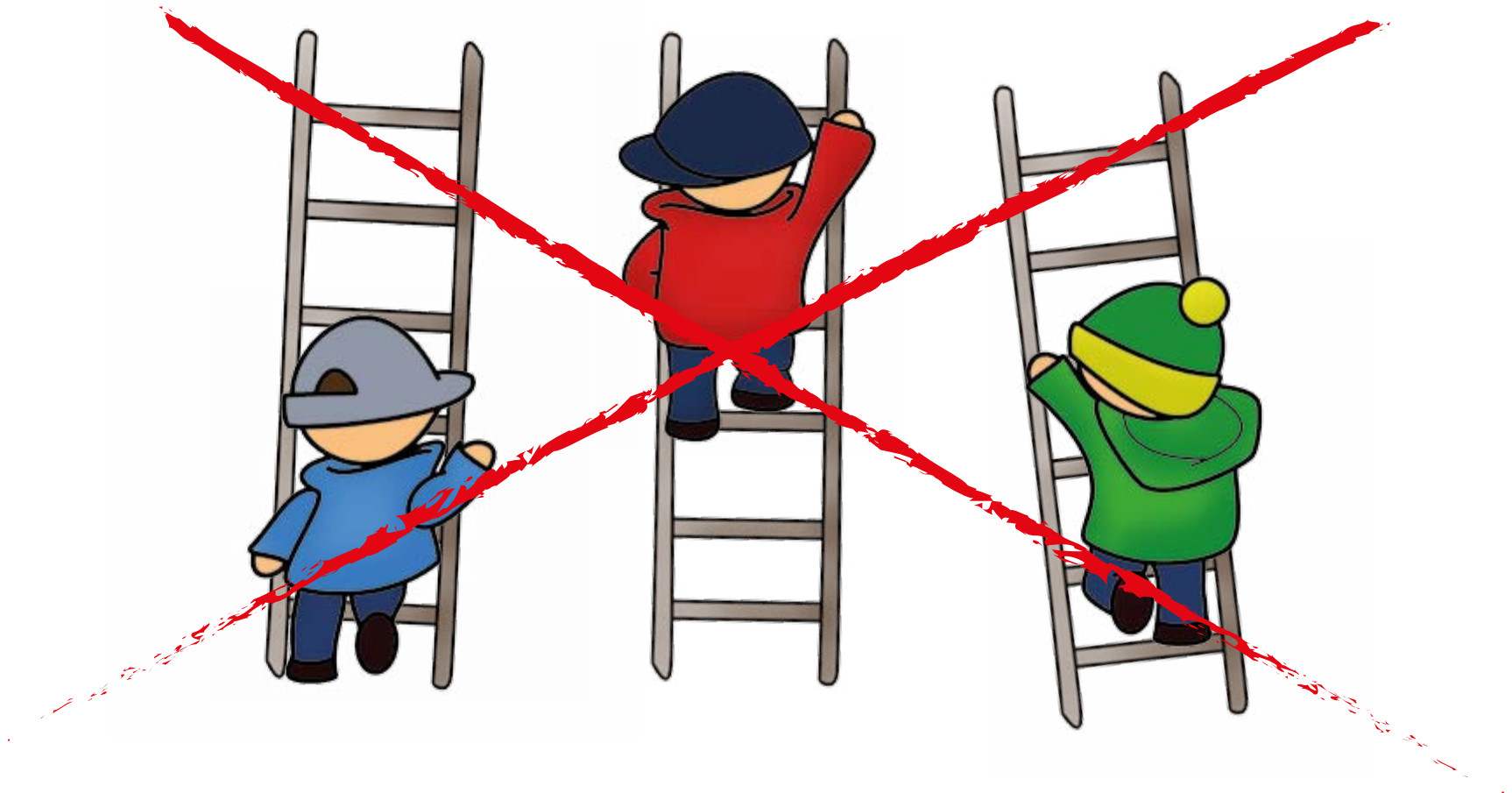




ChrisQuigley  
Education

# Learning Without Lessons

# Pace and race



# Fewer things in greater depth



# Defining depth

“I can drive a car!”





# Fewer things... Really?



248

Things to master in the maths curriculum alone.



# Learning not lessons

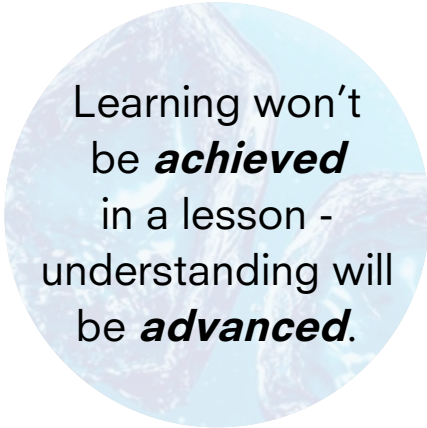
Learning objectives are:

Lessons are:


Progress is:



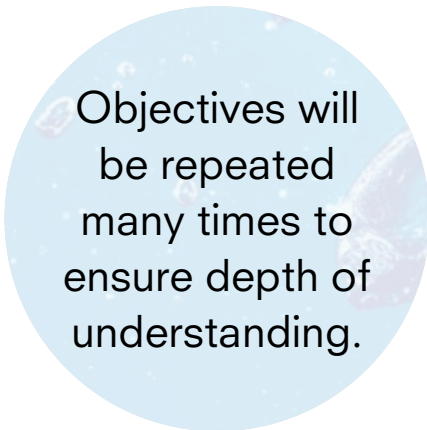
# Learning without lessons - the 4 key principles




Learning won't be ***achieved*** in a lesson - understanding will be ***advanced***.



Lessons may have multiple objectives.



Objectives will be repeated many times to ensure depth of understanding.

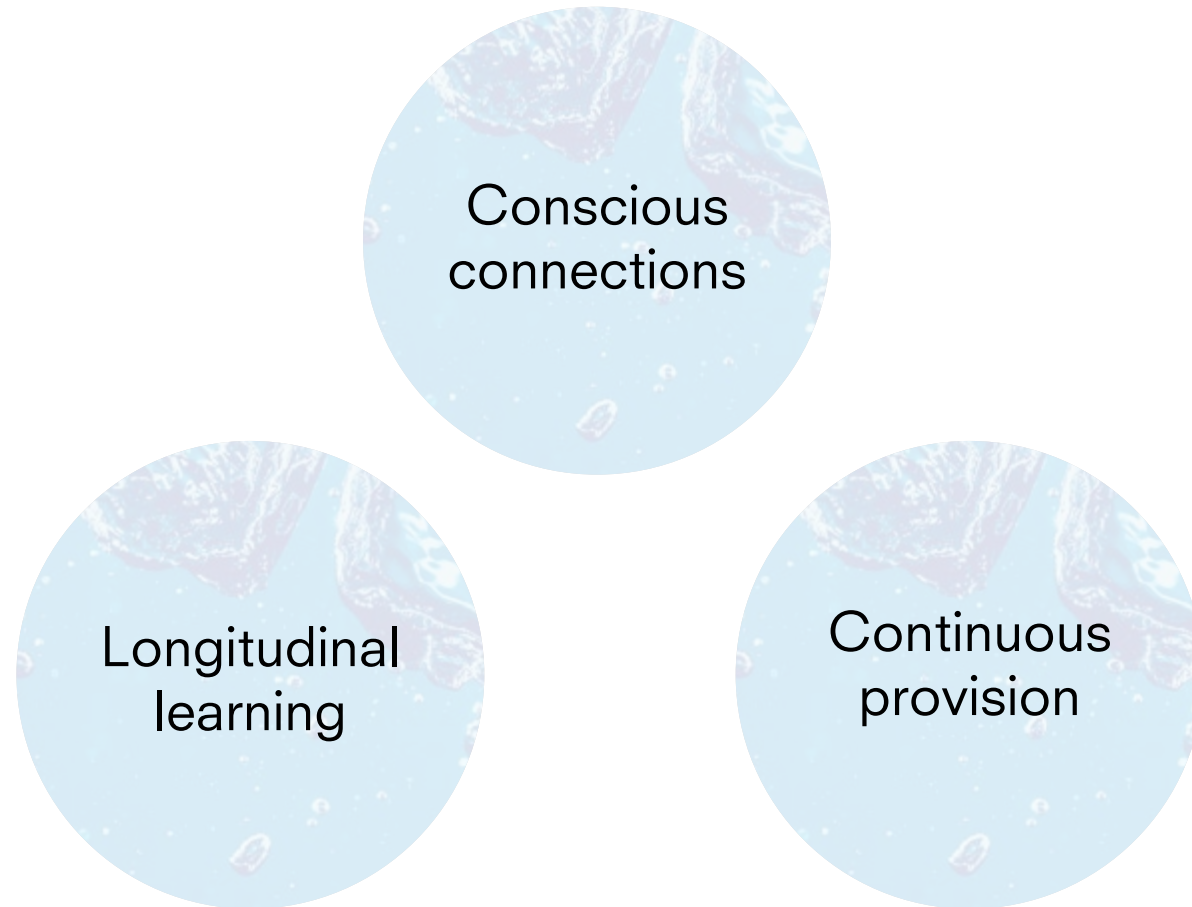


Not all objectives will have dedicated lessons.

Provision needs to be judged over time, not in single lessons.



# Learning without lessons





# Year 1 (31 items)

## Number and place value

- count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number
- count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens
- given a number, identify one more and one less
- identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least
- read and write numbers from 1 to 20 in numerals and words.

## Addition and subtraction

- read, write and interpret mathematical statements involving addition (+), subtraction (−) and equals (=) signs
- represent and use number bonds and related subtraction facts within 20
- add and subtract one-digit and two-digit numbers to 20, including zero
- solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as  $7 = [ ] - 9$ .

## Measures

- compare, describe and solve practical problems for:
  - lengths and heights [for example, long/short, longer/shorter, tall/short, double/half]
  - mass/weight [for example, heavy/light, heavier than, lighter than]
  - capacity and volume [for example, full/empty, more than, less than, half, half full, quarter]
  - time [for example, quicker, slower, earlier, later]
- measure and begin to record the following:
  - lengths and heights
  - mass/weight
  - capacity and volume
  - time (hours, minutes, seconds)
- recognise and know the value of different denominations of coins and notes
- sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]
- recognise and use language relating to dates, including days of the week, weeks, months and years
- tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.

## Multiplication and division

- solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

## Fractions

- recognise, find and name a half as one of two equal parts of an object, shape or quantity
- recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.

## Geometry - shapes

- recognise and name common 2-D and 3-D shapes, including:
  - 2-D shapes [for example, rectangles (including squares), circles and triangles]
  - 3-D shapes [for example, cuboids (including cubes), pyramids and spheres].

## Geometry - position, direction and movement

- describe position, direction and movement, including whole, half, quarter and three-quarter turns.






**Cut your maths lessons by up to  $\frac{1}{3}$**




# The four aspects of maths mastery



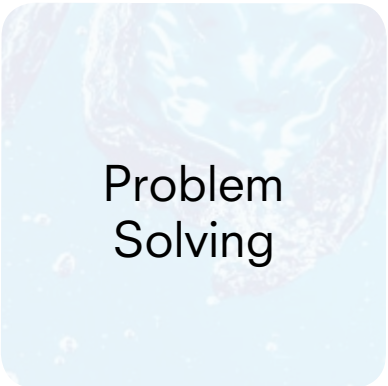
Inter-  
connected



Fluency



Reasoning



Problem  
Solving



# Interconnected maths

Year 1 (31 items)

## Number and place value

- count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number
- count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens
- given a number, identify one more and one less
- identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least
- read and write numbers from 1 to 20 in numerals and words.

## Measures

- compare, describe and solve practical problems for:
  - lengths and heights [for example, long/short, longer/shorter, tall/short, double/half]
  - mass/weight [for example, heavy/light, heavier than, lighter than]
  - capacity and volume [for example, full/empty, more than, less than, half, half full, quarter]
  - time [for example, quicker, slower, earlier, later]
- measure and begin to record the following:
  - lengths and heights
  - mass/weight
  - capacity and volume
  - time (hours, minutes, seconds)
- recognise and know the value of different denominations of coins and notes
- sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]
- recognise and use language relating to dates, including days of the week, weeks, months and years
- tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.

