



Our Curriculum Intent, Implementation, and Impact Model

Our P.U.R.P.L.E. Curriculum Intent, Implementation, and Impact Model

P.U.R.P.L.E. is an acronym that stands for the qualities that we believe all children need to possess to be successful in life. It does not just involve implementing a series of learning experiences, but is a complete values set that encompasses everything that we do. It shapes every minute, of every day, for every child in every class at the school. Our aim is that every single child leaves our school, equipped with a toolbox packed full of knowledge, skills and experiences that enables them to confidently shout: 'I AM P.U.R.P.L.E..' ...and that they keep shouting it for the rest of their lives! Our Curriculum Intent, Implementation, and Impact Model for 2020-2021 describes how we plan to achieve that. Staff, children, and governors at Littleton Green Community School have all contributed to this document

How do children become P.U.R.P.L.E in Maths?

<u>PROUD: I am Proud. I am proud of my work and the effort that I have made to produce it.</u>			
<u>Intent</u>		<u>Implementation</u>	<u>Impact</u>
<u>What are our aims?</u>	<u>What do we want to see?</u>	<u>What will we do?</u>	<u>What will success look like?</u>
<ul style="list-style-type: none"> To provide lots of opportunities to celebrate very high quality work To provide lots of opportunities to celebrate effort 	All children are taking pride in the work that they are producing and the effort that they have put into achieving it. This is being celebrated by all adults.	We will use Class Dojo, P.U.R.P.L.E. assemblies and Open Days to celebrate work and effort in Maths.	Children and adults will be proud of the work produced at LGCS and the efforts that the children have made. Work scrutinies, pupil interviews, and 'Chequebook' walks will show that all children and adults demonstrate the Proud value in every lesson.
		We will hold moderation meetings once a block to ensure that high standards are maintained in Maths.	
		We will create a whole school display to showcase work in Maths.	

<u>UNIQUE: I am Unique. I am an individual who offers many talents. Everybody is good at something.</u>			
<u>Intent</u>		<u>Implementation</u>	<u>Impact</u>
<u>What are our aims?</u>	<u>What do we want to see?</u>	<u>What will we do?</u>	<u>What will success look like?</u>
<ul style="list-style-type: none"> To deliver a curriculum that offers children a chance to develop a wide range of skills in all areas of learning To devote plenty of time to all areas of learning, so children can showcase their talents 	All children are being taught a broad and balanced curriculum, which recognises and celebrates their individual strengths but also identifies and addresses any gaps that they may have.	We will use children as experts in Maths in every class.	Every class will use child experts in each subject. Work scrutinies, pupil interviews, and 'Chequebook' walks will show that all children and adults demonstrate the Unique value in every lesson.
		We will deliver a Maths curriculum that provides enough time for knowledge and skills to be developed.	
		We will provide interventions to ensure that <u>all</u> children become the best that they can be as a Mathematician.	

<u>REFLECTIVE: I am Reflective. I learn from my mistakes and get better at things as a result.</u>			
<u>Intent</u>		<u>Implementation</u>	<u>Impact</u>
<u>What are our aims?</u>	<u>What do we want to see?</u>	<u>What will we do?</u>	<u>What will success look like?</u>



<ul style="list-style-type: none"> To provide opportunities for children and adults to reflect on learning and then provide opportunities to act upon it 	<p>All children are reflecting on their learning and benefitting from high quality adult pupil dialogue, which is based on accurate AFL.</p>	<p>We will train all teachers and Learning Support Assistants to provide high quality feedback in Maths.</p>	<p>Work scrutinies, pupil interviews, and 'Chequebook' walks will show that all children and adults demonstrate the Reflective value in every lesson.</p>
		<p>We will recap learning in Maths to ensure that knowledge is remembered and skills are applied.</p>	
		<p>We will teach children to peer and group mark Maths work successfully and reflect on their work.</p>	

POSITIVE: I am Positive. I always try my hardest. If at first I don't succeed, I try, try, and try again.

