Key Learning in Mathematics – Year 6

Number – number and place value

- Count forwards or backwards in steps of integers, decimals, powers of 10
- Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit
- Identify the value of each digit to three decimal places
- *Identify, represent and estimate numbers using the number line*
- *Order and compare numbers including integers, decimals and negative numbers*
- *Find 0.001, 0.01, 0.1, 1, 10 and powers of 10 more/less than a given number*
- Round any whole number to a required degree of accuracy
- *Round decimals with three decimal places to the nearest whole number or one or two decimal places*
- Multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places
- Use negative numbers in context, and calculate intervals across zero
- *Describe and extend number sequences including those with multiplication and division steps, inconsistent steps, alternating steps and those where the step size is a decimal*
- Solve number and practical problems that involve all of the above

Number – fractions, decimals and percentages

- Compare and order fractions, including fractions > 1 *(including on a number line)*
- Use common factors to simplify fractions; use common multiples to express fractions in the same denomination
- Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts
- Associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375 and $\frac{3}{8}$)
- 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 (e.g. $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$)
- Divide proper fractions by whole numbers (e.g. $\frac{1}{3} \div 2 = \frac{1}{6}$)
- *Find simple percentages of amounts*
- *Solve problems involving fractions*
- Solve problems which require answers to be rounded to specified degrees of accuracy
- Solve problems involving the calculation of percentages (e.g. of measures and such as 15% of 260) and the use of percentages for comparison

Ratio and proportion

- Solve problems involving the relative sizes of two quantities where missing values can be found using integer multiplication/division facts
- Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples
- Solve problems involving similar shapes where the scale factor is known or can be found

Number – addition and subtraction

- Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method)
- Select a mental strategy appropriate for the numbers in the calculation
- Recall and use addition and subtraction facts for 1 (with decimals to two decimal places)
- Perform mental calculations including with mixed operations and large numbers *and decimals*
- *Add and subtract whole numbers and decimals using formal written methods (columnar addition and subtraction)*
- Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy
- Use knowledge of the order of operations to carry out calculations
- Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
- Solve problems involving all four operations, *including those with missing numbers*

Geometry – properties of shapes

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

Geometry – position and direction

- 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

Statistics

- *Continue to complete and interpret information in a variety of sorting diagrams (including sorting properties of numbers and shapes)*
- Interpret and construct pie charts and line graphs and use these to solve problems
- *Solve comparison, sum and difference problems using information presented in all types of graph*
- Calculate and interpret the mean as an average

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

Number – multiplication and division

- *Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method)*
- Identify common factors, common multiples and prime numbers
- *Use partitioning to double or halve any number*
- Perform mental calculations, including with mixed operations and large numbers
- Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- Multiply one-digit numbers with up to two decimal places by whole numbers
- Divide numbers up to 4 digits by a two-digit whole number using the formal written methods of short or long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
- Use written division methods in cases where the answer has up to two decimal places
- Use estimation *and inverse* to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy
- Use knowledge of the order of operations to carry out calculations
- Solve problems involving all four operations, *including those with missing numbers*

Measurement

- Use, read and write standard units of length, mass, volume and time using decimal notation to three decimal places
- Convert between standard units of length, mass, volume and time using decimal notation to three decimal places
- Convert between miles and kilometres
- Recognise that shapes with the same areas can have different perimeters and vice versa
- Calculate the area of parallelograms and triangles
- Recognise when it is possible to use formulae for area and volume of shapes
- 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 (e.g. mm^3 and km^3)
- *Calculate differences in temperature, including those that involved a positive and negative temperature*
- Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate

