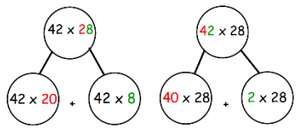


- **Place value counters** to show groupings when using bus stop method



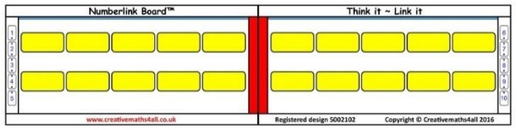
- **Place value counters** to arrays for long multiplication to model the **distributive** law

- **Part whole** to support with application of the **distributive** law



Red and yellow counters for arrays

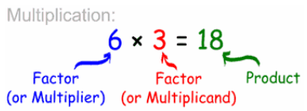
Multilink for arrays

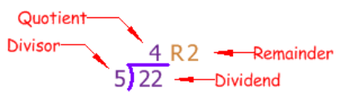


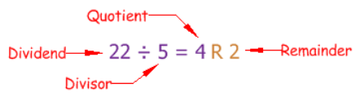
Numberlink boards to show children the relationship of multiplication facts and to teach the 1, 10, 5 derive structure

	• **Formal partitioned** multiplication alongside a **formal** written method for long multiplication		

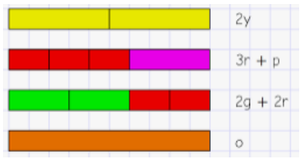
Vocabulary:
lots of, groups of, factor, times, multiply, multiplication, multiplied by, multiple of, product
once, twice, three times… ten times…times as (big, long, wide… and so on), repeated addition, array, row, column, double, halve, share, share equally, one each, two each, three each…group in pairs, threes… tens, equal groups of, , divide, division, divided by, divided into, left, left over, remainder







Domain: **Algebra** (Link to Spine 1.31 problems with two unknowns)

Revision Year 5:	**New learning- KPIs:**	**Resources to support learning:**	**Common misconceptions:**
N/A	**I can use simple formulae** I can generate and describe linear number sequences I can express missing number problems algebraically I can find pairs of numbers that satisfy number sentences involving 2 unknowns I can enumerate possibilities of two unknowns **Visualisation and context:** **Bar model:**  This diagram encapsulates all of the following relationships; a = b + c ; a = c + b ; a – b = c ; a – c = b	**Cuisenaire rods**  	• That certain letters have to have a specific value • Misunderstandings re: about shorthand algebra eg: 5x + 4 = 9x instead of 5 lots of x + 4

Domain: **Measure**

Revision Year 5:	**New learning- KPIs:**	**Resources to support learning:**	**Common misconceptions**
• **I can convert between different units of metric measure (e.g. km to m,**	• **I can use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure.**		• Confusion between base 10 and base 60 for time

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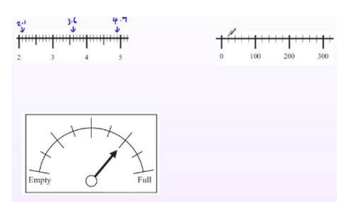
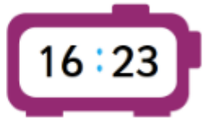
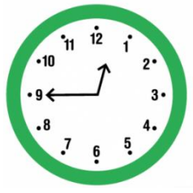
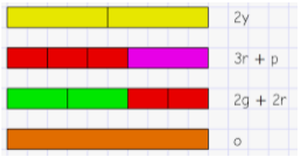
cm to m, cm to mm, g to kg, l to ml)	**Visualisation and context:**       	**Measuring jugs / containers of differing sizes** **Metre sticks, tape measure, string** **Scales – digital and analogue with different weights** **Real-life objects** to be weighed **Clocks – analogue and digital** **Timetables and old calendars** Calendars on display in each classroom?  	• Confusion over number of days in each month • Confusion re: 1000 m/ml = 1km/l but only 100 cm = 1 m
Vocabulary: Second, minute, hour, day, fortnight, month, year, decade, century; millimetre, centimetre, metre, kilometre, miles; gram, milligrams, kilograms; millilitre, litres; between, before, after,			
Phase 2			
Domain: **Calculation** (Spines 1.31 (Y6), 2.22 (Y5) and 2.28 (Y6))			
Revision Year 5: Spine 2.22 – combining multiplication with addition and subtraction	**New learning- KPIs:** • **I can use my knowledge of the order of operations to carry out calculations involving four operations** Spine 1.31 • I can describe the relationship between two unknowns both additively and multiplicatively to find a solution, more than one solution or no solution. • I can use drawings and jottings to expose the structure of a problem with two unknowns. • I can reason about sum and difference problems and sum and multiple problems where there are two unknowns. • I can use a trial and improvement approach to solve problems with two unknowns where there may be one, several or infinite solutions. Spine 2.28 – combining division with addition and subtraction	**Resources to support learning:**  	**Common misconceptions:** • Which part of the equation is the unknown – eg: re-labelling or re-ordering the equation to help you

