

## Mathematics Teaching Sequence – Year 5

Children should engage with appropriate number and practical problems **throughout each topic**.

Statements highlighted in yellow have been identified as ‘ready to progress’ objectives: key concepts which are essential building blocks for the next steps in learning. These objectives must be embedded across the year so that children are fluent.

Resources to support teaching of these specific objectives can be found here:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1017683/Maths\\_guidance\\_KS\\_1\\_and\\_2.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1017683/Maths_guidance_KS_1_and_2.pdf)

<https://www.ncetm.org.uk/classroom-resources/exemplification-of-ready-to-progress-criteria/>

Year 5	
Autumn Term	Key vocab for topic
<p style="text-align: center;"><b><u>Number and Place value</u></b></p> <ul style="list-style-type: none"> <li>• Determine the place value of each digit in numbers, including 10,000, 100,000 and 1,000,000 (including representing/partitioning numbers in different ways e.g. part-whole, number line).</li> <li>• Count forwards and backwards in powers of 10 for numbers up to 1,000,000.</li> <li>• Read and write numbers up to 1,000,000.</li> <li>• Read Roman numerals to 1000 (M).</li> <li>• Recognise years written in Roman numerals.</li> <li>• Compare and order numbers up to 1,000,000.</li> <li>• Round any number up to 1,000,000 to the nearest 10, 100, 1000, 10,000 and 100,000.</li> <li>• Recognise negative numbers in context.</li> <li>• Count forwards and backwards with positive and negative whole numbers, including through zero.</li> </ul> <p><b>Review</b></p> <p><b><u>Addition and subtraction</u></b></p> <ul style="list-style-type: none"> <li>• Add and subtract whole numbers with more than 4 digits mentally (using knowledge of place value).</li> <li>• Use formal written method of column addition to add numbers with more than 4 digits (crossing the boundaries).</li> <li>• Use formal written method of column subtraction with more than 4 digits, with exchange.</li> <li>• Solve multi-step problems, and determine <b><u>operations and methods</u></b> appropriate to problem context.</li> </ul> <p><b>Review</b></p>	<p>Place value Millions Hundreds of thousands Tens of thousands Thousands Hundreds Tens Ones Place holder Roman numerals Greater than Less than Equals to Ascending Descending Positive Negative</p> <p>Addition vocab: sum, totals, altogether, combine, plus, more Subtraction: finding the difference, minus, less than, left, take away Crossing the boundary Exchange Place value columns Operations: addition and subtraction Most efficient method Mental Formal (written)</p>

### Check answers to calculations (+ and -)

- Use rounding to check answers.
- Use rounding to determine levels of accuracy of answers in context.

### Multiplication/division

By the end of year 4, children should be able to recall multiplication and division facts for tables up to 12 x 12.

**Secure fluency in multiplication table facts, and corresponding division facts, through continued practice throughout year 5.**

- Multiply whole numbers by 10,100 and 1000. Understand this as equivalent to making a number 10 or 100 times the size.
- Divide whole numbers by 10,100 and 1000. Understand this as equivalent to making a number 1 tenth or 1 hundredth times the size.
- Identify and find multiples of positive, whole numbers.
- Identify and find factors of positive, whole numbers.
- Find all factors pairs of a number and the common factors of two numbers, expressing a given number as a product of 2 or 3 factors.
- Multiply and divide numbers mentally drawing upon known facts e.g.  $30 \times 4$  (use fact  $3 \times 4 = 12$ )
- Know that a prime number only has two factors (itself and 1) and therefore, can only be divided by itself and 1.
- Establish whether a number (up to 100) is prime.
- Recall prime numbers up to 19.
- Know that a composite number is a whole number that is not prime (has more than one factor).
- Identify non-prime numbers as composite numbers.
- Know that prime factors are factors that are also prime numbers.
- Identify prime factors of a number.
- Solve problems involving multiplication and division, including using knowledge of factors and multiples.