Arithmetic Expectations – Year 6

Skills	Examples
Counting	
Count forwards and backwards in steps of integers, decimals and powers of 10.	Count from 0 in steps for multiplication facts for up to 12x tables What number would come next in this counting sequence? 0, 10, 100, 1000, ___ , ___ What number is missing from this counting sequence? 0, 0.01, 0.02, 0.04, 0.05
Find 0.001, 0.01, 0.1, 1 10 and powers of 10 more/less than a given number.	500 +/- 0.001 = 9.46 +/- 0.01 = What is 1000 more than _____? What is 0.1 less than _____?
Number Facts	
Recall and use addition and subtraction facts for 1 (with decimals to two decimal places)	1 = 0.05 + ___ 0.95 + ___ = 1 ___ + 0.8 = 1 0.09 + ___ = 1 0.23 + ___ = 1 ___ + 0.4 = 1
Multiply and divide numbers by 10, 100, 1000 giving answers up to three decimal places	345 x 10 = 4598 ÷ 10 = 452 ÷ ___ = 4.52 894 x 100 = 2098 ÷ 100 = 109 x ___ = 10900
Mental Calculation Strategies – Addition and Subtraction	
Partition and combine multiples of thousands hundreds, tens and ones *Concrete (if necessary) – place value counters* *Pictorial – number line*	5800 + 2400 5800 add 2000 and 400 = 5800 add 2000 add 400 873 + 350 873 add 300 and 50 = 873 add 300 add 50 4100 - 1600 4100 take away 1000 and 600 = 4100 take away 1000 take away 600 2132 - 440 2132 take away 400 and 40 = 2132 take away 400 take away 40 5124 + 1352 5124 add 1000 and 300 and 50 and 2 = 5124 add 1000 add 300 add 50 add 2 (crossing no boundaries) 7584 - 2351 7584 take away 2000 and 300 and 50 and 1 = 7584 take away 2000 take away 300 take away 50 take away1 (crossing no boundaries)
Partition and combine multiples of ones and tenths *Concrete (if necessary) – place value counters* *Pictorial – number line*	8.4 + 3.8 8.4 add 3 and 0.8 = 8.4 add 3 add 0.8 13.2 – 4.5 13.2 take away 4 and 0.5 = 13.2 take away 4 take away 0.5
Identify and use knowledge of number bonds within a calculation and identify related facts, e.g. 680 + 430, 6.8 + 4.3, 0.68 + 0.43 can all be worked out using the related calculation 68 + 43 *Concrete (if necessary) – place value counters* *Pictorial – related facts addition trios* 100 1 62 38 0.62 0.38	0.62 + 0.38 using knowledge of 62 + 38 = 100 0.75 + 0.56 using knowledge of 75 + 56 = 131 2.8 + 0.43 using knowledge of 280 + 43 = 323 1 – 0.41 using knowledge of 100 – 41 = 59 0.92 – 0.35 using knowledge of 92 – 35 = 57 8.3 – 0.52 using knowledge of 830 – 52 = 778

Find differences by counting up through the next multiple of 0.1, 1, 10, 100 or 1000 *Pictorial – number line*	8.2 – 3.46 14.23 – 7.58
Bridge through 10 when adding or subtracting a single digit number (partitioning, e.g. 58 + 5 = 58 + 2 + 3 or 76 – 8 = 76 – 6 – 2) *Pictorial – number line*	1.5 + 1.7 as 1.5 + 0.5 + 1.2 0.7 + 0.56 as 0.7 + 0.3 + 0.26 8.3 – 2.7 as 8.3 – 2.3 – 0.4
Add or subtract a multiple of 1 or 10 and adjust (for those numbers close to multiples of 1 or 10) *Pictorial – number line*	5.6 + 3.9 as 5.6 + 4 – 0.1 7.5 – 4.8 as 7.5 – 5 + 0.2

