Maths Year 5 Curriculum

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Phase 1

Domain: **Place Value**

Revision year 4:

- I can use column method to add and subtract 3-digit numbers – revision from year 3

- I know that 10 hundreds are equivalent to 1 thousand and that 1,000 is 10 times the size of 100; I can apply this to identify and work out how many 100s there are in other four-digit multiples of 100
- I can recognise the place value of each digit in four-digit numbers using standard and non-standard partitioning
- I can reason about the location of any four-digit number in the linear number system including identifying multiples of 1000 before and after
- I can round any four-digit number to the nearest 10, 100 and 1000
- **I can read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of 0 and place value**

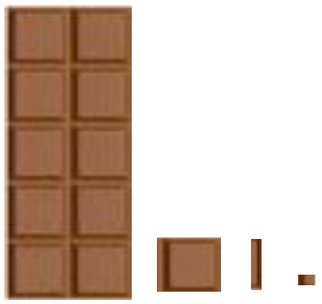
New learning- KPIs:

- **I can read, write, order and compare numbers to at least 1 000 000 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 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
- 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

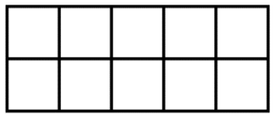
Visualisation:

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



Resources to support learning:

Numicon can be used to support children with number bonds to 10.



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…

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

Common misconceptions:

- Finding the multiple before or after the number which needs rounding for example multiple of 10 before 64 is 50
- Thinking that negative numbers with a larger digit have a hight 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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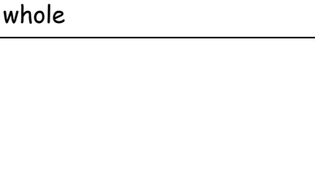
Gattengo charts to the value of each digit in a 4-digit number; this resource helps children to build numbers and understand the value of the digits in the number

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, ones, tens, hundreds, digit, one-, two- or three-digit number, 'teens' number place, place value, stands for, represents, exchange, 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

one more, ten more, one hundred more, one less, ten less, one hundred 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

Domain: **Number facts**

Revision year 4:

- I can divide 1,000 into 2, 4, 5 and 10 equal parts
- I can read scales/number lines marked in **multiples** of 1,000 with 2,4,5 and 10 equal parts
- I can apply place-value knowledge to know

New learning- KPIs:

- I can divide 1 whole into 2, 4, 5 and 10 equal parts
- I can read number lines and scales where units of 1 are marked with 2, 4, 5 and 10 equal parts
- I can use additive and multiplicative number facts (scaling facts by 1 tenth or 1 hundredth)

Resources to support learning:

Cuisenaire rods where the orange rod can represent 1 whole

Common misconceptions:

- Dividing 1 whole into parts and being able to visualise what a part of a whole would look like
- Not making the parts equal – especially when placing intervals on a number line
- Not understanding equivalent decimals for example one tenth

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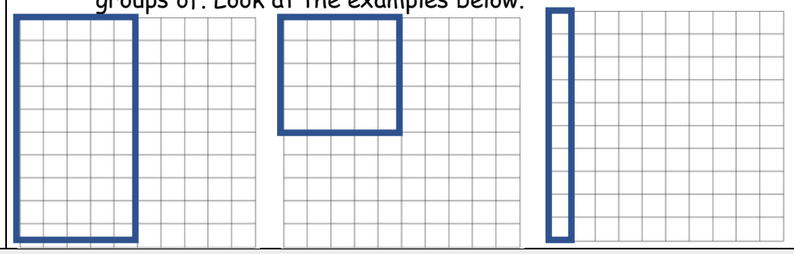
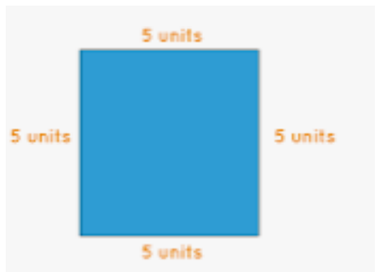
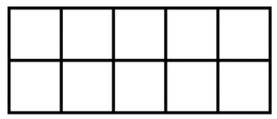
additive and **multiplicative** number facts (**scaling** facts to 100)	**Visualisation:** • **Empty 100 square** to represent 1 whole as a visual model to split into groups of. Look at the examples below. 	 **Number lines** to show children equal intervals	being the same value as ten hundredths