## Multiplication and division

- solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

## Fractions

- recognise, find and name a half as one of two equal parts of an object, shape or quantity
- recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.

## Addition and subtraction

- read, write and interpret mathematical statements involving addition (+), subtraction (−) and equals (=) signs
- represent and use number bonds and related subtraction facts within 20
- add and subtract one-digit and two-digit numbers to 20, including zero
- solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as  $7 = [ ] - 9$ .

## Geometry - shapes

- recognise and name common 2-D and 3-D shapes, including:
  - 2-D shapes [for example, rectangles (including squares), circles and triangles]
  - 3-D shapes [for example, cuboids (including cubes), pyramids and spheres].

## Geometry - position, direction and movement

- describe position, direction and movement, including whole, half, quarter and three-quarter turns.

DT

Computing





# Examples of continuous provision in Key Stage 1



The 4 clock classroom

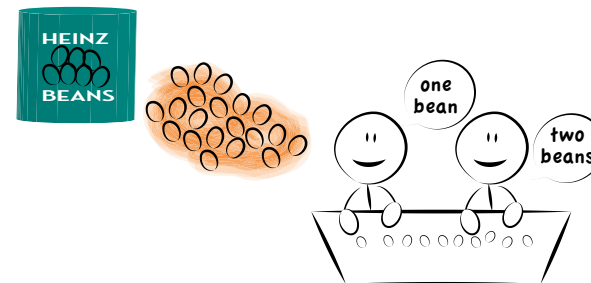


Calendar with weather

(Try adding the season for science: observe seasonal changes)



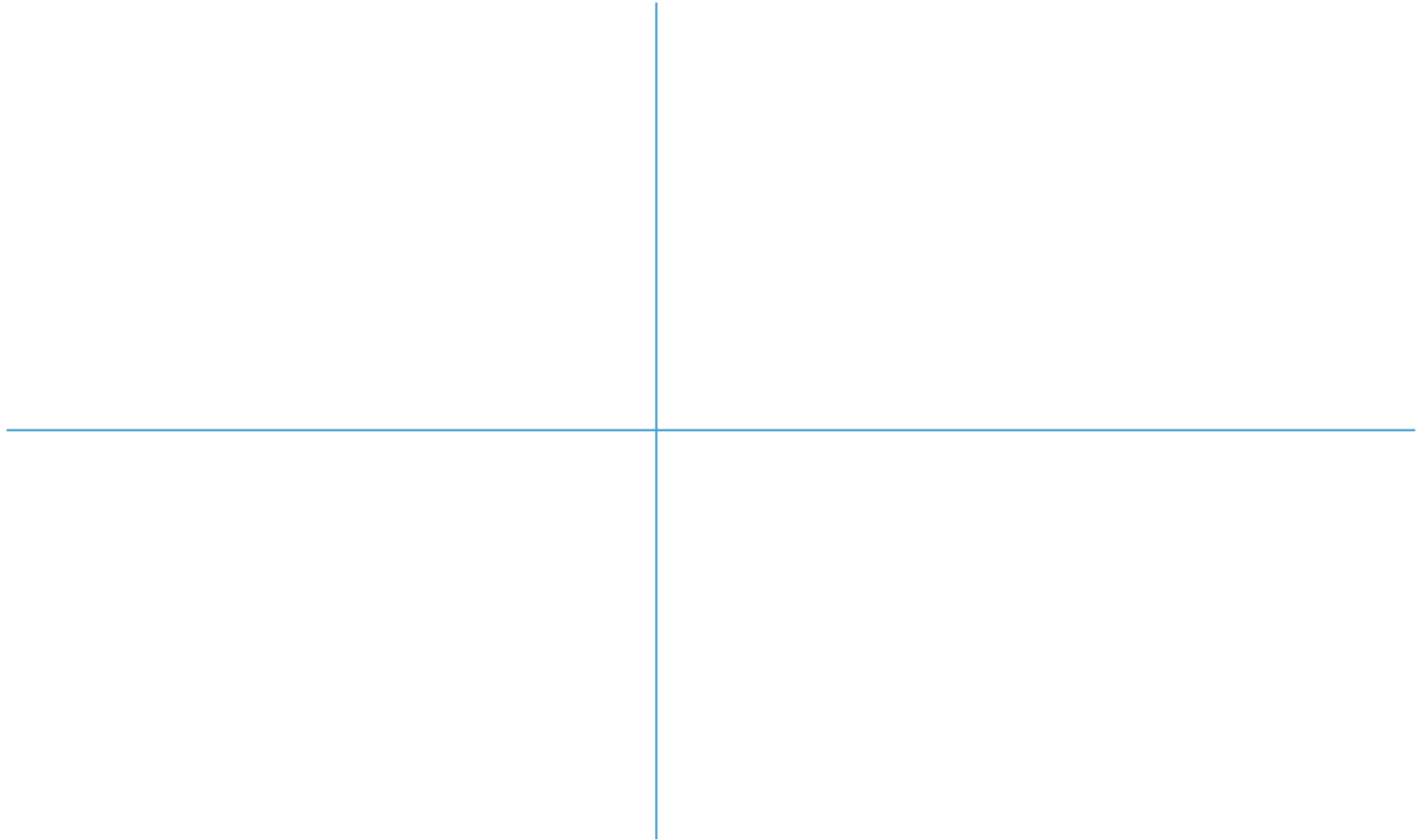
Dear diary...



Counting house



# Other examples of continuous provision in Key Stage 1



# Year 6 (49 items)

## Number and place value

- read, write, order and compare numbers up to 10 000 000 and determine the value of each digit
- round any whole number to a required degree of accuracy
- use negative numbers in context, and calculate intervals across zero
- solve number and practical problems that involve all of the above.

## Addition and subtraction

- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
- divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context
- perform mental calculations, including with mixed operations and large numbers
- identify common factors, common multiples and prime numbers
- use their knowledge of the order of operations to carry out calculations involving the four operations
- solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
- solve problems involving addition, subtraction, multiplication and division
- use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.

## Measures

- solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate
- use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places
- convert between miles and kilometres
- recognise that shapes with the same areas can have different perimeters and vice versa
- recognise when it is possible to use formulae for area and volume of shapes
- calculate the area of parallelograms and triangles
- calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres ( $\text{cm}^3$ ) and cubic metres ( $\text{m}^3$ ), and extending to other units [for example,  $\text{mm}^3$  and  $\text{km}^3$ ].

## Fractions

- use common factors to simplify fractions; use common multiples to express fractions in the same denomination
- compare and order fractions, including fractions  $> 1$
- add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
- multiply simple pairs of proper fractions, writing the answer in its simplest form
- divide proper fractions by whole numbers
- associate a fraction with division and calculate decimal fraction equivalents for a simple fraction
- identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places
- multiply one-digit numbers with up to two decimal places by whole numbers
- use written division methods in cases where the answer has up to two decimal places
- solve problems which require answers to be rounded to specified degrees of accuracy
- recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.

## Ratio and Proportion

- solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts
- solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison
- solve problems involving similar shapes where the scale factor is known or can be found
- solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.

## Algebra

- use simple formulae
- generate and describe linear number sequences
- express missing number problems algebraically
- find pairs of numbers that satisfy an equation with two unknowns
- enumerate possibilities of combinations of two variables.

## Statistics

- interpret and construct pie charts and line graphs and use these to solve problems
- calculate and interpret the mean as an average.

Science and geography

## Geometry - shapes

DT

- draw 2-D shapes using given dimensions and angles
- recognise, describe and build simple 3-D shapes, including making nets
- compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons
- illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius
- recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.

## Geometry - position and direction Computing

- describe positions on the full coordinate grid (all four quadrants)
- draw and translate simple shapes on the coordinate plane, and reflect them in the axes.



# Examples of continuous provision in upper Key Stage 2



The 4 clock classroom

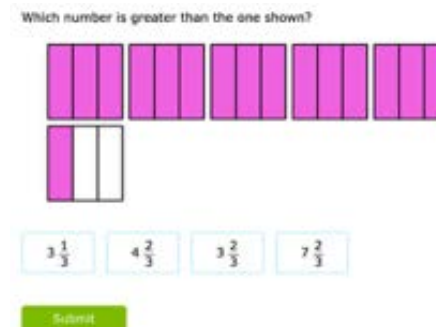


Weather station



Go figure - the news in numbers

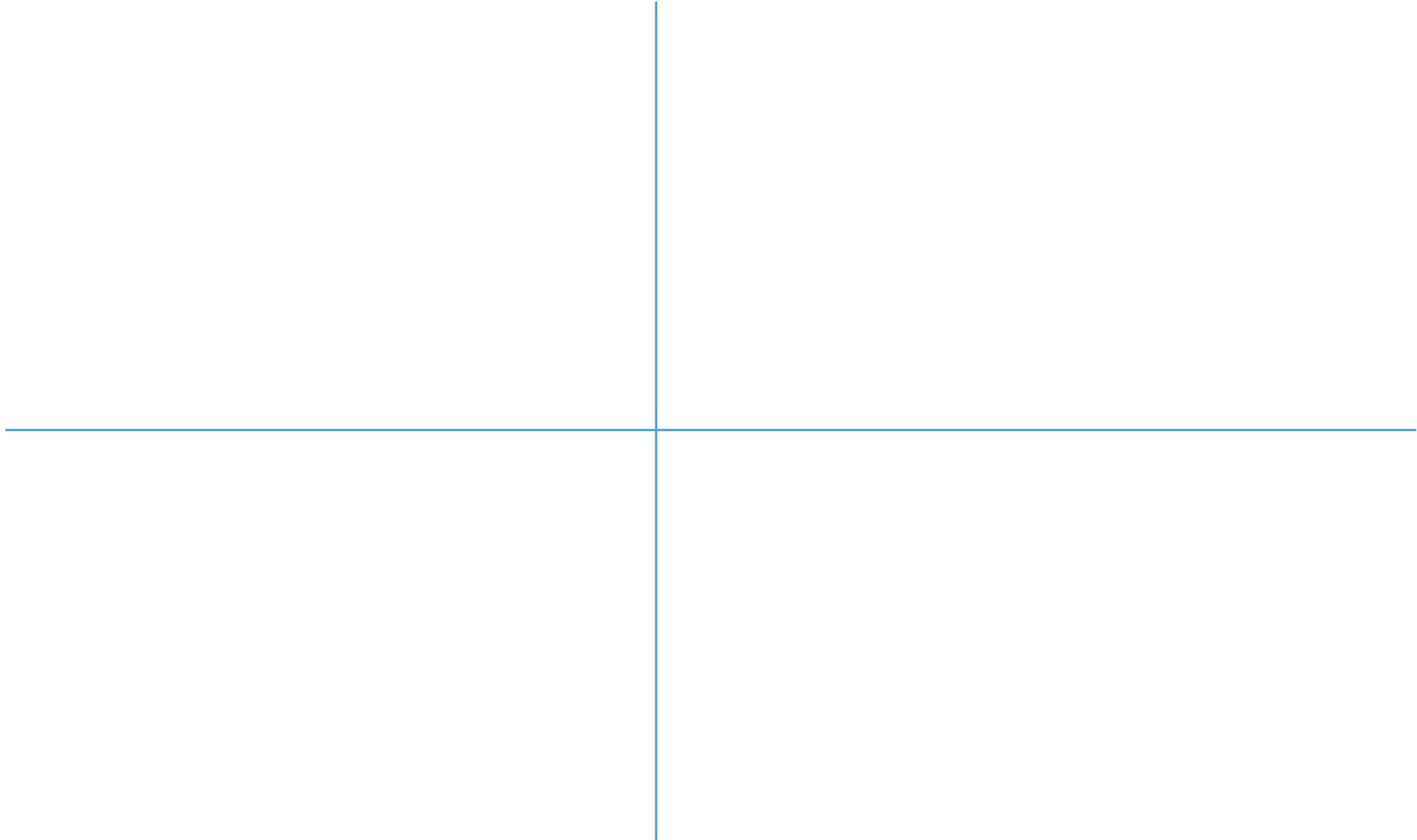
<http://www.bbc.co.uk/news/magazine-35999981>



Maths Games

<https://uk.ixl.com/math/>

# Other examples of continuous provision in upper Key Stage 2





# Year 2 (39 items)

## Addition and subtraction

- solve problems with addition and subtraction:
- using concrete objects and pictorial representations, including those involving numbers, quantities and measures
- applying their increasing knowledge of mental and written methods
- recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
- add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
  - a two-digit number and ones
  - a two-digit number and tens
  - two two-digit numbers
  - adding three one-digit numbers
- show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot
- recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

## Number and place value

- count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward
- recognise the place value of each digit in a two-digit number (tens, ones)
- identify, represent and estimate numbers using different representations, including the number line
- compare and order numbers from 0 up to 100; use  $<$ ,  $>$  and  $=$  signs
- read and write numbers to at least 100 in numerals and in words
- use place value and number facts to solve problems.