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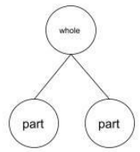
Visualisation and context:
Bar model

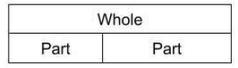
This diagram encapsulates all of the following relationships;

a = b + c ; a = c + b ; a – b = c ; a – c = b

Part part and multi-part whole models

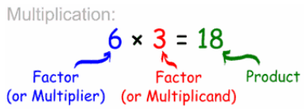


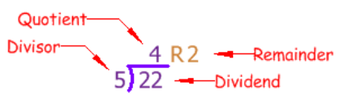
cherry diagram

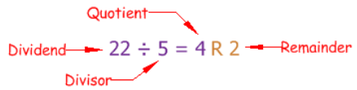


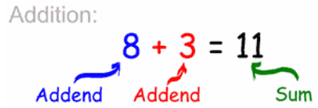
Bar model

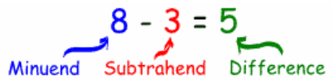
Vocabulary:
lots of, groups of, times, multiply, multiplication, multiplied by, multiple of, product, equal groups of, , divide, division, divided by, divided into, left, left over, remainder











add, addition, more, plus, make, sum, total, altogether, double, near double, one more, two more… ten more… one hundred more,
How many more to make…? How many more is… than…? How much more is…?
subtract, subtraction, take (away), minus, leave, difference, one less, two less… ten less… one hundred less
How many are left/left over how many fewer is… than…? How much less is…?
difference between, equals, sign, is the same as

Domain: **Algebra**

Revision Year 5:
N/A

New learning – KPIs:

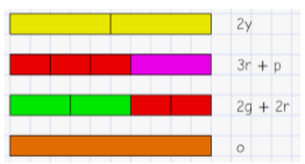
- **I can express missing number problems algebraically.**
- **I can find numbers that satisfy number sentences.**

Visualisation and context:
Bar model

This diagram encapsulates all of the following relationships;

a = b + c ; a = c + b ; a – b = c ; a – c = b

Resources to support learning:



Misconceptions:

- Which part of the equation is the unknown – eg: relabelling or re-ordering the equation to help you
- That certain letters have to have a specific value
- Misunderstandings re: about shorthand algebra eg: 5x + 4 = 9x instead of 5 lots of x + 4

Vocabulary:
is the same as; language linked to four operations (to help with labelling equations)

Domain: **Fractions and decimals** (Spines 3.9 and 3.10)

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Revision Year 5:

Spine 3.8

- I can find factors and multiples of positive whole numbers including finding common factors and common multiples
- I can express a number as a product of 2 or 3 factors
- I can convert between units of measure including using common decimals and common fractions
- I can find non-unit fractions of quantities
- I can find equivalent fractions and understand that they have the same value and the same position of a linear number system
- I can recall decimal fractions equivalents for $\frac{1}{2}$, $\frac{1}{4}$, 1/5, 1/10 and for multiples of these proper fractions