Domain: **Addition and Subtraction**

Revision year 4: • I can add and subtract 3-digit numbers using a column method (year 3) • **I can add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate** • **I can estimate and use inverse operations to check answers to a calculation** • **I can solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why** • I can find the perimeter of regular 2D shapes	**New learning- KPIs:** • **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 **Visualisation and context:** • **Money** as a real-life context for adding and subtracting decimal numbers • **Addition** to find the perimeter of regular and irregular polygons (including those where you have missing lengths)  	**Resources to support learning:**  **Dienes** to support children to understand regrouping e.g. 10 ones becoming 1 ten  **Place value counters** to practise the skill of adding and subtracting  **Tens frame** to support children in understanding how to bridge through 10	**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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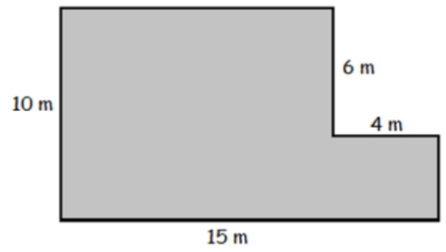

Vocabulary:

Addition:

8 + 3 = 11
Addend Addend Sum

8 - 3 = 5
Minuend Subtrahend Difference

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

Domain: **Short multiplication and division**

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Revision year 4:

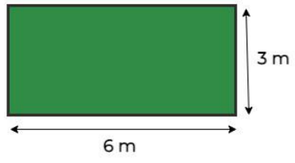
- I can recall multiplication and division facts for my 3-, 6- and 9-times tables
- I can identify the relationship between the 5- and 10-times table families
- I can recognise the relationship between the 2-, 4- and 8-times table families
- I can recognise the relationship between the 3-, 6- and 9-times table families
- I can recall multiplication and division facts for the 7 times tables
- I can multiply and divide whole numbers by 10 and 100 and understand that this is the same as making something ten times or a hundred times the size
- **I can multiply together 3 numbers**
- **I can recognise and use factor pairs and commutativity in mental calculations**

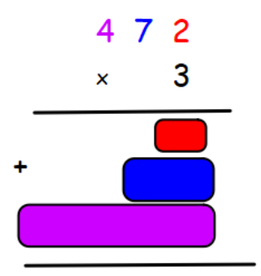
New learning- KPIs:

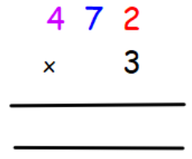
- **I know and can use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers**
- **I can establish whether a number up to 100 is prime and recall prime numbers up to 19**
- **I can identify multiples and factors, including finding all factor pairs of a number, and common factors 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

Visualisation and context:

- **Multiplication** to find the area of rectangles and squares
- **Expanded and compact** methods of multiplication must be taught alongside one another (see example below)



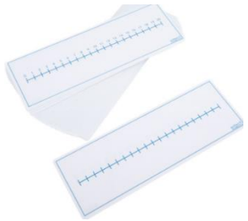




- **Place value counters** to show groupings when using bus stop method

Resources to support learning:

Times table flash cards/ playing cards for rapid recall games



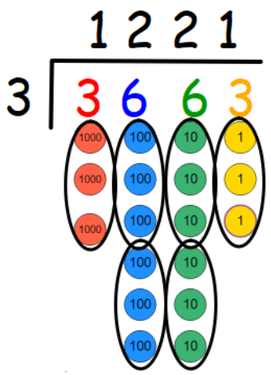
Double sided number line whiteboards to show the relationship between multiplication families

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

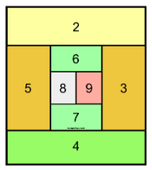
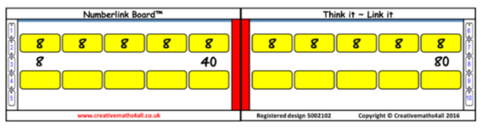
Common misconceptions:

- 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
- 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