## Measures

- choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature ( $^{\circ}\text{C}$ ); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels
- compare and order lengths, mass, volume/capacity and record the results using  $>$ ,  $<$  and  $=$
- recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value
- find different combinations of coins that equal the same amounts of money
- solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change
- compare and sequence intervals of time
- tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times
- know the number of minutes in an hour and the number of hours in a day.

## Fractions

- recognise, find, name and write fractions  $\frac{1}{4}$ ,  $\frac{1}{2}$  and  $\frac{3}{4}$  of a length, shape, set of objects or quantity
- write simple fractions for example, of  $6 = 3$  and recognise the equivalence of and .

## Statistics

- interpret and construct simple pictograms, tally charts, block diagrams and simple tables
- ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity
- ask and answer questions about totalling and comparing categorical data.

## Multiplication and division

- recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication ( $\times$ ), division ( $\div$ ) and equals ( $=$ ) signs
- show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot
- solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

## Geometry - shapes

- identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line
- identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces
- identify 2-D shapes on the surface of 3-D shapes [for example, a circle on a cylinder and a triangle on a pyramid]
- compare and sort common 2-D and 3-D shapes and everyday objects.

## Geometry - position, direction and movement

- order and arrange combinations of mathematical objects in patterns and sequences
- use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise).





# Year 3 (35 items)

## Addition and subtraction

- add and subtract numbers mentally, including:
  - a three-digit number and ones
  - a three-digit number and tens
  - a three-digit number and hundreds
- add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- estimate the answer to a calculation and use inverse operations to check answers
- solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.

## Number and place value

- count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number
- recognise the place value of each digit in a three-digit number (hundreds, tens, ones)
- compare and order numbers up to 1000
- identify, represent and estimate numbers using different representations
- read and write numbers up to 1000 in numerals and in words
- solve number problems and practical problems involving these ideas.

## Statistics

- interpret and present data using bar charts, pictograms and tables
- solve one-step and two-step questions [for example, 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables.

## Measures

- measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)
- measure the perimeter of simple 2-D shapes
- add and subtract amounts of money to give change, using both £ and p in practical contexts
- tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks
- estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight
- know the number of seconds in a minute and the number of days in each month, year and leap year
- compare durations of events [for example to calculate the time taken by particular events or tasks].

## Fractions

- count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10
- recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators
- recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators
- recognise and show, using diagrams, equivalent fractions with small denominators
- add and subtract fractions with the same denominator within one whole [for example,  $\frac{1}{10} + \frac{1}{10} = \frac{2}{10}$ ]
- compare and order unit fractions, and fractions with the same denominators
- solve problems that involve all of the above.

## Multiplication and division

- recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
- solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which  $n$  objects are connected to  $m$  objects.

## Geometry - shapes

- draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them
- recognise angles as a property of shape or a description of a turn
- identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle
- identify horizontal and vertical lines and pairs of perpendicular and parallel lines.



# Year 4 (42 items)

## Addition and subtraction

- add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate
- estimate and use inverse operations to check answers to a calculation
- solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.

## Number and place value

- count in multiples of 6, 7, 9, 25 and 1000
- find 1000 more or less than a given number
- count backwards through zero to include negative numbers
- recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)
- order and compare numbers beyond 1000
- identify, represent and estimate numbers using different representations
- round any number to the nearest 10, 100 or 1000
- solve number and practical problems that involve all of the above and with increasingly large positive numbers
- read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value.

## Statistics

- interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.
- solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.

## Measures

- Convert between different units of measure [for example, kilometre to metre; hour to minute]
- measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres
- find the area of rectilinear shapes by counting squares
- estimate, compare and calculate different measures, including money in pounds and pence
- read, write and convert time between analogue and digital 12- and 24-hour clocks
- solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.

## Fractions

- recognise and show, using diagrams, families of common equivalent fractions
- count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.
- solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number
- add and subtract fractions with the same denominator
- recognise and write decimal equivalents of any number of tenths or hundredths
- recognise and write decimal equivalents to , ,
- find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths
- round decimals with one decimal place to the nearest whole number
- compare numbers with the same number of decimal places up to two decimal places
- solve simple measure and money problems involving fractions and decimals to two decimal places.

## Multiplication and division

- recall multiplication and division facts for multiplication tables up to  $12 \times 12$
- use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers
- recognise and use factor pairs and commutativity in mental calculations
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as  $n$  objects are connected to  $m$  objects.

## Geometry - shapes

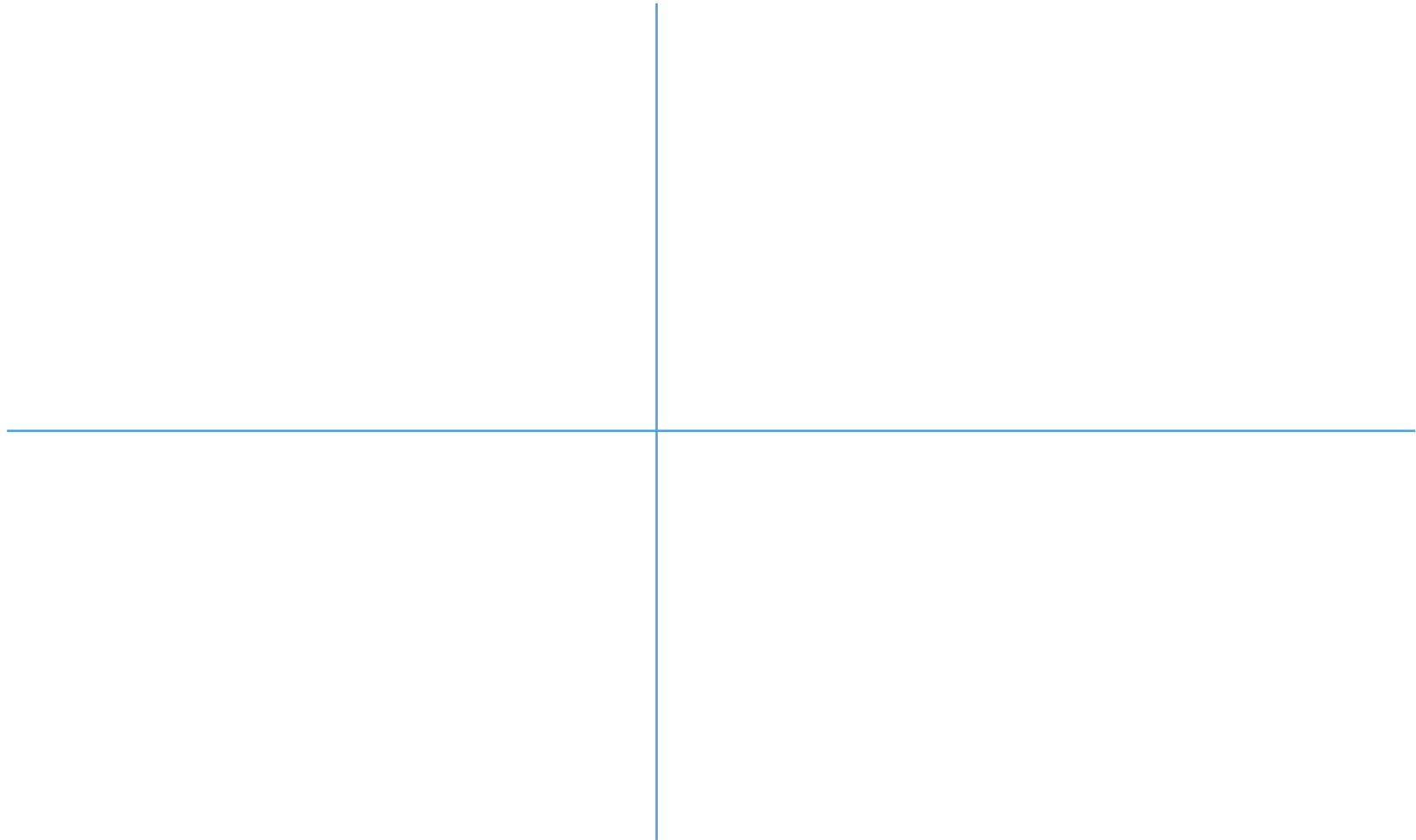
- compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes
- identify acute and obtuse angles and compare and order angles up to two right angles by size
- identify lines of symmetry in 2-D shapes presented in different orientations
- complete a simple symmetric figure with respect to a specific line of symmetry.

## Geometry - position and direction

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



# Other examples of continuous provision in lower Key Stage 2





# Year 5 (52 items)

## Number and place value

- 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
- interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero
- round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000
- 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.

## Addition and subtraction

- add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)
- add and subtract numbers mentally with increasingly large numbers
- use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

## Statistics

- solve comparison, sum and difference problems using information presented in a line graph
- complete, read and interpret information in tables, including timetables.

## Multiplication and division

- identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
- know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers
- establish whether a number up to 100 is prime and recall prime numbers up to 19
- 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
- multiply and divide numbers mentally drawing upon known facts
- divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context
- multiply and divide whole numbers and those involving decimals by 10, 100 and 1000
- recognise and use square numbers and cube numbers, and the notation for squared ( $^2$ ) and cubed ( $^3$ )
- solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes
- solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
- solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.

## Fractions

- compare and order fractions whose denominators are all multiples of the same number
- identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths
- recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements  $> 1$  as a mixed number
- add and subtract fractions with the same denominator and denominators that are multiples of the same number
- multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams
- read and write decimal numbers as fractions [for example,  $0.71 = \frac{71}{100}$ ]
- recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents
- round decimals with two decimal places to the nearest whole number and to one decimal place
- read, write, order and compare numbers with up to three decimal places
- solve problems involving number up to three decimal places
- recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal
- solve problems which require knowing percentage and decimal equivalents of  $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{1}{5}$ ,  $\frac{2}{5}$ ,  $\frac{4}{5}$  and those fractions with a denominator of a multiple of 10 or 25.



# Year 5 (52 items) continued

## Measures

- convert between different units of metric measure [for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre]
- understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints
- measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres
- calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres ( $\text{cm}^2$ ) and square metres ( $\text{m}^2$ ) and estimate the area of irregular shapes
- estimate volume [for example, using  $1\text{ cm}^3$  blocks to build cuboids (including cubes)] and capacity [for example, using water]
- solve problems involving converting between units of time
- use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.

## Geometry - shapes

- identify 3-D shapes, including cubes and other cuboids, from 2-D representations
- know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles
- draw given angles, and measure them in degrees ( $^\circ$ )
- identify:
  - angles at a point and one whole turn (total  $360^\circ$ )
  - angles at a point on a straight line and a turn (total  $180^\circ$ )
  - other multiples of  $90^\circ$
- use the properties of rectangles to deduce related facts and find missing lengths and angles
- distinguish between regular and irregular polygons based on reasoning about equal sides and angles.