Mental Calculation Strategies – Multiplication and Division

Multiply whole numbers and decimals to three decimal places by 10, 100 and 1000 *Pictorial – place value chart*	4562 x 1000 9.682 x 10 25.784 x 100
Use partitioning to double or halve any number *Concrete (if necessary) – place value counters* *Pictorial – partitioning diagram*	What is double 34.7? What is half of 456? 34.5 ÷ 2 = 409 x 2 =
Identify and use all related facts that link to tables *Pictorial – related facts multiplication trios* 42 7 6 42000 7 6000	7000 x 6 becomes 7 x 1000 x 6 reordered as 7 x 6 x 1000 500 x 40 becomes 5 x 100 x 4 x 10 reordered as 5 x 4 x 100 x 10 900 x 300 becomes 9 x 100 x 3 x 100 reordered as 9 x 3 x 100 x 100 3000 x 80 becomes 3 x 1000 x 8 x 10 reordered as 3 x 8 x 1000 x 10
Use related facts to multiply 0.0t by a one-digit number *Pictorial – related facts multiplication trios* 24 8 3 0.24 8 0.03	0.03 x 7 related to 3 x 7 = 21 0.06 x 9 related to 6 x 9 = 54 0.05 x 4 related to 5 x 4 = 20
Use related facts to divide TU by 0.t *Pictorial – related facts multiplication/division trios* 72 8 9 72 0.8 90	56 ÷ 0.8 related to 56 ÷ 8 = 7 21 ÷ 0.7 related to 21 ÷ 7 = 3 36 ÷ 0.9 related to 36 ÷ 9 = 4 48 ÷ 0.4 related to 48 ÷ 4 = 12
Use related facts to divide 0.th by 0.t *Pictorial – related facts multiplication/division trios* 45 5 9 0.45 0.5 9	0.32 ÷ 0.4 related to 32 ÷ 4 = 8 0.64 ÷ 0.8 related to 64 ÷ 8 = 8 0.45 ÷ 0.9 related to 45 ÷ 9 = 5

Use compensation to multiply U.9 and U.99 by a one-digit number *Pictorial – rectangle with given dimensions*	5.9 x 4 understood as 6 x 4 – 0.1 x 4 3.99 x 7 understood as 4 x 7 – 0.01 x 7 9.99 x 6 understood as 10 x 4 – 0.01 x 6
Use partitioning to multiply 0.th by a one-digit number *Pictorial – partitioning diagram*	0.76 x 3 0.28 x 7 0.54 x 6
Use partitioning to double numbers including those with three decimal places *Concrete (if necessary) – place value counters* *Pictorial – partitioning diagram*	Double 3.421 Double 6.705 Double 12.594 Double 54 672 Double 674 960
Divide whole numbers and decimals to three decimal places by 10, 100 and 1000 *Pictorial – place value chart*	356.7 ÷ 100 9.83 ÷ 10 7.04 ÷ 10 860.2 ÷ 100 56 789 ÷ 1000
Use related facts to divide by 50 *Pictorial – place value chart if necessary for initial step of ÷ 100*	4100 ÷ 50 understood as (4100 ÷ 100) x 2 7800 ÷ 50 understood as (7800 ÷ 100) x 2 530 ÷ 50 understood as (530 ÷ 100) x 2
Use related facts to divide by 25 *Pictorial – place value chart if necessary for initial step of ÷ 100*	3200 ÷ 25 understood as (3200 ÷ 100) x 4 7600 ÷ 25 understood as (7600 ÷ 100) x 4 360 ÷ 25 understood as (360 ÷ 100) x 4
Use partitioning to divide ThHTU by a one-digit number *Concrete (if necessary) – place value counters* *Pictorial – partitioning diagram*	5035 ÷ 5 by partitioning into 5000 and 35 (multiples of 5 totalling 5035) 1236 ÷ 4 by partitioning into 1200 and 36 (multiples of 4 totalling 1236) 9240 ÷ 6 by partitioning into 6000 and 3000 and 240 (multiples of 6 totalling 9240)

Progression Towards Written Calculation Strategies – Addition

This final stage of the method should have been achieved in Year 3, and should be continued to be used for all written addition calculations.
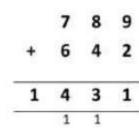The first example would be explained as follows:
5 + 8 = 13, put 3 down and carry the 10 *(written as a 1 in the tens column)*
20 + 40 + 10 that was carried over = 70 *(7 written in the tens column)*
600 + 0 = 600 *(6 written in the hundreds column)*
Children will be expected to use this method for adding numbers with up to seven digits, numbers involving decimals and adding any number of amounts together.