		**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	

Phase 2

Domain: **Multiplication and Division**

Revision year 4:	**New learning- KPIs:**	**Resources to support learning:**	**Common misconceptions:**
• multiply two-digit and three-digit numbers by a one-digit number using formal written layout • I can manipulate multiplication and division equations and can understand and apply the law od **commutativity** • I can solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by 1 digit • I can solve division problems with two-digit dividends and one-digit	• I can multiply any two-digit number with a number with up to 3 digits by using a formal written method • 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 • I can find the volume of an object • **I can multiply and divide numbers mentally, drawing upon known facts** • **I can recognise and use square numbers and cube numbers, and the notation for squared (²) and cubed (³)** • **I can solve problems involving multiplication and division, including using their knowledge of factors and multiples, squares and cubes** • **I can solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equal's sign**	 **Drop Zone** game to support times table recall  **Numberlink boards** to make connections between multiplication families 	• In formal written, long multiplication lining up digits accurately in their place value columns • Forgetting to make the second product in long multiplication ten times larger (forgetting the zero) • Understanding the process of long multiplication due to weaker understanding on unitising • Squared number are a factor multiplied by 2 rather than a factor multiplied by itself • Cubed numbers are a factor multiplied by 3 rather than a factor multiplied by itself then itself again

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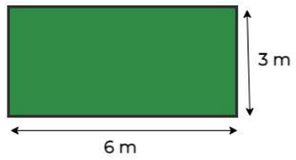
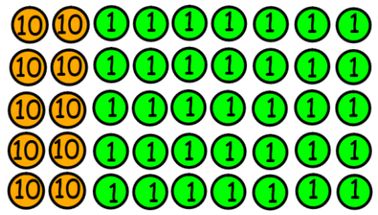
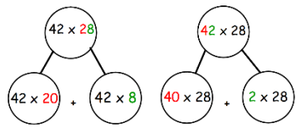
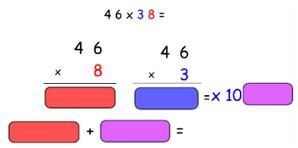
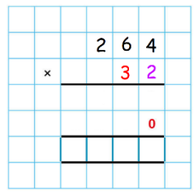
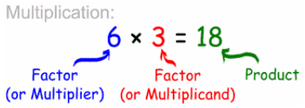
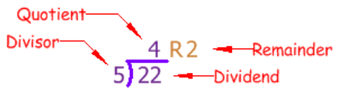
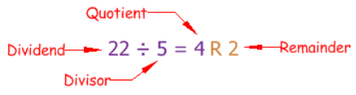
divisors that involve remainders • **I can multiply and divide whole numbers by using a formal written method**	**Visualisation and context:** • **Multiplication** to find the area of rectangles and squares • **Place value counters** to arrays for long multiplication to model the **distributive** law • **Part whole** to support with application of the **distributive** law • **Formal partitioned** multiplication alongside a **formal** written method for long multiplication     	**Place value counters** for children to build long multiplication arrays and to apply the distributive law  **Multi-link** to build squared and cubed numbers	

Vocabulary

lots of, groups of, , 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: **Calculating with decimal fractions**

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Revision from year 4:

- **Compare numbers with the same number of decimal places up to two decimal places**
- **Rounds decimals with one decimal place to the nearest whole number**
- **Solves simple measure and money problems involving fractions and decimals to two decimal places**

New learning- KPIs:

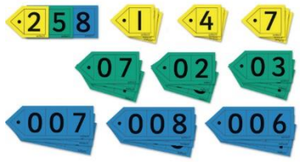
- I can multiply and divide numbers by 10, 100 and understand this is equivalent to making a number 10 times or 100 times larger
- I can recognise that a number is a tenth or hundredth of the size of another
- **I can convert between different units of metric measure (e.g. km to m, cm to m, cm to mm, g to kg, l to ml)**
- **I can find the area, perimeter and volume of objects including those which require conversion between different units of measure**
- **I can read, write and order numbers with up to 3 decimal places**
- **Solve problems involving numbers up to 3 decimal places**
- **I can recognise fraction equivalents for tenths, hundredths and thousandths**

Resources to support learning:

Sliding Place Value charts to show how the position of digits changes when you multiply by powers of 10

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

Common misconceptions:

- To make a number 10 times bigger add a zero onto the end of the number
- To multiply a number by a power of ten, add that number of zeros to the number e.g. 1000 has 3 zeros so you add that many zeros to the factor
- Knowing the multiples of one, the multiple of tenths and multiples of hundredths before and after a decimal number when trying to round

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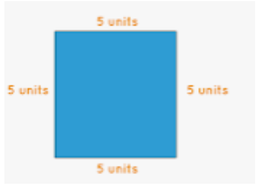
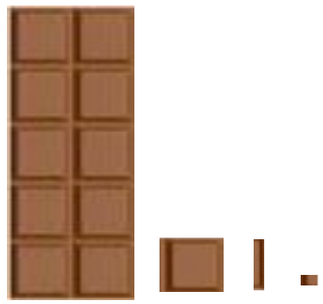
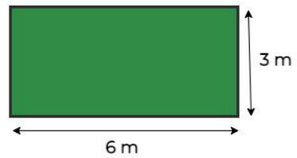
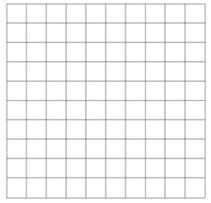
Visualisation and context:

- Chocolate bar split into ten equal **pieces**, ten pieces split into ten equal **slithers**, ten slithers cut into ten equal **crumbs**
- **Money** as a real-life context for adding and subtracting decimal numbers
- **Area and perimeter** contexts when the lengths are measured in different units of measure and require conversion between units of measure
- **Measuring scales** within problems which require conversion between units of measure









Hundred square to teach fraction and decimal equivalents for tenths and hundredths

Number lines to show the position of decimal numbers and to compare decimal numbers

Dienes when large cubes represent 1 whole, flats represent one tenth, stick represent hundredths and small cubes represent one thousandth to build and compare the size of decimal numbers

Domain: **Fractions**

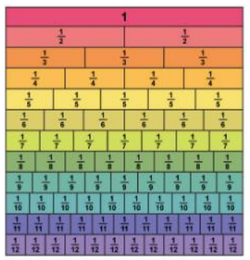
Revision year 4:

- I can interpret and write proper fractions to represent 1 or several parts of a whole that is divided into equal parts
- I can reason about the position of mixed numbers in a linear number system

New learning- KPIs:

- 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 simplify fractions to their simplest form by dividing the numerator and denominator by the highest common factor

Resources to support learning:



Fraction walls to identify equivalent fractions

Misconceptions:

- 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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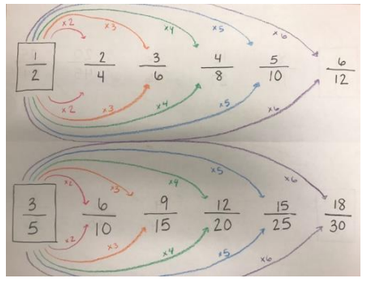
- I can convert mixed numbers to improper fractions and vice versa
- I can add and subtract fractions with the same denominator
- I can add and subtract improper and mixed fractions with the same denominator including bridging through a whole number
- **I can compare and order fractions when the denominator is the same**

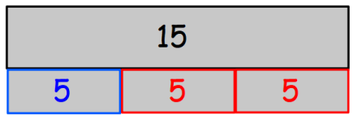
- I can recall decimal fractions equivalents for 1/2, 1/4, 1/5, 1/10 and for multiples of these proper fractions

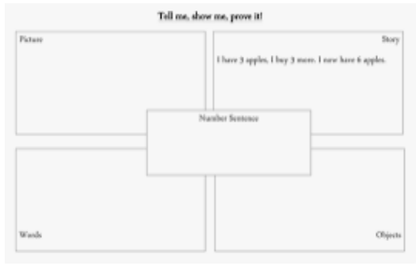
- **I can recognise mixed number and improper fractions and convert from one form to the other and write mathematical statements >1 as a mixed number (e.g. 2/5 + 4/5 = 6/5 = 1 1/5)**
- **I can compare and order fractions whose denominators are all multiples of the same number**
- **Multiply proper fractions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

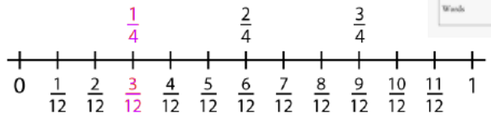
Visualisation and context:

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

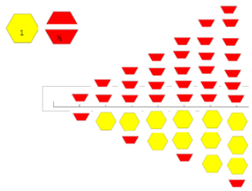








Cuisenaire rods to identify and build fraction families



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

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

Pattern blocks to support with teaching equivalent fractions

Red and yellow counters to teach fractions of amount

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Vocabulary:
Equivalent, Numerator, Denominator
part, equal parts, fraction, one whole, one half, two halves
one quarter, two… three… four quarters, one third, two thirds, three thirds, one tenth

Phase 3

Domain: Percentages

Revision year 4:

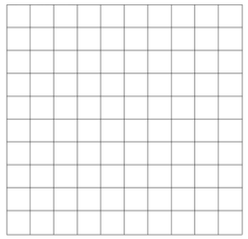
- **I can count up and down in hundredths and recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten**
- **I can solve problems where I have to calculate a fraction of an amount involving increasingly harder fractions to calculate quantities**
- **I can use fractions to divide quantities, including non-unit fractions where the answer is a whole number**

New learning- KPIs:

- **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**

Visualisation and context:

- **Empty hundred square** to represent percentage means out of a hundred and to model equivalent decimals, fractions and percentages



Resources to support learning:

Red and **yellow counters** to find percentages of an amount

Red and **yellow stick** to find the relationship between finding percentages of amount for example, if we know 10% how can we find 5% or 1% or 20%

Misconceptions:

- Not understanding that 1/100 is the same as 1% and 0.01
- Thinking that 0.1 = 1% rather than 10%
- Not understanding that 10% is equivalent to finding 1/10 or 10/100 of an amount

Domain: Geometry – properties of a shape

Revision from year 4:

- I can identify lines of symmetry in 2D shapes presented in different orientations
- I can reflect shapes in a line of symmetry
- I can complete a symmetrical figure or pattern with respect to a specific line of symmetry
- I can identify parallel and perpendicular lines

New learning- KPIs:

- **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**
- **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**

Resources to support learning:

Folding plastic geometric shapes to support children with classification of 3D shapes and to understand nets

Misconceptions:

- Confusion between vertex, vertices, edges and faces

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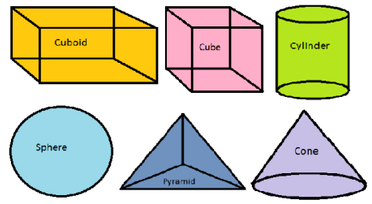
Not bold- Ready to Progress document

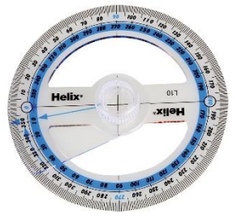
- **I can compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes**
- **I can identify acute and obtuse angles and compare and order angles up to two right angles by size**

- **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

Domain: Geometry- position and direction

Revision from year 4:

- **I can describe positions on a 2-D grid as coordinates in the first quadrant**
- **I can describe movements between positions as translations of a given unit to the left/right and up/down**
- **I can plot specified points and draw sides to complete a given polygon.**

New learning- KPIs:

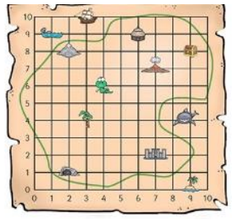
- **I can identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed**

Visualisation and context:

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

Resources to support learning:

Connect four to practise reading 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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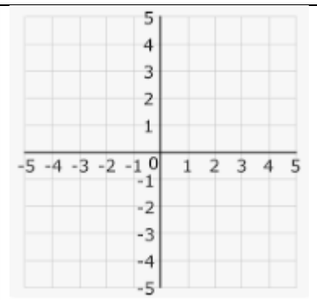


Treasure map to practise reading and plotting coordinates

Domain: Statistics and time

Revision from year 4:

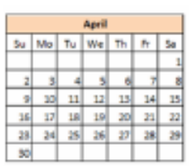
- **I can interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs**
- **I can solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.**
- **I can read, write and convert time between analogue and digital 12- and 24-hour clocks**
- **I can solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days**

New learning-KPIs:

- **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)**

Visualisation and context:

- **Line graphs**
- **Timetables**
- **Calendars**
- **12- and 24-hour clocks**



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

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

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