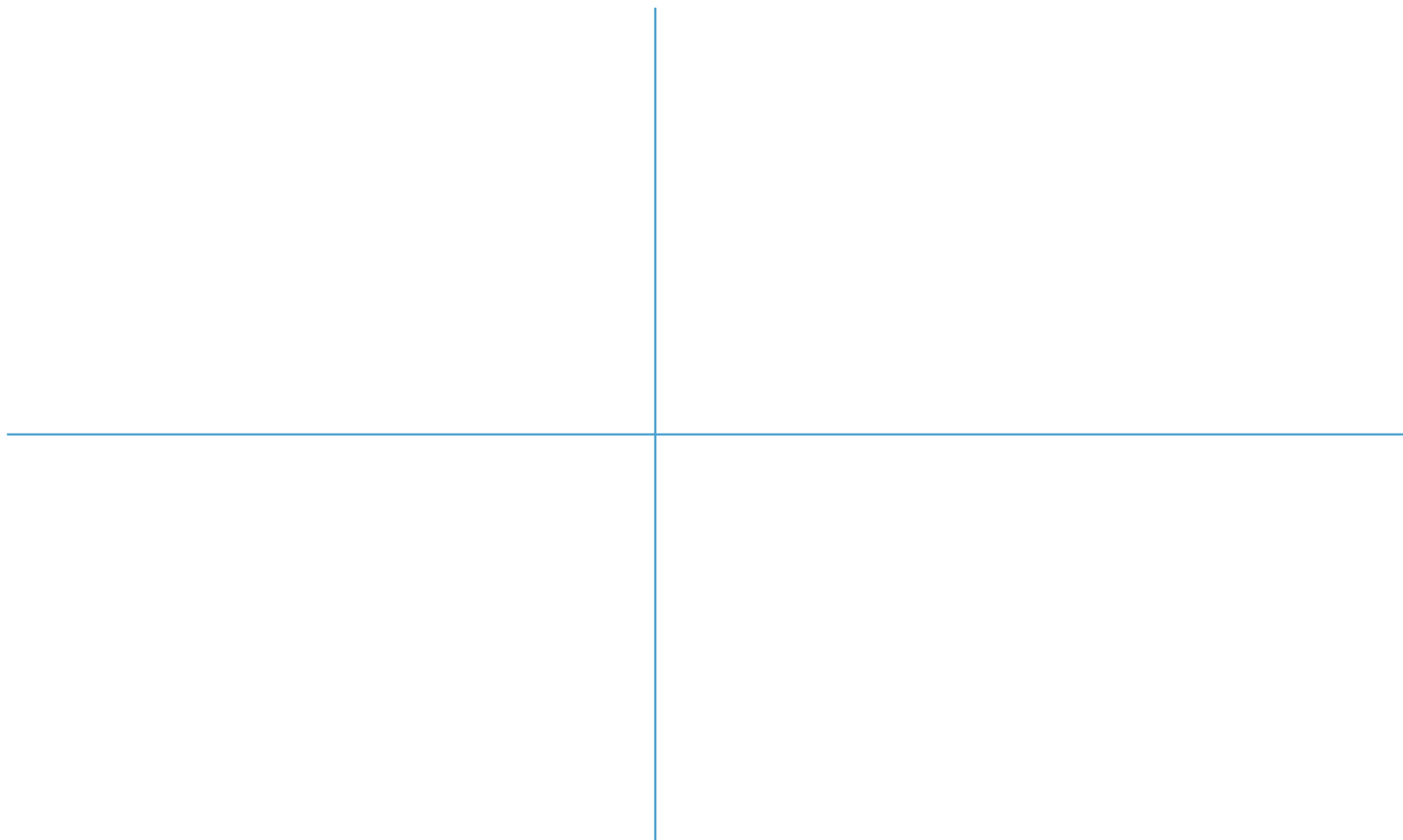
## Geometry - position and direction

- 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.





# Other examples of continuous provision in upper Key Stage 2



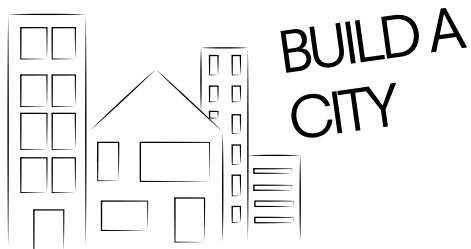
# The September shock



# Longitudinal learning



# Maths Missions - Year 1



## Fractions challenges

- Find  $\frac{1}{2}$  of height
- Find  $\frac{1}{4}$  of size
- Find  $\frac{3}{4}$  of quantities

## Movement and Position challenges

- Describe what is to the left/right of the (post office)
- Build a new tower at the back of the school

## Number challenges

- Must have 100 windows
- Floors must be labelled 1st, 2nd, etc
- Buildings with 1 more/less floors
- Buildings with 1  $><$  any number of rooms
- Buildings with 2x as many floors

## Measure challenges

- Make a 3cm window
- Measure the tallest tower
- Measure the shortest tower
- Make a building  $\frac{1}{2}$  the size of the tallest.

## Calculation challenges

- Add windows on 2 buildings
- 'Window bonds' to 10
- Add number of people in buildings
- Take away people

## Data challenges

## Shape challenges

- Add a triangular roof
- Put in a circular window
- Build a cube shape building
- Make a rectangular window



# Other possible Maths Missions KS1

## Run a shop

- Counting
- Adding/Subtracting how much  
change
- Sorting
- Fractions (1/2 Price)
- Measure (money)

## How far can you...

- bat a ball
- kick a ball
- hit a golf ball
- throw a ball
- jump
- measuring lengths and heights
- estimating
- recording in numerals

## Mission to Mars

- 3x meals a day - How many?
- 2x toilet breaks - How many?  
1/2 way there - How long/for  
3/4 way there - How long/for

## Chart the weather

- days of the week
- months
- temperatures °C
- higher/lower
- add - subtract temperatures





# Maths Missions - Year 5

## C.S.I

### Fractions challenges

### Movement and Position challenges

- Coordinates of incidents/ trails around school
- Describe route/ locations
- Notes found describing way in. It says x y z ... Trace the route on the map

### Number challenges

- Analyse and compare theft amounts up to 1,000,000
- Find crimes £100 more/less, £1000, more or less and £10,000 more or less from list of crimes.
- Round crime figures

### Measure challenges

- Calculate how long between events  
Eg: The witness said he heard a noise at 3:15pm but didn't raise the alarm until 3:49, why? How long did he wait?

### Calculation challenges

- Find total crime figures for a number of burglaries
- Subtract amounts from company profits etc
- Theft at house no's 2, 3, 5, 7, 11, 13, 17, 19, 23 etc.. Identify why these numbers are significant... prime suspect!...

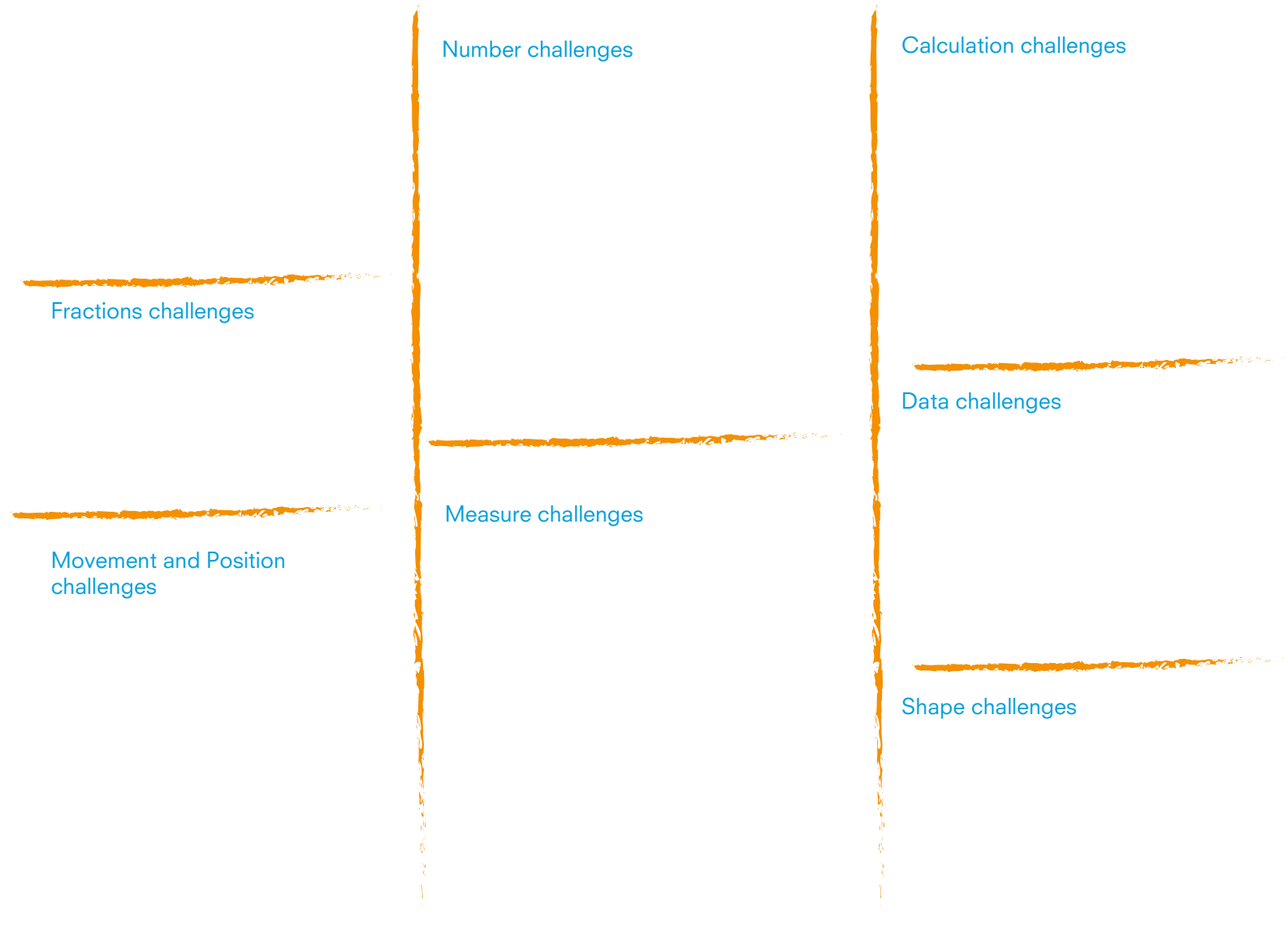
### Data challenges

- Look at crime statistics and calculate increase/decrease ([homeoffice.gov](http://homeoffice.gov))

### Shape challenges



# Maths Missions



The following problem solving activities are all based on the principle of interconnected maths. They are taken from Chris Quigley's book, *Mastery Maths*.

## Milestone 1: Controlled throw

With two or three others ...

- Who can throw a bean bag exactly 3 metres?
- Who can throw it between 5 and 6 metres?
- Who can throw it  $\frac{3}{4}$  of 12 metres ?
- Who can throw it  $\frac{1}{10}$  of 25 metres?

Throw the bean bag and then measure.



## Milestone 1: Odd opening times

A new shop has opened nearby but has very odd opening times.

MON:  $> 7\text{am}$  until  $< 5\text{pm}$

TUE: 9am to an odd hour that is a multiple of 3

WED: 7:15am for 130 minutes

THU: 3:15am for 20 minutes

FRI: 3:30pm for  $4\frac{1}{2}$  hours



Can you work out when the shop is open each day?



## Milestone 2: Secret agents

Four secret agents each have a special code name so they can work in secret. Their real names are Dominic, Jo, Tariq and Malik.

What are their code names?

- Jo plays tennis with Curly and goes swimming with Ace.
- Tariq has been on holiday with Curly but travels to school with Fudgy.
- Spider, Curly and Dominic play in the football team.
- Spider sometimes goes to tea with Jo.





## Milestone 3: Fizz bath

Fizzy drink cans hold 330ml.

If you wanted a 'fizz bath', how many cans would you need if:

- The bath holds 75 litres?
- You had a shallow bath  $\frac{2}{3}$  full?

A can of fizz costs 52p. How much will:

- A full bath cost?
- A shallow bath cost?

If you get a 15% discount for buying in bulk, how much would each bath cost?