Intent		Implementation	Impact
What are our aims?	What do we want to see?	What will we do?	What will success look like?
<ul style="list-style-type: none"> To provide lessons which really challenge a child's understanding by delivering an age related curriculum to all children all day, every day To teach higher order thinking skills and an "it's good to be stuck" ethos To provide praise, praise and more praise! 	<p>All children using appropriate strategies to achieve learning objectives, which challenge them.</p>	<p>We will plan, deliver, and assess using Power Maths and Cornerstones to ensure that the level of challenge is appropriate for all children in in all Maths lessons.</p>	<p>Work scrutinies, pupil interviews, and 'Chequebook' walks show that all children and adults demonstrate the Positive value in every lesson.</p>
		<p>We will hold regular staff meetings to understand how children approach challenges that they are stuck on in Maths.</p>	

LOVING: I Love. I respect and love the world that I live in. I respect and love other people. I respect and love myself.

Intent		Implementation	Impact
What are our aims?	What do we want to see?	What will we do?	What will success look like?
<ul style="list-style-type: none"> To provide a curriculum that places a high degree of emphasis on building mutual respect To provide a curriculum that enables a child to recognise that they can influence local, national and international communities To have high expectations about the quality of the learning environment and of the child's actions and attitudes within it 	<p>All children are profiting from a climate of mutual respect in which Positive Behaviour Intervention Strategies are applied at all times. They feel seen, safe, soothed and secure.</p>	<p>We will follow a Behaviour Policy, which encourages Positive Behaviour Intervention Strategies for all.</p>	<p>In Interviews, children and staff can demonstrate that they feel seen, safe, soothed and secure at school.</p>
		<p>We will appoint Pupil Ambassadors to provide pupil voice and lead school projects.</p>	<p>Pupil Interviews and Ambassador led learning walks indicate that the children 'love'.</p>
		<p>We will teach children how to support one another by working in mixed ability pairs in Maths and take care of the school.</p>	<p>In pupil interviews, children enjoy working in mixed ability pairs and have the skills to support each other successfully.</p>

EMPOWERED: I am Empowered. I can overcome any challenge that comes my way because I own a toolkit packed full of skills and knowledge that I will use for the rest of my life.

Intent		Implementation	Impact
What are our aims?	What do we want to see?	What will we do?	What will success look like?



<ul style="list-style-type: none"> To equip children with a wide range of skills that they can use throughout their life To ensure that every single stakeholder at the school's sole focus is making sure that every single child leaves our school being 'the best that they can be' 	<p>All children are fully focused on their learning and either acquiring new knowledge/skills or applying knowledge/skills that have been previously taught.</p>	<p>We will ensure that all teaching and support staff take part in Maths training to improve subject knowledge.</p>	<p>Knowledge and skills are progressive, demanding and match the aims of the P.U.R.P.L.E. curriculum for all pupils in all classes.</p>
		<p>We will hold regular Subject Leader, R.A.P And Link Governor Meetings to ensure that high standards are maintained and to ensure that the development of knowledge and skills is progressive in Maths.</p>	<p>Children make good progress in all subjects.</p>
		<p>We will ensure that every child in the school completes a P.U.R.P.L.E. Passport which includes some maths activities.</p>	<p>Children increase the range of P.U.R.P.L.E. experiences that they have had.</p>
		<p>We will teach children how to be a P.U.R.P.L.E. Mathematician.</p>	<p>In pupil interviews, children can talk with confidence about being P.U.R.P.L.E.</p>

How do we teach Maths?

- During Maths lessons, children are referred to as Mathematicians.
- In EYFS, children spend a daily session in the maths zone. In this session, children take part in an adult led session focusing on Number and Shape, Space and Measures. They also choose from a selection of activities and games designed to promote early Numeracy
- A Maths lesson in Years 1 – 6 will follow this structure:

Power Up

Each lesson begins with a Power Up activity, which reinforces key skills such as times-tables, number bonds
In addition, working with place value.