Supported (if necessary) by the use of place value counters.

$$
\begin{array}{r}
7\ 8\ 9 \\
+\ 6\ 4\ 2 \\
\hline
1\ 4\ 3\ 1 \\
{\scriptstyle 1\ \ 1}
\end{array}
$$

4	.	4	5
1	.	9	
+ 0	.	0	8

Progression Towards Written Calculation Strategies – Subtraction

This final stage is the compact method of decomposition should have been achieved in Year 4, and should be continued to be used for all written subtraction calculations.
Children will be expected to use this method for subtracting numbers with up to seven digits and numbers involving decimals.

Supported (if necessary) by the use of place value counters.

The example shown would be explained as follows:
We are subtracting 86 from 754. Start with the least significant place value column.
Are there enough hundredths to subtract 3 hundredths?
No – so let's exchange a tenth from the tenths column for ten hundredths. 2 tenths and 0 hundredths becomes 41 tenth and 10 hundredths.
10 hundredths subtract 3 hundredths = 8 hundredths
Are there enough tenths to subtract 8 tenths?
No – so let's exchange a one from the ones column for ten tenths. 1 one and 1 tenth becomes 0 ones and 1 tenths.
11 tenths subtract 8 tenths = 3 tenths.
Are there enough ones to subtract 4 ones?
No – so let's exchange a ten from the tens column for ten ones. 5 tens and 0 ones becomes 4 tens and 10 ones
10 – 4 = 6
4 tens (40) – 0 tens = 4 tens (40)
Answer 46.37

$$
\begin{array}{r}
{\scriptstyle 4\ 10\ 11\ 1} \\
5\ 1.20 \\
-\ \ 4.83 \\
\hline
46.37
\end{array}
$$

Progression Towards Written Calculation Strategies – Multiplication

As the grid method for multiplication supports children's number sense and appreciation of the values of each digit, schools can decide if this is the final stage of written multiplication.
It is often easier for children to keep track of the partial products calculated by using the grid method rather than the compact vertical method.
Concerns over 'acceptable methods' for 2 mark questions in the end of key stage 2 test should be weighed up against the improved chance of gaining 2 marks for the correct answer by using the grid method.

×	600	90	3	
20	12000	1800	60	= 13 860
4	2400	360	12	= 2 772 +
				16 632

Children may be add these mentally.

Optional

If schools wish to proceed to the compact vertical method for written multiplication then this is how it should progress, with different colours for the partial products to highlight how the steps taken are the same, just in a different order.

Step 1

```
TTh Th H T U
        6 9 3
    x     2 4
    2 7 7 2   (693 x 4)
```

Step 2

```
TTh Th H T U
        6 9 3
    x     2 4
    2 7 7 2   (693 x 4)
  + 1 3 8 6 0 (693 x 20)
```

Step 3

```
TTh Th H T U
        6 9 3
    x     2 4
    2 7 7 2   (693 x 4)
  + 1 3 8 6 0 (693 x 20)
  1 6 6 3 2
```

Progression Towards Written Calculation Strategies – Division

As the chunking method for division supports children's number sense and appreciation of the values of each digit, schools can decide if this is the final stage of written division. It can be used for both short and long division (Year 6 expectation) and leads to more efficient mental methods.

As children develop their understanding of this method, they should use ever more efficient steps. The menu box may not need to be written, but the children should continue to think in this way.

```
      640 r2
  8 5122
  - 4800   600x
     322
  -  320    40x
       2
```

```
       155 r4
  26 4034
  - 2600   100x
    1434
  - 1300    50x
     134
  -  130     5x
       4
```
➡
```
       155 r4
  26 4034
  - 3900   150x
     134
  -  130     5x
       4
```

Decision Making

When calculating, children should ask themselves:
- do I know the answer because it is a fact I have learnt?
- can I work it out easily in my head?
- can I use some equipment or a jotting?
- do I need to use the written method?