# Example medium-term plan - Year 6

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Term 1	Addition and subtraction Using <b>measures</b> as the context			Multiplication Using <b>measures</b> as the context			Fractions and number and place value			Division Using <b>fractions</b> and <b>measures</b> as the context		
	Times tables and Mental calculations fluency											
	Number fluency and Algebra											
	Position and direction problems											
Term 2	Algebra using <b>measures</b> (Area and volume) as the context			Addition, subtraction, multiplication and division using <b>Ratio, proportion</b> and <b>measures</b> as the context			Addition, subtraction, multiplication and division using <b>geometry</b> as the context			Addition, subtraction, multiplication and division using <b>fractions</b> as the context		
	Times tables and Mental calculations fluency											
	Number fluency and Algebra											
	Position and direction problems											
Term 3	Addition, subtraction, multiplication and division using <b>fractions</b> and <b>measures</b> the context			Algebra	Position and direction	Geometry	National Assessments some time around here			Secondary school transition mathematics		
	Times tables and Mental calculations fluency											
	Number fluency and Algebra											
	Position and direction problems											



# Medium-term plan - Year

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Term 1												
Term 2												
Term 3												



# Key Stage 1 Geography

## Essential opportunities

- Investigate the world's continents and oceans.
- Investigate the countries and capitals of the United Kingdom.
- Compare and contrast a small area of the United Kingdom with that of a non-European country.
- Explore weather and climate in the United Kingdom and around the world.
- Use basic geographical vocabulary to refer to and describe key physical and human features of locations.
- Use world maps, atlases and globes.
- Use simple compass directions.
- Use aerial photographs.
- Use fieldwork and observational skills.



Extreme Weather



Australian Adventure



Amazing Places and Spaces

# Extreme weather





## As **geographers** we will:

- Learn about some of the amazing weather around the world
- Name the continents and oceans
- Practise our geography skills in mapping
- Learn and practise geographical vocabulary
- Identify patterns
- Identify some key features of the places we study.

We will watch videos and read about cyclones, tornadoes, snow storms, hot deserts, floods and other incredible weather features.

We will name the continents and oceans and investigate the weather and climate in tropical, temperate and cold places. We will explore the weather and climate in places around the world we have heard of and some new places too.

We will find out about the equator and the tropics, the Arctic Circle and Antarctica.

We will track the weather in some of our favourite places in the world, as well as keeping a chart of the weather at school. We will then use this information to make comparisons.

We will learn about the main cloud types and keep an eye on weather forecasts to see how the weather is affected by the different cloud types.

## As **scientists** we will:

- Observe seasonal changes.  
We will find out which areas have the same seasons as us and where in the world things are not the same. We will explore how places in the Southern Hemisphere have the opposite seasons to us.

## As **writers** we will:

- Present information
- Write reports
- Produce glossaries
- Write stories
- Write letters
- Create and recite poetry.

## As **artists** we will:

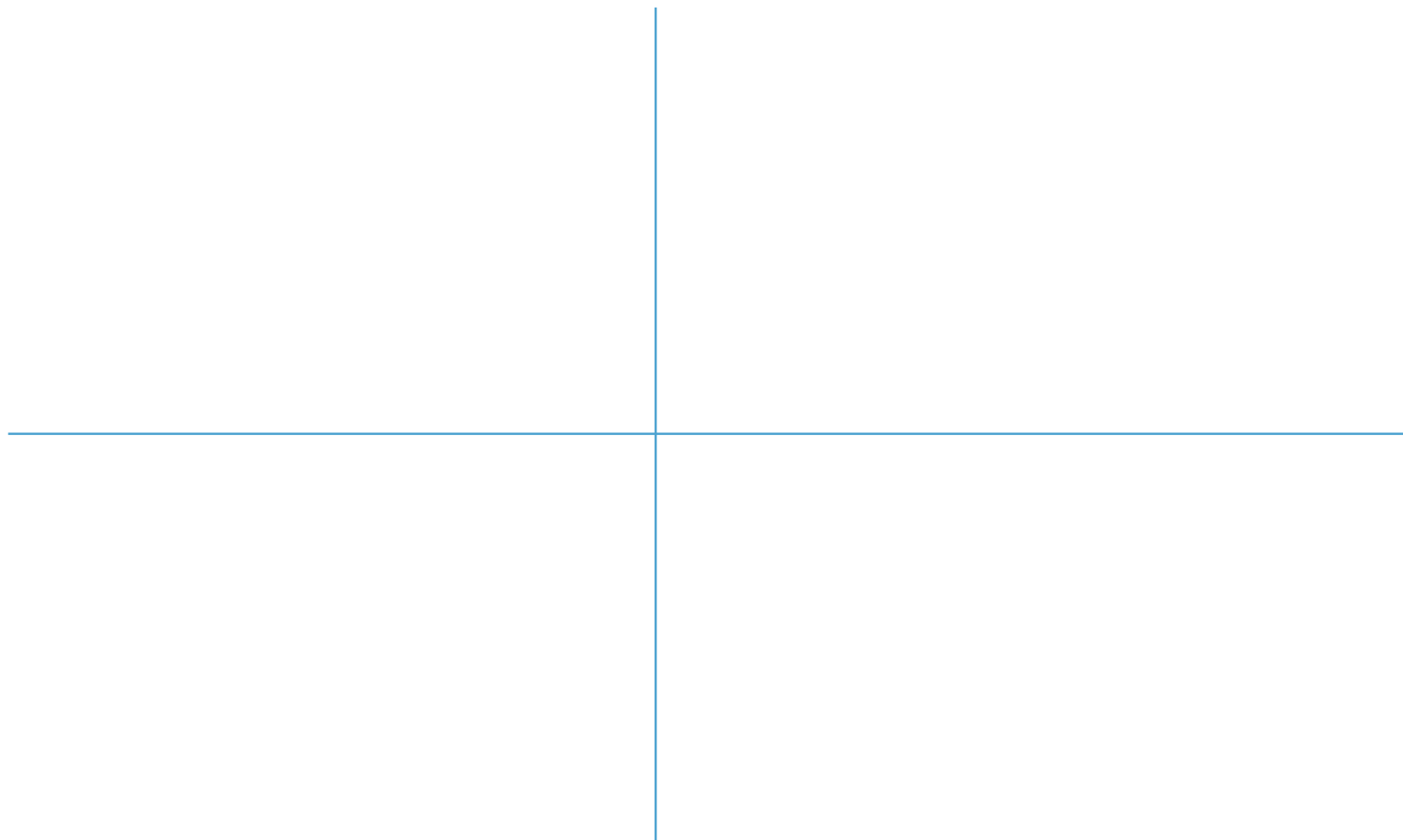
- Use collage to create cloud formations
- Draw and paint storms and wreckage
- Use digital media to collect and change pictures of our local weather.

## As **mathematicians** we will:

- Add and subtract by comparing temperatures to find the difference
- Collect weather statistics so that we can construct pictograms, tally charts, block diagrams and tables
- Take and record daily temperature and rainfall measurements.



# Other examples of continuous provision in Key Stage 1



# Key Stage 2 Geography

## Essential opportunities

- Locate the world's countries, with a focus on Europe and countries of particular interest to pupils.
- Locate the world's countries, with focus on North and South America and countries of particular interest to pupils.
- Identify key geographical features of the countries of the United Kingdom, and show an understanding of how some of these aspects have changed over time.
- Locate the geographic zones of the world.
- Understand the significance of the geographic zones of the world.
- Understand geographical similarities and differences through the study of human and physical geography of a region or area of the United Kingdom (different from that taught at Key Stage 1).
- Understand geographical similarities and differences through the study of human and physical geography of a region or area in a European country.
- Understand geographical similarities and differences through the study of the human and physical geography of a region or area within North or South America.
- Describe and understand key aspects of:
  - physical geography, including: climate zones, biomes and vegetation belts, rivers, mountains, volcanoes and earthquakes and the water cycle
  - human geography, including: settlements, land use, economic activity including trade links and the distribution of natural resources including energy, food, minerals and water supplies.
- Use maps, atlases, globes and digital/computer mapping to locate countries and describe features studied.
- Use the eight points of a compass, four-figure grid references, symbols and keys (including the use of Ordnance Survey maps) to build knowledge of the United Kingdom and the world.
- Use a wide range of geographical sources in order to investigate places and patterns.
- Use fieldwork to observe, measure and record the human and physical features in the local area using a range of methods, including sketch maps, plans and graphs and digital technologies.



Land of the Free



Eurovision



Earthquakes, Zones  
and Volcanoes



Land of Hope and  
Glory

# Land of Hope and Glory





## As **geographers** we will:

- Study the United Kingdom (UK)
- Study its main physical and human features
- Look at changes over time
- Explore similarities to and differences from other European countries
- Study one area (different to that studied in Key Stage 1) in some depth

We will look at:

Human features, including:

- A reminder of the countries and capitals of the UK
- The major transport links between cities and the main ports and airports that link the UK to other countries
- Some of the UK's ancient castles and monasteries, exploring the geographical reasons why they were located as they are
- Some of the most recognisable buildings in the UK
- The differences between town and country – urban and rural, including land use and economic activity
- The effects of storms and floods in recent years, such as the Atlantic storms in Dawlish, Devon in 2014. The storms washed away the cliff, leaving a railway line dangling. We will investigate how engineers found solutions to the problems in record time

Physical features, including:

- The major mountains of Ben Nevis, Scafell Pike and Snowdon
- Some amazing places of beauty, such as the Lake District, the Giant's Causeway, the Needles, Portland Bill, the hills and valleys of Wales, the limestone caves of the Peak District and Loch Ness in Scotland
- The UK's longest and local rivers, including a study of the journey of a river from source to mouth
- Some of the UK's rugged and beautiful coastlines and find out how some of these features are formed

We will explore some of the changes that have taken place in the UK over time such as:

- The industrial past, such as railways, shipbuilding, coal and mineral mining and the textiles industry
- How disused industrial sites, like the Olympic park, have helped to regenerate these areas
- How the influence of the UK in the world over time led Edward Elgar to write a song called Land of Hope and Glory

We will compare aspects of the physical and human features of the United Kingdom with some other European countries we have studied. We will also compare and contrast the cultures and practices of these countries by looking at:

- Food
- Languages
- Governments and monarchies
- National days and festivals
- Weather and climate
- Major sporting events in which European countries compete

We will also explore the network of 53 independent countries called the Commonwealth.

## As **writers** we will:

- Present information
- Write reports
- Create stories and other narratives based on the human and physical features we study
- Learn some classic poems from Europe, and write some new ones of our own

## As **artists** we will:

- Draw and paint images of the landscapes and cities we study
- Create sculptures
- Take inspiration from some of Europe's great artists over the centuries