New learning- KPIs:

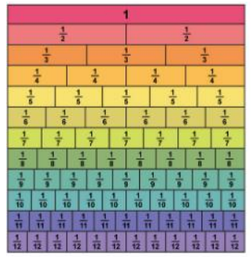
- **I can solve problems which require answers to be rounded to specified degrees of accuracy.**
- **I can recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.**
- **I can add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions.**
- **I can compare and order fractions greater than 1.**
- **I can use written division methods where the answer has up to two decimal places.**
- **I can multiply simple pairs of proper fractions, writing the answer in in its simplest form.**
- **I can divide proper fractions by whole numbers.**

- I can recognise when a fraction can be simplified.
- I can use common factors to simplify fractions.
- I can express fractions in a common denomination and use this to compare fractions that are similar in value.
- I can compare fractions with different denominators, including fractions greater than 1, using reasoning.
- I can choose between reasoning and common denomination as a comparison strategy.

Spine 3.9 – multiplying and dividing fractions by a whole number

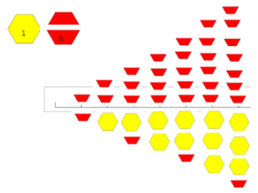
Spine 3.10 – linking fractions, decimals and percentages

Resources to support learning:



Fraction walls to identify equivalent fractions

Cuisenaire rods to identify and build fraction families; and to convert improper & mixed number fractions



Staircase double number lines to identify how equivalent improper fractions and mixed numbers

Misconceptions:

- That when you multiply fractions the product is bigger
- That when you divide fractions the quotient is bigger (the denominator is a larger number but the size is smaller) = use of stem sentence " the larger the denominator, the smaller the size of the part"
- When you add and subtract fractions with different denominators, adding or subtraction both the numerator and denominator (without finding a common denominator)
- The larger the denominator the larger the fraction because the digit on the bottom has a larger cardinal value

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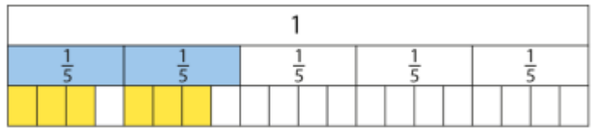
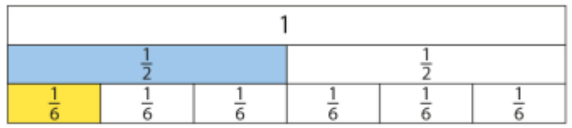
- **I can recognise mixed number and improper fractions and convert from one form to the other and write mathematical statements >1 as a mixed number (e.g. 2/5 + 4/5 = 6/5 = 1 1/5)**
- **I can compare and order fractions whose denominators are all multiples of the same number**
- **Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams**

Visualisation and context:

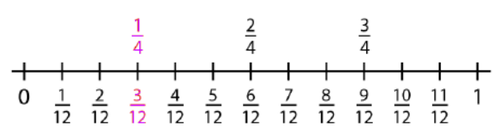
Visualisation and context:

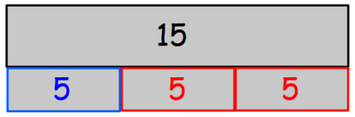
- **Fraction rainbows** to show how to find equivalent fractions
- **Explain**, **make** and **prove** it grids
- **Bar models** to show fractions of amount; to show how to divide and multiply fractions
- **Double number lines** to show equivalent fractions