The strategies used within this document are taken from the Lancashire Mathematics Team Progression in Mental Calculation Strategies Policies and the Progression Towards Written Methods Policies.

See www.lancsngfl.ac.uk/curriculum/primarymaths for the full policies.

Ellel St. John's CofE Primary School Year 6 Maths Curriculum

Year 6 Mathematics Yearly Overview

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Week 1	Place Value Decimals	Fractions	Place Value, Sequences, Coordinates	Mental and Written Addition and Subtraction	Place Value, Decimals and Fractions	Measurement (Mass, Volume, Capacity)
Week 2	Mental and Written Addition	Fractions, Percentages, Ratio and Proportion	2-D Shape, Coordinates, Translation and Reflection	Measurement, Ratio and Proportion	Mental and Written Calculation	Mental and Written Calculation
Week 3	Mental and Written Multiplication (Time)	Geometry (Angles), Statistics (Pie Charts)	Temperature, Mean	2-D and 3-D Shape	Calculating Fractions, Ratio and Proportion	Fractions
Week 4	2-D and 3-D Shape	Measurement (Length, Perimeter, Mass)	Calculating with Fractions	Area, Perimeter and Volume of Shapes	Coordinates, Translation and Reflection	Place Value Decimals
Week 5	Mental and Written Subtraction	Measurement (Area and Volume)	Mental and Written Division	Statistics Line Graphs and Pie Charts	Algebra and Sequences	2-D and 3-D Shape
Week 6	Mental and Written Division	Assess and Review Week	Mental and Written Multiplication	Assess and Review Week	Measurement (Length / Time) Statistics (Mean)	Assess and Review Week

		AUTUMN	
6		**Topic**	**Main Learning**
		Place Value including decimals	• Identify, represent and estimate numbers using the number line. • 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. • Count forwards or backwards in steps of integers, decimals or powers of 10 for any number. • Order and compare numbers including integers, decimals and negative numbers. • Find 0.001, 0.01, 0.1, 1, 10 and powers of 10 more or less than a given number. • Recall and use addition and subtraction facts for 1 (with decimal numbers to two decimal places). • Round decimals with three places to the nearest whole number or one or two decimal places. • 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. • Solve number and practical problems that involve all of the above.
		Mental and written addition	• Perform mental calculations, including with mixed operations and large numbers and decimals. • Identify, represent and estimate numbers using the number line. • Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method). • Select a mental strategy appropriate for the numbers involved in the calculation. • Solve addition multi- step problems in contexts, deciding which operations and methods to use and why. • Solve problems involving addition. • Express missing number problems algebraically. • Find pairs of numbers that satisfy an equation with two unknowns. • Use estimation and inverse to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy. • Add whole numbers and decimals using formal written methods (columnar addition). • Solve problems which require answers to be rounded to specified degrees of accuracy.
		Mental and written multiplication in the context of time	• Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication. • Multiply one-digit numbers with up to two decimal places by whole numbers. • Perform mental calculations, including with mixed operations and large numbers and decimals. • Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method). • Select a mental strategy appropriate for the numbers involved in the calculation. • Solve problems involving addition, subtraction, multiplication and division. • Express missing number problems algebraically. • Find pairs of numbers that satisfy an equation with two unknowns. • Use, read, write and convert between standard units, converting measurements of time from a smaller unit to a larger unit, and vice versa. • Use estimation and inverse to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy. • Solve problems which require answers to be rounded to specified degrees of accuracy.
		Geometry- 2D and 3D Shape	• 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. • Continue to complete and interpret information in a variety of sorting diagrams (including those used to sort properties of numbers and shapes)
		Mental and written subtraction	• Perform mental calculations, including with mixed operations and large numbers and decimals. • Identify, represent and estimate numbers using the numberline. • Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method). • Select a mental strategy appropriate for the numbers involved in the calculation. • Solve subtraction multi -step problems in contexts, deciding which operations and methods to use and why. • Solve problems involving subtraction. • Express missing number problems algebraically. • Find pairs of numbers that satisfy an equation with two unknowns. • Use estimation and inverse to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy. • Subtract whole numbers and decimals using formal written methods (columnar subtraction). • Solve problems which require answers to be rounded to specified degrees of accuracy.
		Mental and written division	• Perform mental calculations, including with mixed operations and large numbers and decimals. • 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 numbers 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 • Use written division methods in cases where the answer has up to two decimal places. • Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method). • Solve problems involving division. • Solve problems which require answers to be rounded to specified degrees of accuracy. • Use estimation and inverse to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy
	Fractions	• Identify common factors, common multiples and prime numbers. • Compare and order fractions, including fractions >1 (including on a number line). • Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions. • Associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction. • Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts. • Solve problems involving fractions.
	Fractions, percentages, ratios and proportion	• Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts. • Find simple percentages of amounts. • 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
	Geometry(angles) and statistics (pie charts)	• Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles. • Interpret and construct pie charts and line graphs and use these to solve problems. • Solve comparison, sum and difference problems using information presented in all types of graph.
	Measurement (length, perimeter, mass)	• Solve problems involving the calculation and conversion of units of measure (including money and time), using decimal notation up to three decimal places where appropriate. • Use, read, write and convert between standard units, converting measurements of length and mass, 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.
	Measurement (area and volume)	• Recognise that shapes with the same areas can have different perimeters and vice versa. • Calculate the area of parallelograms and triangles. • Use, read and write standard units using decimal notation to up to three decimal places. • Recognise when it is possible to use the formulae for area and volume of shapes. • Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres(cm3) and cubic metres (m3) and extending to other units (for example, mm3 and km3)