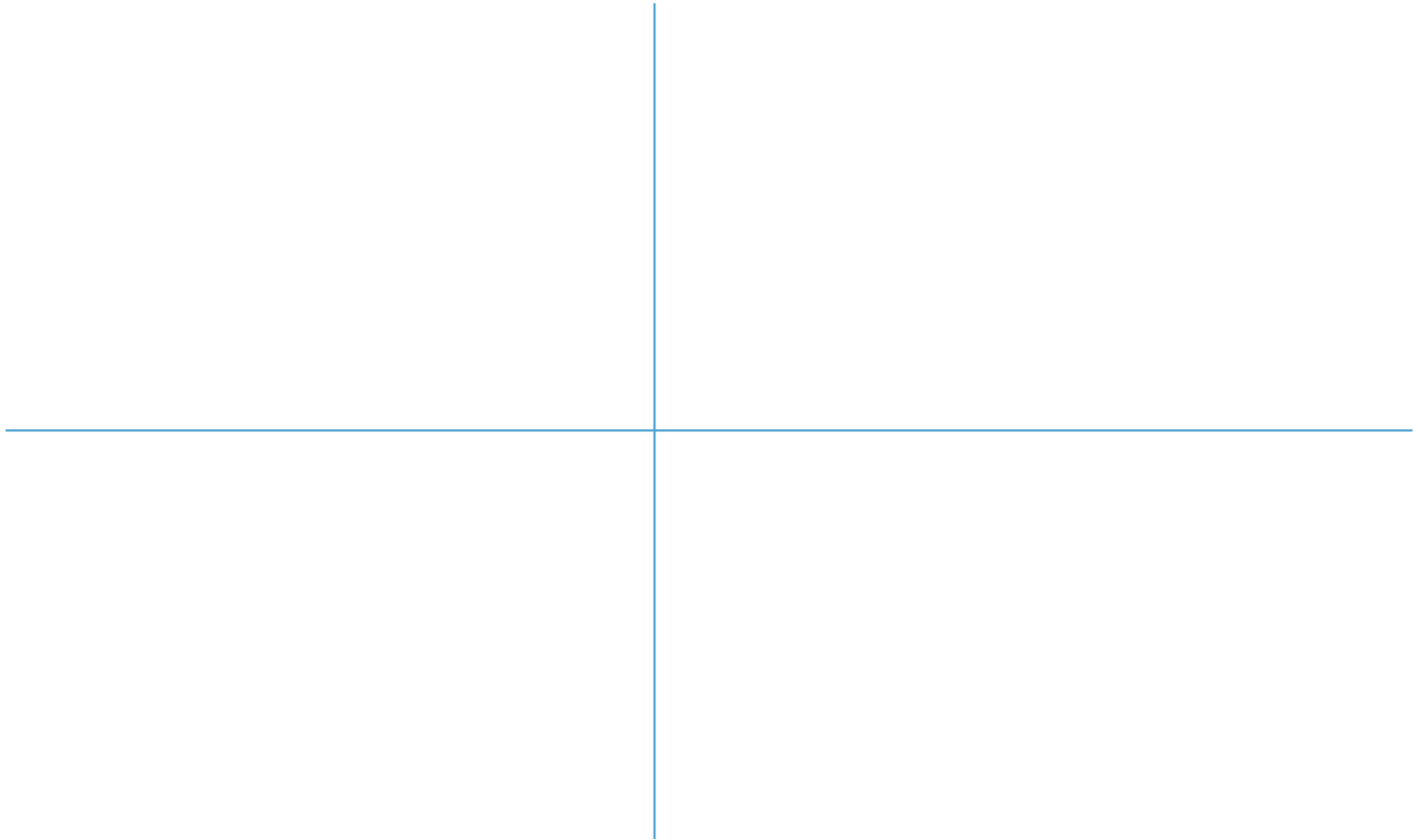
## As **mathematicians** we will:

- Use statistics
- Calculate time
- Make calculations involving addition, subtraction, multiplication and division

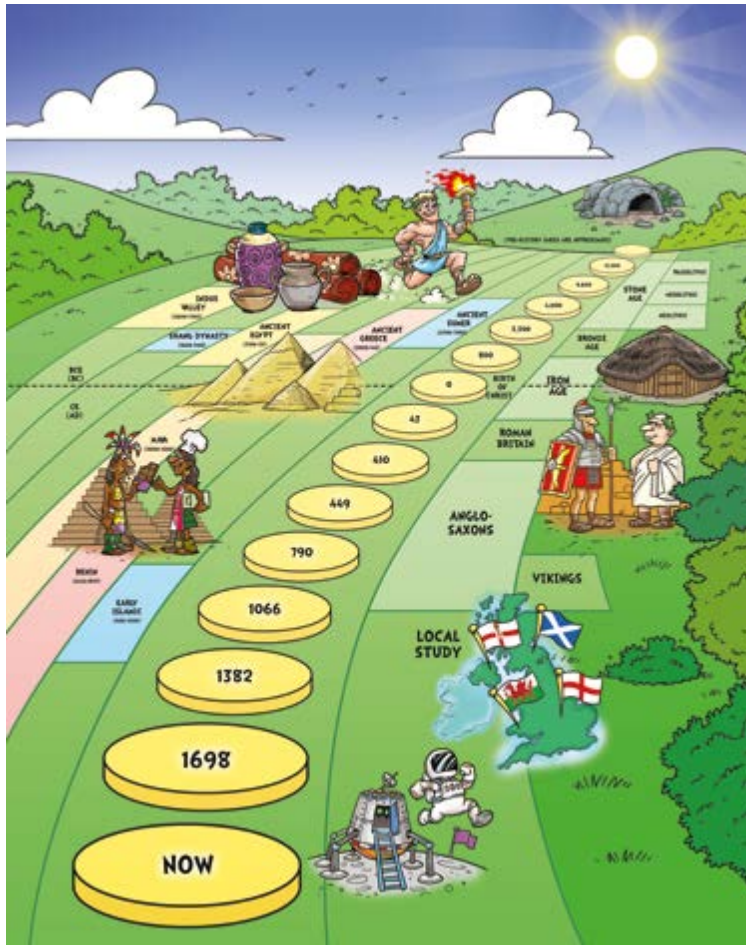




# Other examples of continuous provision in Key Stage 2



# Key Stage 2 history taught through themes...



# The Arts



# The Arts

## As **historians** we will:

- Study the development of the arts throughout British history, looking at:
  - The Stone Age
  - The Bronze Age
  - The Iron Age
  - The Roman invasion of Britain
  - The Anglo Saxons
  - The Vikings
  - The locality of our school from Viking to the present day.
- Study the arts in some ancient civilisations, looking at
  - The Sumer
  - The Indus Valley
  - The Shang Dynasty
  - Ancient Egypt
  - Ancient Greece
  - Early Baghdad
  - The Maya
  - The Benin Empire

We will begin by looking at some of the world's most well recognised art works and artists. We will explore paintings by modern artists such as Banksy, a range of classic British artist such as Turner and European artists such as Salvador Dali, Monet, Van Gogh and Leonardo Da Vinci. We will look at the importance of the arts in society and find out about some artworks from the locality of our school.

We will then look at art in British history, beginning with cave art and carved stones of the Stone Age, Bronze Age rock art, Iron Age Celtic art with its magnificent geometric shapes and the white horses carved into chalk hillsides. We will look at the frescoes and mosaics of Roman times and the wonderful illuminated manuscripts of Anglo-Saxon times, especially the Lindisfarne Gospels. We will explore the intricate wood carvings on Viking ships and then explore some of the big arts movements of Tudor times and modern Britain, such as the Arts and Crafts movement of 1860–1910.

We will look at art in ancient civilisations, such as Ancient Egyptian wall art and jewellery, Ancient Greek plates and vases and some of the fantastic and ornate arabesque repeating patterns of early Islamic civilisations. We will also at the magnificent coloured feather headdresses of the Mayans.

We will also explore the development of music and dance throughout history by studying the types of musical instruments in some of the time periods we study.

## As **writers** we will:

- Write stories that contain mythical, legendary or historical characters or events
- Write stories of adventure based on events in history
- Write non-chronological reports
- Present information in a variety of ways to inform audiences of our findings
- Tell stories to an audience.

## As **mathematicians** we will:

- Calculate the passing of time.

## As **artists** we will:

- Draw and paint images of some of the amazing artworks we look at, adopting brush strokes and styles inspired by those used by the artists
- Create images and artworks inspired by Mayan feather headdresses.





# Composition

	Milestone 1	Milestone 2	Milestone 3
To write with purpose	<ul style="list-style-type: none"> <li>• Say first and then write to tell others about ideas.</li> <li>• Write for a variety of purposes.</li> <li>• Plan by talking about ideas and writing notes.</li> <li>• Use some of the characteristic features of the type of writing used.</li> <li>• Write, review and improve.</li> </ul>	<ul style="list-style-type: none"> <li>• Write for a wide range of purposes using the main features identified in reading.</li> <li>• Use techniques used by authors to create characters and settings.</li> <li>• Compose and rehearse sentences orally.</li> <li>• Plan, write, edit and improve.</li> </ul>	<ul style="list-style-type: none"> <li>• Identify the audience for writing.</li> <li>• Choose the appropriate form of writing using the main features identified in reading.</li> <li>• Note, develop and research ideas.</li> <li>• Plan, draft, write, edit and improve.</li> </ul>
To use imaginative description	<ul style="list-style-type: none"> <li>• Use adjectives to add detail.</li> <li>• Use names of people, places and things.</li> <li>• Use well-chosen adjectives</li> <li>• Use nouns and pronouns for variety.</li> <li>• Use adverbs for extra detail.</li> </ul>	<ul style="list-style-type: none"> <li>• Create characters, settings and plots.</li> <li>• Use alliteration effectively.</li> <li>• Use similes effectively.</li> <li>• Use a range of descriptive phrases including some collective nouns.</li> </ul>	<ul style="list-style-type: none"> <li>• Use the techniques that authors use to create characters, settings and plots.</li> <li>• Create vivid images by using alliteration, similes, metaphors and personification.</li> <li>• Interweave descriptions of characters, settings and atmosphere with dialogue.</li> </ul>
To organise writing appropriately	<ul style="list-style-type: none"> <li>• Re-read writing to check it makes sense.</li> <li>• Use the correct tenses.</li> <li>• Organise writing in line with its purpose.</li> </ul>	<ul style="list-style-type: none"> <li>• Use organisational devices such as headings and sub headings.</li> <li>• Use the perfect form of verbs to mark relationships of time and cause.</li> <li>• Use connectives that signal time, shift attention, inject suspense and shift the setting.</li> </ul>	<ul style="list-style-type: none"> <li>• Guide the reader by using a range of organisational devices, including a range of connectives.</li> <li>• Choose effective grammar and punctuation and propose changes to improve clarity.</li> <li>• Ensure correct use of tenses throughout a piece of writing.</li> </ul>
To use paragraphs	<ul style="list-style-type: none"> <li>• Write about more than one idea.</li> <li>• Group related information.</li> </ul>	<ul style="list-style-type: none"> <li>• Organise paragraphs around a theme.</li> <li>• Sequence paragraphs.</li> </ul>	<ul style="list-style-type: none"> <li>• Write paragraphs that give the reader a sense of clarity.</li> <li>• Write paragraphs that make sense if read alone.</li> <li>• Write cohesively at length.</li> </ul>
To use sentences appropriately	<ul style="list-style-type: none"> <li>• Write so that other people can understand the meaning of sentences.</li> <li>• Sequence sentences to form a short narrative.</li> <li>• Convey ideas sentence by sentence.</li> <li>• Join sentences with conjunctions and connectives.</li> <li>• Vary the way sentences begin.</li> </ul>	<ul style="list-style-type: none"> <li>• Use a mixture of simple, compound and complex sentences.</li> <li>• Write sentences that include:               <ul style="list-style-type: none"> <li>• conjunctions</li> <li>• adverbs</li> <li>• direct speech, punctuated correctly</li> <li>• clauses</li> <li>• adverbial phrases.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Write sentences that include:               <ul style="list-style-type: none"> <li>• relative clauses</li> <li>• modal verbs</li> <li>• relative pronouns</li> <li>• brackets</li> <li>• parenthesis</li> <li>• a mixture of active and passive voice</li> <li>• a clear subject and object</li> <li>• hyphens, colons and semi colons</li> <li>• bullet points.</li> </ul> </li> </ul>





# Composition across the curriculum (rather than genres)

Art & Design

Computing

Design Technology

Geography

History

Languages

Music

Religious Education

Science

Consider dropping specific composition lessons and embed within other subjects.