Discover

Children are given a practical, real-life problem to arouse their curiosity. In pairs, using concrete objects, children explore and discuss possible strategies.

Share

Teacher-led, highlighting the variety of methods that can be used to solve a single problem. Children brought together to discuss their methods and celebrate their solutions and strategies.

Teacher uses targeted questions and interactive structures and representations to link concrete and pictorial to abstract concepts.

Think Together

Teacher models question one.

Question 2 is less structured. Children will need to think together in their pairs, and then discuss their methods and solutions as a class.

In questions, 3 and 4 children try working out the answer independently. The openness of the challenge question helps to check depth of understanding.

Practice

Using their Practice Books, children work independently while the teacher circulates and checks on progress. Questions follow small steps of progression to deepen learning.

If some children are struggling, teacher to work with them as a group, using mathematical structures and representations to support understanding as necessary.

Some children could work separately with a teacher or a teaching assistant.

Reflect



Maths at Littleton Green Community School

The Reflect section gives teachers the opportunity to check how deeply children understand the target concept with activities such as, 'spot the mistake'.



What is Power Maths?

We use the Power Maths Scheme of work to support our teaching of Maths.

Power Maths is a whole-class, textbook-based mastery resource that empowers every child to understand and succeed. Power Maths rejects the notion that some people simply 'can't' do maths. Instead, it develops growth mind-sets and encourages hard work, practice and a willingness to see mistakes as learning tools.

Power Maths builds every concept in small, progressive steps and helps teachers check understanding and ensure that every child is keeping up. In addition, it establishes core elements such as intelligent practice and revel action.

One of the key underlying elements of Power Maths is its practical approach, allowing teachers to make maths real and Relevant to children, no matter their age. Manipulatives are essential resources and Power Maths encourages teachers to use these at every opportunity, and to continue the Concrete-Pictorial-Abstract approach right through to Year 6.

Progression of Knowledge and skills

<u>Birth to 11 months</u>	<ul style="list-style-type: none"> Notices changes in number of objects/images or sounds in-group of up to 3.
<u>8-20 months</u>	<ul style="list-style-type: none"> Develops an awareness of number names through their enjoyment of action rhymes and songs that relate to their experience of numbers. Has some understanding that things exist, even when out of sight.
<u>16-26 months</u>	<ul style="list-style-type: none"> Knows that things exist, even when out of sight. Beginning to organise and categorise objects, e.g. putting all the teddy bears together or teddies and cars in separate piles. Says some counting words randomly.
<u>22-36 months</u>	<ul style="list-style-type: none"> Selects a small number of objects from a group when asked, for example, 'please give me one', 'please give me two'. Recites some number names in sequence. Creates and experiments with symbols and marks representing ideas of number. Begins to make comparisons between quantities. Uses some language of quantities, such as 'more' and 'a lot'. Knows that a group of things changes in quantity when something is added or taken away.
<u>30-50 months</u>	<ul style="list-style-type: none"> Uses some number names and number language spontaneously. Uses some number names accurately in play. Recites numbers in order to 10. Knows that numbers identify how many objects are in a set. Beginning to represent numbers using fingers, marks on paper or pictures. Sometimes matches numeral and quantity correctly. Shows curiosity about numbers by offering comments or asking questions. Compares two groups of objects, saying when they have the same number. Shows an interest in number problems. Separates a group of three or four objects in different ways, beginning to recognise that the total is still the same. Shows an interest in numerals in the environment. Shows an interest in representing numbers. Realises not only objects, but also anything can be counted including steps, claps, or jumps.
<u>40-60 months+</u>	<ul style="list-style-type: none"> Recognise some numerals of personal significance. Recognises numerals 1 to 5.