YEAR	Spring	
6	**Topic**	**Main Learning**
	Place value, sequences and coordinates	• Count forwards or backwards in steps of integers, decimals or powers of 10 for any number. • Describe and extend number sequences including those with multiplication and division steps, inconsistent steps, alternating steps and those where the step size is a decimal. • Use simple formulae. • Generate and describe linear number sequences. • Describe positions on the full coordinate grid (all four quadrants).
	2-D shape, coordinates, translation and reflection	• 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.
	Measurement (temperature)	• Use negative numbers in context, and calculate intervals across zero. • Order and compare numbers including integers, decimals and negative numbers.

	and statistics (mean)	• Calculate and interpret the mean as an average.
	Calculating with fractions	• Identify common factors, common multiples and prime numbers. • Use common factors to simplify fractions; use common multiples to express fractions in the same denomination. • Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions. • Multiply simple pairs of proper fractions (using diagram), writing the answer in its simplest form. • Divide proper fractions by whole numbers (using diagram) • Associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction.
	Mental and written division	• 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. • Use written division methods in cases where the answer has up to two decimal places. • Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method). • Solve problems which require answers to be rounded to specified degrees of accuracy.
	Mental and written multiplication	• Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication. • Multiply one-digit numbers with up to two decimal places by whole numbers. • Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method). • Select a mental strategy appropriate for the numbers involved in the calculation. • Solve problems which require answers to be rounded to specified degrees of accuracy. • Enumerate possibilities of combinations of two variables.
	Mental and written addition and subtraction	• Identify, represent and estimate numbers using the number line. • Add and subtract whole numbers and decimals using formal written methods (columnar addition and subtraction). • Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method). • Select a mental strategy appropriate for the numbers involved in the calculation. • Solve problems involving addition and subtraction. • Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why. • Use their knowledge of the order of operations to carry out calculations involving the four operations.
	Measurement, ratio and proportion	• Solve problems involving similar shapes where the scale factor is known or can be found. • 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. • Solve problems involving the calculation and conversion of units of measure (including money and time), using decimal notation up to three decimal places where appropriate. • 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 unequal sharing and grouping using knowledge of fractions and multiples.
	Geometry- 2D and 3D shapes	• 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. • Continue to complete and interpret information in a variety of sorting diagrams (including those used to sort properties of numbers and shapes). • 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.
	Area, perimeter and volume of shape	• Recognise that shapes with the same areas can have different perimeters and vice versa. • Recognise when it is possible to use the 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).
	Statistics (line graphs and pie charts)	• Convert between miles and kilometres. • Interpret and construct pie charts and line graphs and use these to solve problems. • Solve comparison, sum and difference problems using information presented in all types of graph.