# Art

## Essentials for progress

		Milestone 1	Milestone 2	Milestone 3
To develop ideas		<ul style="list-style-type: none"> <li>• Respond to ideas and starting points.</li> <li>• Explore ideas and collect visual information.</li> <li>• Explore different methods and materials as ideas develop.</li> </ul>	<ul style="list-style-type: none"> <li>• Develop ideas from starting points throughout the curriculum.</li> <li>• Collect information, sketches and resources.</li> <li>• Adapt and refine ideas as they progress.</li> <li>• Explore ideas in a variety of ways.</li> <li>• Comment on artworks using visual language.</li> </ul>	<ul style="list-style-type: none"> <li>• Develop and imaginatively extend ideas from starting points throughout the curriculum.</li> <li>• Collect information, sketches and resources and present ideas imaginatively in a sketch book.</li> <li>• Use the qualities of materials to enhance ideas.</li> <li>• Spot the potential in unexpected results as work progresses.</li> <li>• Comment on artworks with a fluent grasp of visual language.</li> </ul>
To master techniques	Drawing	<ul style="list-style-type: none"> <li>• Draw lines of different sizes and thickness.</li> <li>• Colour (own work) neatly following the lines.</li> <li>• Show pattern and texture by adding dots and lines.</li> <li>• Show different tones by using coloured pencils.</li> </ul>	<ul style="list-style-type: none"> <li>• Use different hardnesses of pencils to show line, tone and texture.</li> <li>• Annotate sketches to explain and elaborate ideas.</li> <li>• Sketch lightly (no need to use a rubber to correct mistakes).</li> <li>• Use shading to show light and shadow.</li> <li>• Use hatching and cross hatching to show tone and texture.</li> </ul>	<ul style="list-style-type: none"> <li>• Use a variety of techniques to add interesting effects (e.g. reflections, shadows, direction of sunlight).</li> <li>• Use a choice of techniques to depict movement, perspective, shadows and reflection.</li> <li>• Choose a style of drawing suitable for the work (e.g. realistic or impressionistic).</li> <li>• Use lines to represent movement.</li> </ul>



# Awesome art



John Adam Houston (1812-1884), British  
'Sir Isaac Newton (1642 – 1727) in His Study', 1876 (oil painting)

## What can we see?

This is a portrait of Sir Isaac Newton, the English physicist and mathematician who revolutionised scientific thinking in the seventeenth century. His discoveries in optics, motion and mathematics have had a lasting legacy, laying down the principles of modern physics.

He sits in his fashionable clothes in his study. All his scholarly books are tidily arranged on the bookshelf – the sign of a disciplined mind. He holds a quill pen that has recently been dipped in the ink well on his desk. He looks deep in thought, poised to write something. The lamp on his desk lights his papers and also his face, leading our eyes to his.

There is another light source too. Can you guess where it is coming from? That's right, it's the moonlight hidden behind the red curtains, subtly illuminating the night sky and the telescope that sits on the table in the window. This refers to Newton designing and making the first reflecting telescope in 1668 for his inaugural lecture as Professor at Cambridge University. It led to his important work being recognised by the Royal Society (a scientific association based in London founded in 1660), which in 1703 he came president of.

# Awesome art

## Things of interest?

Newton was one of the most influential scientists of all time. He acknowledged however, in a letter to fellow scientist (and rival) Robert Hooke (1635 – 1703), that if he had seen further it was by 'standing on ye shoulders of giants'. His inspiration came from Ancient Greek geometry, modern philosophical concepts (for example those of René Descartes (1596 - 1650), and heliocentric ideas that promoted the theory that the Earth revolved around the Sun (as described, among others, by Galileo (1564 - 1642).

Among his discoveries he conceived theories on light and colour and the laws of planetary motion. After seeing an apple falling from a tree he established his Universal Law of Gravity. This explained forces in nature, such as how planets are kept in orbit by the pull of the Sun's gravity, and how the moon revolves around the Earth, and how the gravitational pull of the Sun and the Moon creates the tides of the sea on Earth. (See 'Earthrise' notes in the pack for a modern day application of Newton's theory).

## About the artist

Born in North Wales and educated firstly in Scotland and then in London, John Adam Houston followed his passion for painting from an early age. After traveling to Paris and Germany to gain inspiration for his work he returned to Scotland in 1841 settling in Edinburgh.

As well as producing portraits he mainly concentrated on landscape and figure painting, exhibiting at both the Royal Academy in London and the Scottish Academy, which he became a member of in 1845.

A companion piece to 'Sir Isaac Newton (1642 – 1727) in His Study' entitled 'Newton Investigating Light' can be found on the Your Paintings website. It shows Newton proving his theory that white light is a composite of all colours of the spectrum.



# Awesome art - activities

Basic	Advancing	Deep
<ul style="list-style-type: none"> <li>Find all the items in the painting that would suggest that Sir Isaac Newton was a scientist.</li> <li>List all the ways this painting tells you he is scholar and a thinker. Use the DEDUCE it map to help you spot the clues.</li> <li>Sir Isaac Newton discovered gravity. Find out about gravity. List 5 facts about gravity such as gravity always pulls, it never pushes, oceans and tides are caused by the gravitational pull of the moon, Newton is said to watch an apple fall from a tree and call the force that pulled the force gravity, gravity holds the moon in orbit around our Earth.</li> <li>Use our PROFILE map to report all you can find out about Sir Isaac Newton. He was said to be an accomplished scholar but preferred not to be around people and was a little grumpy.</li> <li>He lived in troubled times and was born at the same time the outbreak of the English Civil War, lived through the The Great Fire of London and the Plague! USE the TIMELINE or PIECE it map to identify key events.</li> <li>Discover what else Sir Isaac Newton did in his lifetime. He had many careers – not just as a scientist. Create a timeline to show the things he did and was successful at. The TIMELINE or ILLUSTRATE it map may help.</li> </ul>	<ul style="list-style-type: none"> <li>Discovering gravity is what Sir Isaac Newton is really famous for. Explain, using an apple as an example, what effect gravity has. The EXPLAIN it map may help.</li> <li>Organise the innovations and ideas that Sir Isaac Newton invented over time, such as improving the telescope. Use the ORGANISE it map to help</li> <li>The big argument! Sir Isaac Newton had a feud with another great thinker, from Germany, called Gottfried Leibniz who claimed to have invented calculus. Newton said he had invented before Leibniz. Use our COMPARE maps to see what was similar and different between these two great thinkers.</li> <li>Sir Isaac Newton died in 1727. John Adam Houston painted this portrait in 1876. This means that the artist had not met the Sir Newton. Look at other portraits of Sir Isaac Newton. Compare several portraits of the scientist. Which ones do you think John Houston would have helped him the most? Use the COMPARE map to spot the ones you think would help the most.</li> <li>What else happened in the 17th Century? Organise and summarise what has caught your eye in this period of time? Write short paragraphs to explain each significant event. Use the PIECE it map to help.</li> <li>Explain the ideas and inventions of Sir Isaac Newton. Use our KNOW it map to help.</li> <li>Choose something in the painting that captures your eye and interest. Use the ZOOM it map to show it in further detail. Explain why this has caught your attention.</li> </ul>	<ul style="list-style-type: none"> <li>Sir Isaac Newton did not take criticism well. Look for evidence where he fell out with people. Did these fallouts help or hinder his career and his ideas?</li> <li>Prove this right or wrong - Gravity on the moon is the same as on earth. Discuss this statement and justify your answers. You may need to have some proof! Use the DEBATE it map to help.</li> <li>Look for how Newton's ideas have been used today to help us. Where can you find evidence of this?</li> <li>Use our CONNECTIONS map to help you show your understanding about Sir Isaac Newton and the impact of his ideas. Select key ideas that stand out for you.</li> <li>Sort then prioritise Newton's inventions or theories into an order of importance. Justify why you think that. Use our PRIORTISE it map to help.</li> <li>Use the RECOMMEND it map. Recommend this painting to someone else. Why is it important? How can it help us raise discussions and arguments about science?</li> <li>Sir Isaac Newton is reported to have said, "What we know is a drop. What we don't know is an ocean." Discuss what he meant by this and debate your ideas. Use the DEBATE it map to help.</li> </ul>





# DT

## Essential opportunities

### Key Stage 1

Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of relevant contexts, such as the home and school, gardens and playgrounds, the local community, industry and the wider environment.

When designing and making, pupils should be taught to:

#### Design

- design purposeful, functional, appealing products for themselves and other users based on design criteria.
- generate develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology.

#### Make

- select from and use a range of tools and equipment to perform practical tasks such as cutting, shaping, joining and finishing.
- select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics.

#### Evaluate

- explore and evaluate a range of existing products.
- evaluate their ideas and products against design criteria.

#### Technical knowledge

- build structures, exploring how they can be made stronger, stiffer and more stable.
- explore and use mechanisms, such as levers, sliders, wheels and axles, in their products.

#### Cooking and nutrition

- use the basic principles of a healthy and varied diet to prepare dishes.
- understand where food comes from.



# DT

## Essential opportunities

### Key Stage 2

Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of relevant contexts, such as the home, school, leisure, culture, enterprise, industry and the wider environment.

When designing and making, pupils should be taught to:

#### Design

- use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups.
- generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design.

#### Make

- select from and use a wider range of tools and equipment to perform practical tasks, such as cutting, shaping, joining and finishing, accurately.
- select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities.

#### Evaluate

- investigate and analyse a range of existing products.
- evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.
- understand how key events and individuals in design and technology have helped shape the world

#### Technical knowledge

- apply their understanding of how to strengthen, stiffen and reinforce more complex structures.
- understand and use mechanical systems in their products, such as gears, pulleys, cams, levers and linkages.
- understand and use electrical systems in their products, such as series circuits incorporating switches, bulbs, buzzers and motors.
- apply their understanding of computing to programme, monitor and control their products.

#### Cooking and nutrition

- understand and apply the principles of a healthy and varied diet.
- prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques.
- understand seasonality and know where and how a variety of ingredients are grown, reared, caught and processed.

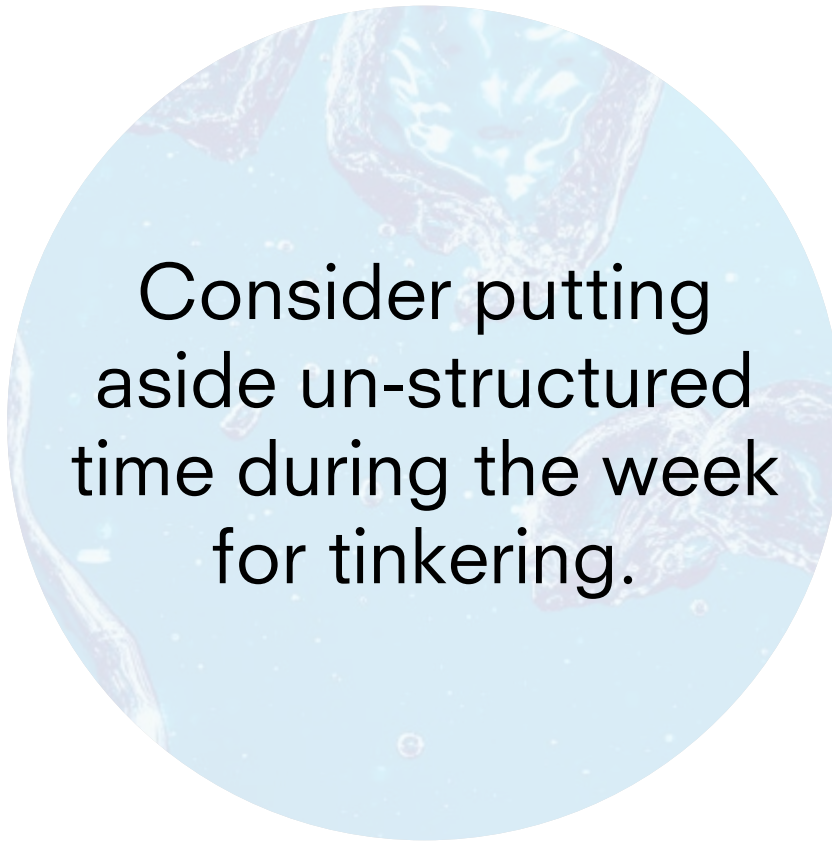


# Teach and tinker

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
DT Term 1	Teach Structures											
			Tinker with structures									
DT Term 2			Teach Structures									
	Tinker with structures				Tinker with structures							
DT Term 3				Finalise Structures								
	Tinker with structures											



# Tinkering time



Consider putting  
aside un-structured  
time during the week  
for tinkering.

## **Benefits:**

- Allows pupils to refine skills
- Allows time for creativity and imagination
- Frees up teacher time to listen to pupils read, coaching and other important activities.



# Parlez-vous les mathématiques?

Save time teaching languages: consider a dual-language classroom.

Les Nombres		
1	1	un
	2	deux
	3	trois
	4	quatre
	5	cinq
8	6	six
	7	sept
	8	huit
	9	neuf
9	10	dix
	11	onze
	12	douze
	13	treize
	14	quatorze
	15	quinze
7	16	seize
	17	dix-sept
	18	dix-huit
	19	dix-neuf
	20	vingt

Examples from across the curriculum...