- Counts up to three or four objects by saying one number name for each item.
- Counts actions or objects, which cannot be moved.
- Counts objects to 10, and beginning to count beyond 10.
- Counts out up to six objects from a larger group.
- Selects the correct numeral to represent 1 to 5, then 1 to 10 objects.
- Counts an irregular arrangement of up to ten objects.
- Estimates how many objects they can see and checks by counting them.
- Uses the language of 'more' and 'fewer' to compare two sets of objects.
- Finds the total number of items in two groups by counting all of them.
- Says the number that is one more than a given number.
- Finds one more or one less from a group of up to five objects, then ten objects.
- In practical activities and discussion, beginning to use the vocabulary involved in adding and subtracting.
- Records, using marks that they can interpret and explain.
- Begins to identify own mathematical problems based on own
- Interests and fascinations.

Early Learning Goal

Children count reliably with numbers from one to 20, place them in order, and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving, and sharing.

Year 1

Number - number and place value

Pupils should be taught to:

- 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 2s, 5s and 10s
- given a number, identify 1 more and 1 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

Number - addition and subtraction

Pupils should be taught to:

- 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 0
- Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = ? - 9$

Number - multiplication and division

Pupils should be taught to:

- 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

Number - fractions

Pupils should be taught to:

- recognise, find and name a half as 1 of 2 equal parts of an object, shape or quantity
- recognise, find and name a quarter as 1 of 4 equal parts of an object, shape or quantity

Measurement

Pupils should be taught to:

- 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

Geometry - properties of shapes

Pupils should be taught to:

- 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 and direction

Pupils should be taught to:

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

Year 2

Number - number and place value

Pupils should be taught to:

- count in steps of 2, 3, and 5 from 0, and in 10s from any number, forward and backward
- recognise the place value of each digit in a two-digit number (10s, 1s)
- 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

Number - addition and subtraction

Pupils should be taught to:

- 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 1s
 - a two-digit number and 10s
 - 2 two-digit numbers
 - adding 3 one-digit numbers
- show that addition of 2 numbers can be done in any order (commutative) and subtraction of 1 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 - multiplication and division

Pupils should be taught to:

- 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 2 numbers can be done in any order (commutative) and division of 1 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

Number - fractions

Pupils should be taught to:



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

Measurement

Pupils should be taught to:

- 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

Geometry - properties of shapes

Pupils should be taught to:

- 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 and direction

Pupils should be taught to:

- 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)

Statistics

Pupils should be taught to:

- interpret and construct simple pictograms, tally charts, block diagrams and 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

Year 3

Number - number and place value

Pupils should be taught to:

- 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 3-digit number (100s, 10s, 1s)
- compare and order numbers up to 1,000
- identify, represent and estimate numbers using different representations
- read and write numbers up to 1,000 in numerals and in words
- solve number problems and practical problems involving these ideas

Number - addition and subtraction

Pupils should be taught to:

- add and subtract numbers mentally, including:
 - a three-digit number and 1s
 - a three-digit number and 10s
 - a three-digit number and 100s
- add and subtract numbers with up to 3 digits, using formal written methods of columnar addition and



	<p>subtraction</p> <ul style="list-style-type: none"> 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 <p><u>Number - multiplication and division</u></p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> 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 <p><u>Number - fractions</u></p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> 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, $5/7 + 1/7 = 6/7$] compare and order unit fractions, and fractions with the same denominators solve problems that involve all of the above <p><u>Measurement</u></p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> 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, am/pm, 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] <p><u>Geometry - properties of shapes</u></p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> 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 2 right angles make a half-turn, 3 make three-quarters of a turn and 4 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 <p><u>Statistics</u></p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> 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
Year 4	<p><u>Number - number and place value</u></p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> count in multiples of 6, 7, 9, 25 and 1,000 find 1,000 more or less than a given number



- count backwards through 0 to include negative numbers
- recognise the place value of each digit in a four-digit number (1,000s, 100s, 10s, and 1s)
- order and compare numbers beyond 1,000
- identify, represent and estimate numbers using different representations
- round any number to the nearest 10, 100 or 1,000
- 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 0 and place value