YEAR	Summer	
6	**Topic**	**Main Learning**
	Place value, decimals and fractions	- Count forwards or backwards in steps of integers, decimals or powers of 10 for any number. - Order and compare numbers including integers, decimals and negative numbers. - Identify, represent and estimate numbers using the number line. - Find 0.001, 0.01, 0.1, 1, 10 and powers of 10 more or less than a given number. - Round decimals with three places to the nearest whole number or one or two decimal places. - Use common factors to simplify fractions; use common multiples to express fractions in the same denomination. - Compare and order fractions, including fractions >1 (including on a number line). - Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions. - Associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction
	Mental and written calculation	- Perform mental calculations, including with mixed operations and large numbers and decimals. - Identify, represent and estimate numbers using the number line. - Add and subtract whole numbers and decimals using formal written methods (columnar addition and subtraction). - Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method). - Select a mental strategy appropriate for the numbers involved in the calculation. - 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 their knowledge of the order of operations to carry out calculations involving the four operations. - 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. - Use estimation and inverse to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy
	Calculating fractions, ratio and proportion	- Multiply simple pairs of proper fractions, writing the answer in its simplest form (using diagram). - Divide proper fractions by whole numbers (using diagram) - 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.
	2-D shape, coordinates, translation and reflection	- Draw 2-D shapes using given dimensions and angles. - 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
	Algebra and sequences	- Describe and extend number sequences including those with multiplication and division steps, inconsistent steps, alternating steps and those where the step size is a decimal. - Use simple formulae. - Generate and describe linear number sequences. - Convert between miles and kilometres.
	Measurement (length and time) and statistics (mean)	- Solve problems involving the calculation and conversion of units of measure (including money and time), using decimal notation up to three decimal places where appropriate. - Use, read, write and convert between standard units, converting measurements of length and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places. - Calculate and interpret the mean as an average. - Solve comparison, sum and difference problems using information presented in all types of graph.
	Measurement (mass and volume/capacity)	- Solve problems involving the calculation and conversion of units of measure (including money and time), using decimal notation up to three decimal places where appropriate. - Use, read, write and convert between standard units, converting measurements of mass and volume from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places. - 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).

	Mental and written calculation	• Perform mental calculations, including with mixed operations and large numbers and decimals. • Add and subtract whole numbers and decimals using formal written methods (columnar addition and subtraction). • Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method). • Select a mental strategy appropriate for the numbers involved in the calculation. • 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 their knowledge of the order of operations to carry out calculations involving the four operations. • 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. • Use estimation and inverse to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.
	Fractions	• Use common factors to simplify fractions; use common multiples to express fractions in the same denomination. • Compare and order fractions, including fractions >1 (including on a number line). • 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 (using diagram) • Divide proper fractions by whole numbers (using diagram)
	Place value and decimals	• Count forwards or backwards in steps of integers, decimals or powers of 10 for any number. • Order and compare numbers including integers, decimals and negative numbers. • Calculate differences in temperature, including those that involve a positive and negative temperature. • Find 0.001, 0.01, 0.1, 1, 10 and powers of 10 more or less than a given number. • Round decimals with three places to the nearest whole number or one or two decimal places. • Describe and extend number sequences including those with multiplication and division steps, inconsistent steps, alternating steps and those where the step size is a decimal
	Geometry (2-D and 3-D shape)	• 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. • Continue to complete and interpret information in a variety of sorting diagrams (including those used to sort properties of numbers and shapes). • 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