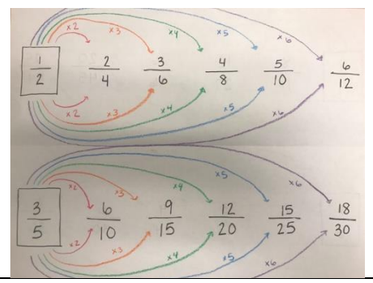


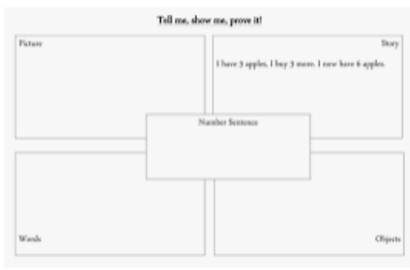


$\frac{1}{2} \div 3 = \frac{1}{6} \longrightarrow \frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$









Fraction dice to support in lessons when identifying fractions of amount and the relationship between denominators

Pattern blocks to support with teaching equivalent fractions; and to convert improper & mixed number fractions

Red and yellow counters to teach fractions of amount

Vocabulary:
Equivalent, Numerator, Denominator, divisor, per cent, percentage, decimal fraction, reciprocal
part, equal parts, fraction, one whole, one half, two halves
one quarter, two… three… four quarters, one third, two thirds, three thirds, one tenth

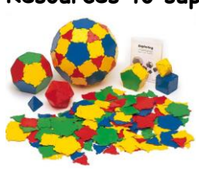
Domain: **Measure**

Revision Year 5:
N/A

New learning- KPIs:

- **I can calculate and compare the area of rectangles (including squares) and including standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes.**
- **I can recognise that shapes with the same areas can have different perimeters and vice versa.**

Resources to support learning:



Misconceptions:

- Misunderstandings re: formula (length x width = area in __ but forget to square it when it isn't a square)

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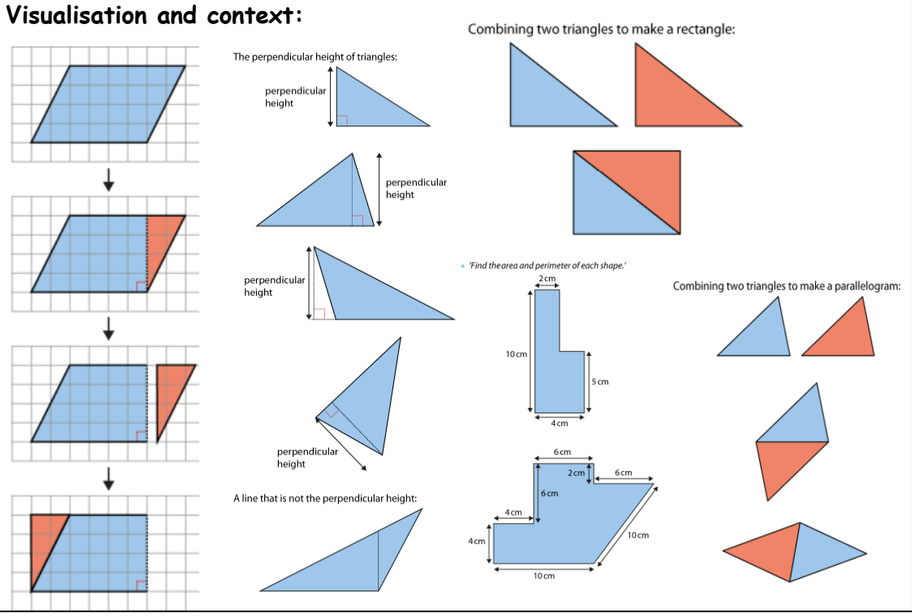
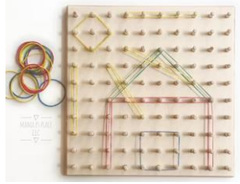
Spine 2.30 – multiplicative contexts, area and perimeter 2

Visualisation and context:



3D shapes/polydron to build compound shapes



Peg boards and elastic bands

Sheets of squared paper/shapes to draw shapes and cut out

- Adding additional lengths when calculating the perimeter of compound shapes (eg: adding the length of the side you've used to split the original length
- Formula for the area of a parallelogram = base x height (shape when it's formed a rectangle) whereas perimeter = base x width (original shape)
- Confusion re: properties of triangles and how to use these to help find area
- That shapes with the same area have the same perimeter and vice versa