### Statistics

- Know that a line graph shows change over time.
- Interpret information from a line graph, including solving comparison, sum and difference problems.

To the nearest...

Closest

Furthest

Most/least accurate

Place value vocab, including:

*Decimal point*

*Tenths*

*Hundredths*

*Thousandths*

Move digits to the right x number of places

Move digits to the left x number of places

Powers of 10

Share/split

Factor pairs

Common factor

Prime number

Prime factor

Composite number

Language associated with multiplication: product, repeated addition,

groups/lots of

Language associated with division: share, split equally,

equal groups, dividend,

divisor, quotient, division

bracket

Statistics

Line graph

Data representation

Plot data points

Title

Labelling

Key

Equal intervals

X – Axis

Y – Axis

Trends

Compare/comparison

<p><b>Multiplication</b></p> <ul style="list-style-type: none"> <li>• Know that a square number is a whole number multiplied by itself and the notation is <math>^2</math>.</li> <li>• Recognise square numbers.</li> <li>• Know that a cube number is a whole number multiplied by itself twice e.g. <math>4 \times 4 \times 4</math> and the notation is <math>^3</math>.</li> <li>• Recognise cube numbers.</li> <li>• Solve problems involving multiplication and division, including using knowledge of squares and cubes.</li> </ul> <p><b>Autumn Term review</b></p>	<p>Greater/less than Sum Difference</p> <p>Square number Notation (<math>^2</math>) Expanded form e.g. <math>4 \times 4</math> Cube number Notation (<math>^3</math>) Expanded form <math>4 \times 4 \times 4</math> Multiplying by itself</p>
<p><b>Spring Term</b></p> <p><b>Multiplication</b></p> <p><b>Using a formal written method</b></p> <ul style="list-style-type: none"> <li>• Multiply numbers up to 4 digits by a 1-digit number (short multiplication revision).</li> </ul> <p><b>Using the formal written method of long multiplication (expanded then compact)</b></p> <ul style="list-style-type: none"> <li>• Multiply 2 digit numbers by 2 digit numbers.</li> <li>• Multiply 3 digit numbers by 2 digit numbers.</li> <li>• Multiply 4 digit numbers by 2 digit numbers.</li> <li>• Multiply 2 digit numbers mentally drawing upon known facts (done previously).</li> <li>• Identify and use the most efficient multiplication method to answer questions e.g. known facts, short multiplication, long multiplication, moving digits.</li> </ul> <p><b>Division</b></p> <p><b>Using the formal written method of short division</b></p> <ul style="list-style-type: none"> <li>• Divide up to 4 digits by a 1-digit number.</li> <li>• Know that when the divisor is not a multiple of the dividend, there will be remainders e.g. <math>123 \div 2</math>. There will be remainders as 123 is not a multiple of 2 (all multiples of two are even).</li> <li>• Interpret remainders appropriately for the context.</li> <li>• Divide 2 digit numbers mentally drawing upon known facts (done previously).</li> <li>• Identify and use most efficient division method to answer questions e.g. using known facts or short division.</li> <li>• Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign.</li> </ul> <p><b>Review</b></p>	<p>Place value vocab (Th, H, T, O) Multiplicand Multiplier Known facts (times tables knowledge) Short multiplication Moving digits Long multiplication (formal written method)</p> <p>Language associated with division: share, split equally, equal groups, dividend, divisor, quotient, division bracket Mental method Short division Known facts Most efficient method</p>

## Measurement – perimeter and area

- Know that the perimeter of a 2D shape is the distance all around it.
- Measure and calculate the perimeter of composite, rectilinear shapes in centimetres and metres.
- Use knowledge of 2D shape properties to calculate lengths of missing shape sides and the perimeter e.g. squares have four equal sides.
- Know that the area is the total surface of/space inside a shape.
- Know that area can be calculated using number of squares (non-standard unit of measure), square centimetres with the notation of (cm<sup>2</sup>) or square metres with the notation of (m<sup>2</sup>).
- Calculate and compare the area of rectangles (including squares) using standard units.
- Estimate the area of irregular shapes e.g. using non-standard units of measure such as squares/half squares.