# Science Key Stage 1

## Essential opportunities

### Key Stage 1

#### Working scientifically

Across all year groups scientific knowledge and skills should be learned by working scientifically. (This is documented in the Essentials for progress section.)

#### Biology

##### Plants

- Identify, classify and describe their basic structure.
- Observe and describe growth and conditions for growth.

##### Habitats

- Look at the suitability of environments and at food chains.

##### Animals and humans

- Identify, classify and observe.
- Look at growth, basic needs, exercise, food and hygiene.

##### All living things\*

- Investigate differences.

#### Chemistry

##### Materials

- Identify, name, describe, classify, compare properties and changes.
- Look at the practical uses of everyday materials.

#### Physics

##### Light\*

- Look at sources and reflections.

##### Sound\*

- Look at sources.

##### Electricity\*

- Look at appliances and circuits.

##### Forces

- Describe basic movements.

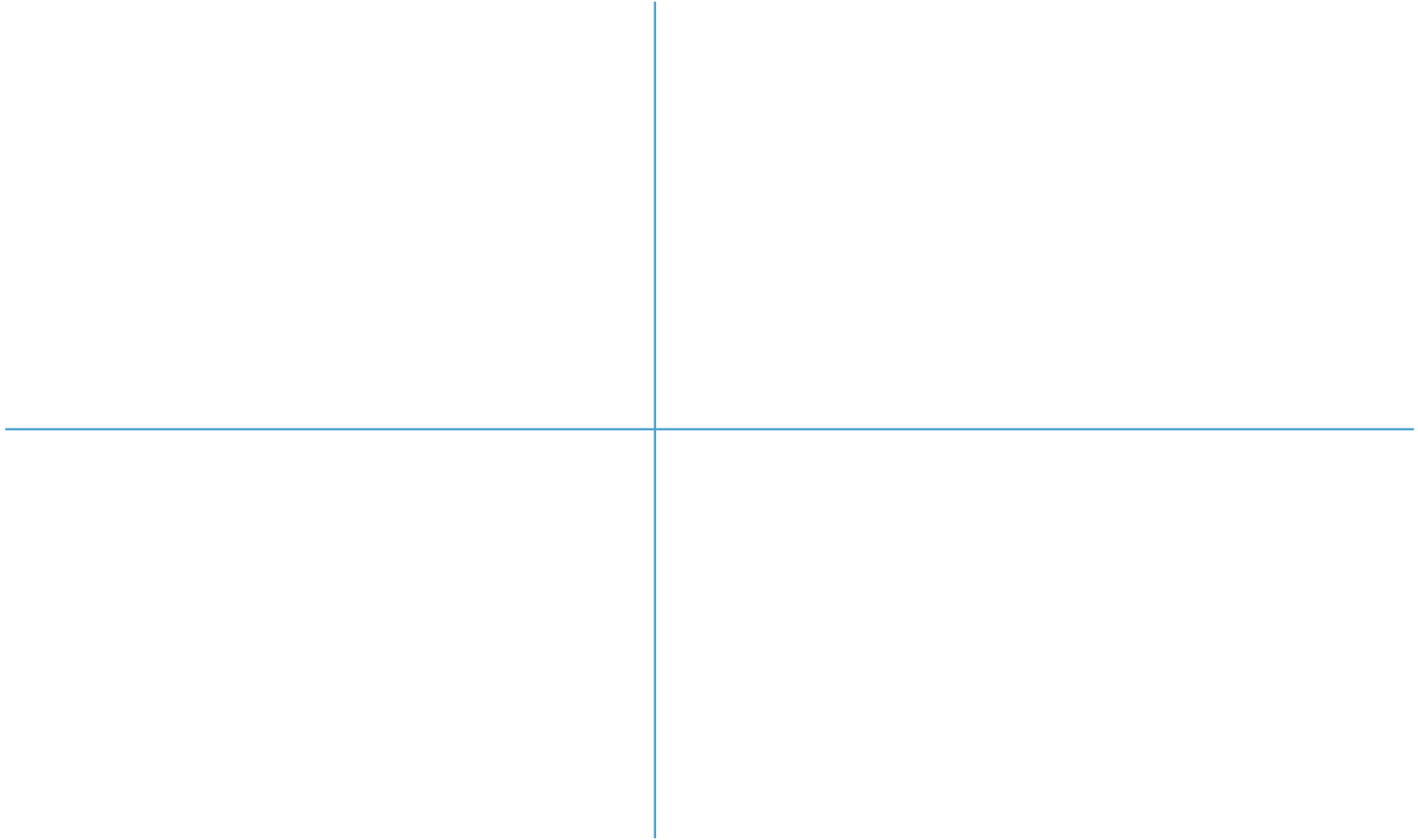
##### Earth and space

- Observe seasonal changes.

\* Items marked \* are not statutory.



# Examples of continuous provision in Key Stage 1



# Science Key Stage 2

## Essential opportunities

### Key Stage 2

#### Working scientifically

Across all year groups scientific knowledge and skills should be learned by working scientifically. (This is documented in the Essentials for progress section.)

#### Biology

##### Plants

- Look at the function of parts of flowering plants, requirements of growth, water transportation in plants, life cycles and seed dispersal.

##### Evolution and inheritance

- Look at resemblance in offspring.
- Look at changes in animals over time.
- Look at adaptation to environments.
- Look at differences in offspring.
- Look at adaptation and evolution.
- Look at changes to the human skeleton over time.

##### Animals and humans

- Look at nutrition, transportation of water and nutrients in the body, and the muscle and skeleton system of humans and animals.
- Look at the digestive system in humans.
- Look at teeth.
- Look at the human circulatory system.

##### All living things

- Identify and name plants and animals
- Look at classification keys.
- Look at the life cycle of animals and plants.
- Look at classification of plants, animals and micro-organisms.
- Look at reproduction in plants and animals, and human growth and changes.
- Look at the effect of diet, exercise and drugs.

#### Chemistry

##### Rocks and fossils

- Compare and group rocks and describe the formation of fossils.

##### States of matter

- Look at solids, liquids and gases, changes of state, evaporation, condensation and the water cycle.

##### Materials

- Examine the properties of materials using various tests.
- Look at solubility and recovering dissolved substances.
- Separate mixtures.
- Examine changes to materials that create new materials that are usually not reversible.

#### Physics

##### Light

- Look at sources, seeing, reflections and shadows.
- Explain how light appears to travel in straight lines and how this affects seeing and shadows.

##### Sound

- Look at sources, vibration, volume and pitch.

##### Electricity

- Look at appliances, circuits, lamps, switches, insulators and conductors.
- Look at circuits, the effect of the voltage in cells and the resistance and conductivity of materials.

##### Forces and magnets

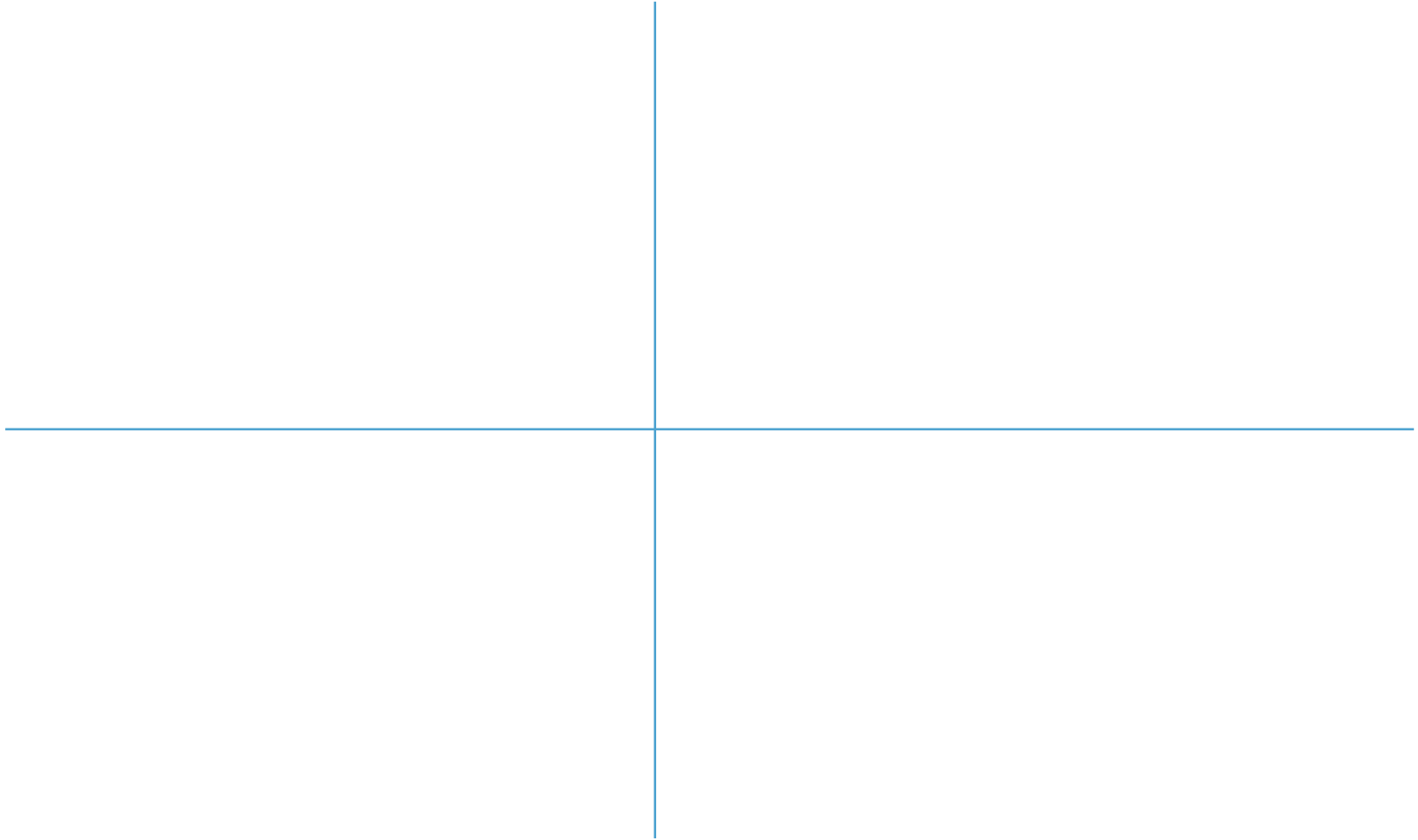
- Look at contact and distant forces, attraction and repulsion, comparing and grouping materials.
- Look at poles, attraction and repulsion.
- Look at the effect of gravity and drag forces.
- Look at transference of forces in gears, pulleys, levers and springs.

##### Earth and space

- Look at the movement of the Earth and the Moon
- Explain day and night



# Examples of continuous provision in Key Stage 2



# Music

## Essential opportunities

### Key Stage 1

- Use their voices expressively by singing songs and speaking chants and rhymes.
- Play tuned and untuned instruments musically.
- Listen with concentration and understanding to a range of high-quality live and recorded music.
- Make and combine sounds using the inter-related dimensions of music.

### Key Stage 2

- Play and perform in solo and ensemble contexts, using voice and playing instruments with increasing accuracy, control and expression.
- Improvise and compose music using the inter-related dimensions of music separately and in combination.
- Listen with attention to detail and recall sounds with increasing aural memory.
- Use and understand the basics of the stave and other musical notations.
- Appreciate and understand a wide range of high-quality live and recorded music from different traditions and from great musicians and composers.
- Develop an understanding of the history of music.





# Mixtape Music



Make a 'mixtape' (of course it'll be a digital or video one!) of different music genres, past present.

Listen to a new one daily and appraise using musical terminology.

# Personal Development



# The 'O' Zone

150. Inspectors will use a considerable amount of first-hand evidence gained from observing pupils in lessons, talking to them about their work, scrutinising their work and assessing how well leaders are securing continual improvements in teaching. Direct observations in lessons will be supplemented by a range of other evidence to enable inspectors to evaluate the impact that teachers and support assistants have on pupils' progress. Inspectors will not grade the quality of teaching, learning and assessment in individual lessons or learning walks.

- No preferred Ofsted style of teaching
- No preferred Ofsted style of curriculum