Vocabulary:
base, height, width, length, area, perimeter, squared units of measure, equilateral, isosceles, scalene, right-angle, perpendicular, parallel, parallelogram, rectangle, square, triangle, compound, scale factor

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Domain: **Ratio and Proportion** (Spine 2.27)

Revision Year 5:

- **I can recognise the percent symbol (%) and understand that percent relates to 'number of parts per hundred'**
- **I can and percentages as a fraction with denominator 100 and as a decimal**
- **I can solve problems which require knowledge of percentage and decimal equivalents of 1/2, 1/4, 1/5, 2/5, 4/5 and those fractions with a denominator of a multiple of 10 or 25**

New learning- KPIs:

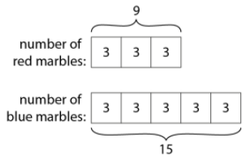
- **I can solve problems involving the calculation of percentages (eg: of measures) such as 15% of 360**
- **I can use percentages for comparison**
- **I can solve problems involving unequal sharing and grouping using my knowledge of fractions and multiples.**

Spine 2.27 – scale factors, ratio and proportional reasoning

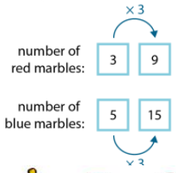
Visualisation and context:

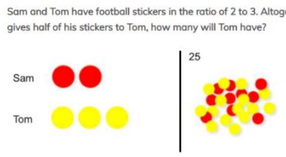
Bar models
Ratio grids
Tables

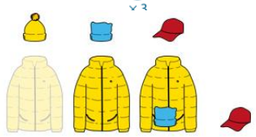
Bar modelling:



Ratio grid:







Number of coats	Number of hats	Combinations
1	1	1
1	2	2
1	3	3

Resources to support learning:

Red and yellow counters to create ratio grids

Misconceptions:

- In ratio tables, forgetting to find the total (whole) eg: Sam has 2 counters, Tom has 3 so they have 5 counters altogether to help find the denominator eg: S = 2/5 and T = 3/5

Vocabulary:
Scale, factor, scale factor, increasing, decreasing, proportional, proportion, part of, part, whole, total
Links to multiplication and division language

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Phase 3

Domain: **Ratio and Proportion**

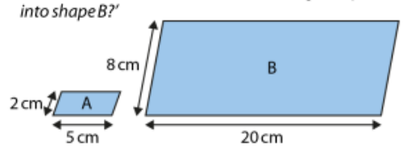
Revision year 5:
N/A

New learning- KPIs:

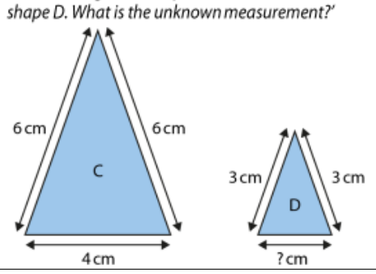
- **I can solve problems involving similar shapes where the scale factor is known or can be found.**

Visualisation and context:

- *'What scale factor has been used to change shape A into shape B?'*



- *'The side-lengths of Shape C have been scaled to make shape D. What is the unknown measurement?'*



Resources to support learning:

Squared paper for drawing scaled shapes

Misconceptions:

- That if you're scaling down the size of something, it is becoming a fraction of its size so you are actually dividing by a fraction eg: it is getting 3 times smaller = it's 1/3 of its original size

Vocabulary:
Scale, factor, scale factor, increasing, decreasing, proportional, proportion, part of, larger than, smaller than, dimensions, longer, shorter, reduce/reduction, enlarge/enlargement
Links to multiplication and division language

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Domain: **Measure**

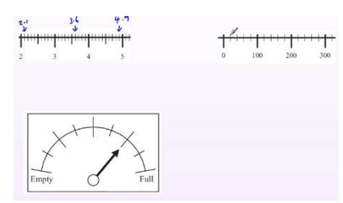
Revision year 5:

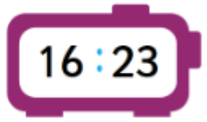
- **I can convert between different units of metric measure (e.g. km to m, cm to m, cm to mm, g to kg, l to ml)**

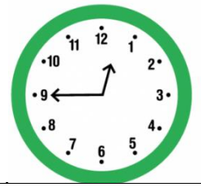
New learning- KPIs:

- **I can estimate volume (using 1cm^3 blocks to build cubes and cuboids) and capacity (using water).**
- **I can solve problems involving converting between units of time**
- **I can solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places.**
- **I can recognise when it is possible to use formulae for area and volume of shapes.**

Visualisation and context:






Resources to support learning:

Dienes

Multilink cubes to build models to help calculate the volume of shapes

Measuring jugs and cylinders/containers of different sizes

Misconceptions:

- That volume is what's inside a 3D shape and therefore need to multiply 3 factors (length x width x height)
- Not counting all the cubes in a diagram especially when you can't see them

Vocabulary:
Volume, amount of space inside, capacity, length, width, height, how much longer/shorter, difference between, time taken to …

Domain: **Geometry – Shape and Space**

Revision from year 5:

- **I can identify 3-D shapes, including cubes and other cuboids, from 2-D representations**
- **I know angles are measured in degrees and can estimate and compare acute, obtuse and reflex angles**

New learning- KPIs:

- **I can compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangle, quadrilateral or regular polygon.**
- **I can draw 2D shapes using given dimensions and angles.**
- **I know angles are measured in degrees.**
- **I can estimate and compare acute, obtuse and reflex angles.**
- **I can draw given angles and measure them in degrees (x^o).**
- **I can recognise, describe and build simple 3D shapes.**

Resources to support learning:


Plastic geometric shapes/Polydron to support children with classification of 3D shapes and to understand nets

Misconceptions:

- Confusion between vertex, vertices, edges and faces

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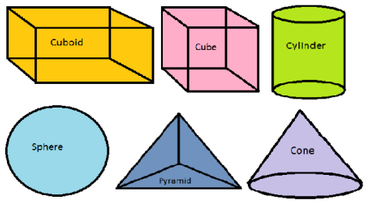
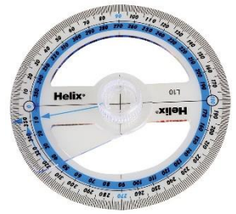
- **I can draw given angles and measure them in degrees**
- **I can identify: angles at a point and one whole turn (total 360 degrees), angles at a point on a straight line and 1/2 a turn (total 180 degrees) and other multiples of 90 degrees**
- **I can use the properties of rectangles to deduce related facts and find missing lengths and angles**
- **I can distinguish between regular and irregular polygons based on reasoning about equal sides and angles**
- **I know that angles inside a triangle add to make 180 degrees and angles inside a quadrilateral add to make 360 degrees**

Visualisation and context:

- **Angle family** to support with identifying different types of angles in shapes
- **2D images** of 3D shapes to support with classification and description of 3D shapes





360 degree protractor to measure and draw angles

Mirrors to identify lines of symmetry

Vocabulary:
Acute, obtuse, reflex, right-angle, degrees, regular, irregular, vertex/vertices, edge, face, sides, corners

Domain: Geometry- position and direction

Revision from year 5:

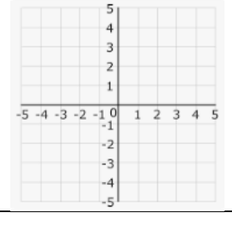
- **I can identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed**

New learning- KPIs:

- **I can describe positions on the full co-ordinates grid (four quadrants).**
- **I can draw and translate simple shapes on the co-ordinate plane, and reflect them in the axis.**

Visualisation and context:

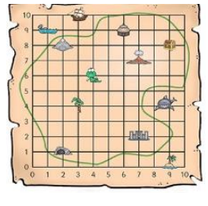
- **Four quadrant grids** when reading and plotting coordinates



Resources to support learning:

Mirrors to help reflect shapes on a grid

Treasure map to practise reading and plotting coordinates



Misconceptions:

- Reading and writing the order of coordinates incorrectly- writing the y axis coordinate number before the x axis coordinate

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Vocabulary:
Quadrant, negative/minus, positive, transform, reflect, translate, axis, y, x,

Domain: **Statistics** (link to Spine 2.26 mean averages and equal shares)

Revision from year 5:

- **I can solve comparison, sum and difference problems using information presented in a line graph**
- **I can complete, read and interpret information in tables, including timetables**
- **I can solve problems involving converting between units of time**
- **I can use all four operations in problems involving time and money, including conversions (for example, days to weeks, expressing the answer as weeks and days)**

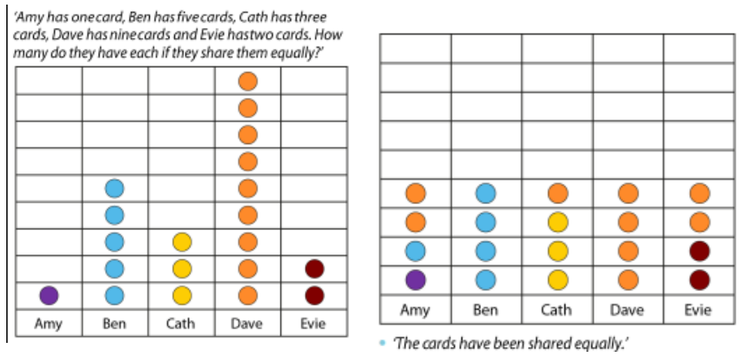
New learning-KPIs:

- **I can complete, read and interpret information in tables, including time tables.**
- **I can solve comparison, sum and difference problems using information presented in a time graph.**
- **I can interpret and construct pie charts and line graphs and use these to solve problems.**
- **I can calculate and interpret the mean as an average.**

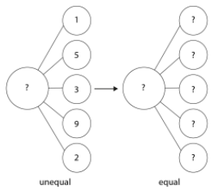
Spine 2.26 – mean average and equal shares

Visualisation and context:

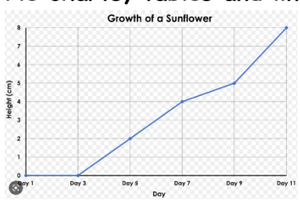
Mean:

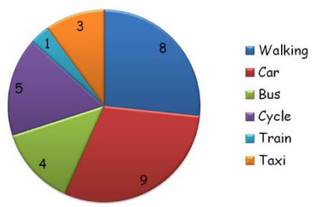


Part whole models to show equal and unequal sharing



Pie charts, tables and line graphs:



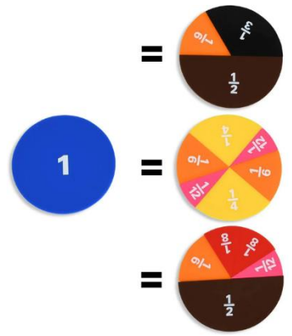


Resources to support learning:

Plastic clocks to teach children how to read the time

Number lines with intervals of 5 to 60 to represent the 12-hour clock as a more familiar number line structure

Magnetic fractions to show pie charts



Counters to help physically redistribute quantities to help calculate mean

Misconceptions:

- Reading the time and confusing the minute and hour hand
- Reading the coordinates on a graph incorrectly – reading the y coordinate before the x coordinate
- Not adding up all the groups and then needing to divide by the number of groups
- Not using 360° in a circle to help calculate sizes of segments in a pie chart

Vocabulary:
Mean, mode, average, median, compare, part/proportion of, difference between, shared equally, unequal sharing, redistributing