Number - addition and subtraction

Pupils should be taught to:

- 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 - multiplication and division

Pupils should be taught to:

- recall multiplication and division facts for multiplication tables up to 12×12
- use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together 3 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 1 digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects

Number - fractions (including decimals)

Pupils should be taught to:

- 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 100 and dividing tenths by 10
- 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 hundreds
- recognise and write decimal equivalents to $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$
- 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 1 decimal place to the nearest whole number
- compare numbers with the same number of decimal places up to 2 decimal places
- solve simple measure and money problems involving fractions and decimals to 2 decimal places

Measurement

Pupils should be taught to:

- 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

Geometry - properties of shapes

Pupils should be taught to:

- compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and



	<p>sizes</p> <ul style="list-style-type: none">• identify acute and obtuse angles and compare and order angles up to 2 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 <p><u>Geometry - position and direction</u></p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none">• 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 <p><u>Statistics</u></p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none">• 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
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Year 5	<p><u>Number - number and place value</u></p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none">• 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 0• round any number up to 1,000,000 to the nearest 10, 100, 1,000, 10,000 and 100,000• solve number problems and practical problems that involve all of the above• read Roman numerals to 1,000 (M) and recognise years written in Roman numerals <p><u>Number - addition and subtraction</u></p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none">• 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 <p><u>Number - multiplication and division</u></p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none">• identify multiples and factors, including finding all factor pairs of a number, and common factors of 2 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 1,000• 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
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Number - fractions (including decimals and percentages)

Pupils should be taught to:

- 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 [for example, $2/5 + 4/5 = 6/5 = 1 \frac{1}{5}$]
- 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, $0.71 = 71/100$]
- recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents
- round decimals with 2 decimal places to the nearest whole number and to 1 decimal place
- read, write, order and compare numbers with up to 3 decimal places
- solve problems involving number up to 3 decimal places
- recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per 100', and write percentages as a fraction with denominator 100, and as a decimal fraction
- solve problems which require knowing 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

Measurement

Pupils should be taught to:

- 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), including using standard units, square centimetres (cm^2) and square metres (m^2), and estimate the area of irregular shapes
- estimate volume [for example, using 1 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 - properties of shapes

Pupils should be taught to:

- 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 1 whole turn (total 360°)
 - angles at a point on a straight line and half a turn (total 180°)
 - other multiples of 90°
 - 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

Pupils should be taught to:

- 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

Statistics

Pupils should be taught to:

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



Year 6

Number - number and place value

Pupils should be taught to:

- 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 0
- solve number and practical problems that involve all of the above

Number - addition, subtraction, multiplication and division

Pupils should be taught to:

- 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 4 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

Number - Fractions (including decimals and percentages)

Pupils should be taught to:

- 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 [for example, $1/4 \times 1/2 = 1/8$]
- divide proper fractions by whole numbers [for example, $1/3 \div 2 = 1/6$]
- associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, $3/8$]
- identify the value of each digit in numbers given to 3 decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers up to 3 decimal places
- multiply one-digit numbers with up to 2 decimal places by whole numbers
- use written division methods in cases where the answer has up to 2 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

Pupils should be taught to:

- solve problems involving the relative sizes of 2 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

Pupils should be taught to:

- use simple formulae



- generate and describe linear number sequences
- express missing number problems algebraically
- find pairs of numbers that satisfy an equation with 2 unknowns
- enumerate possibilities of combinations of 2 variables

Measurement

Pupils should be taught to:

- solve problems involving the calculation and conversion of units of measure, using decimal notation up to 3 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 3 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 (cm^3) and cubic metres (m^3), and extending to other units [for example, mm^3 and km^3]

Geometry - properties of shapes

Pupils should be taught to:

- 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

Pupils should be taught to:

- describe positions on the full coordinate grid (all 4 quadrants)
- draw and translate simple shapes on the coordinate plane, and reflect them in the axes

Statistics

Pupils should be taught to:

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