## Fractions

- Identify, name and write equivalent fractions (visually represented) of a given fraction, including tenths and hundredths; understand that they have the same value and the same position in the linear number system.
- Recognise mixed numbers and know that a mixed number consists of wholes and parts (fraction).
- Recognise improper fractions and know that they have a greater numerator than denominator.
- Convert from improper fractions to mixed numbers.
- Convert from mixed numbers to improper fractions.
- Write mathematical statements >1 as a mixed number e.g.  $\frac{3}{4} + \frac{2}{4} = \frac{5}{4} = 1 \frac{1}{4}$
- Compare fractions with denominators that are all multiples of the same number.
- Order fractions with denominators that are all multiples of the same number.
- Add and subtract fractions with the same denominator.
- Add fractions with denominators that are multiples of the same number.
- Subtract fractions with denominators that are multiples of the same number.
- Multiply proper fractions by whole numbers (supported by concrete resources and diagrams).
- Multiply mixed numbers by whole numbers (supported by concrete resources and diagrams).
- Calculate fractions of amounts (finding non-unit fractions of quantities).
- Use fractions as operators (when fractions act as a function in a calculation) e.g. know that  $\frac{1}{4}$  of 8 means  $\frac{1}{4} \times 8$ .

Perimeter  
2D shape  
Shape properties  
Parallel sides  
Equal sides  
Sum of sides/lengths  
Standard measurement units: centimetres, metres.  
Composite, rectilinear shapes  
Compound shapes  
Non-standard units: squares, half squares  
Square centimetres (cm<sup>2</sup>)  
Square metres (m<sup>2</sup>)  
Area  
Area of a rectangle = Base x Height  
Estimate

Parts  
Whole  
Denominator  
Numerator  
Unit fraction  
Non-unit fraction  
Simplifying  
Equivalent  
Vinculum (fraction line)  
Halves  
Tenths  
Quarters  
Eighths  
Thirds  
Sixths  
Fifths  
Associate fraction line with division  
Mixed numbers  
Proper fractions  
Improper fractions  
Convert  
Greater than 1  
Multiples  
Common denominator  
Lowest common multiple  
Highest common multiple  
Operator  
Scaling

- Solve problems involving multiplication and division, including scaling by simple fractions.

## Review

### Decimals

- Read and write numbers with up to three decimal places.
- Identify and recognise place value of each digit in numbers up to 2 dp E.g. In 0.52, there are 5 tenths and 2 hundredths (or 52 tenths) using partitioning (standard and non-standard).
- Know equivalences:
  - 10 tenths = 1 one
  - 1 is 10 times greater 0.1.
  - 100 hundredths = 1 one, 1 is 100 times the size of 0.01.
  - 10 hundredths = 1 tenth
  - 0.1 is 10 times greater than 0.01.

- Divide 1 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in units of 1 with 2, 4, 5 and 10 equal parts.
- Read and write decimal numbers (up to 3dp) as fractions e.g.  $0.71 = \frac{71}{100}$

- Read and write decimal numbers as mixed numbers and improper fractions.

E.g.  $1.61 = 1 \frac{61}{100}$  (mixed number) =  $\frac{161}{100}$  (improper fraction)

- Recognise, use and write thousandths as decimals e.g. know that 0.004 is equivalent to  $\frac{4}{1000}$ .
- Relate decimal equivalences of thousandths to tenths and hundredths.

$$0.2 = 0.20 = 0.200$$

$$\frac{2}{10} = \frac{20}{100} = \frac{200}{1000} \quad (= \frac{1}{5})$$

$\frac{30}{100}$  and  $30 \div 1,000$  are both equivalent to 0.03. Encourage checking by division as  $3 \div 100 = 0.03$  and  $30 \div 1000 = 0.03$ .

- Write improper fractions and mixed numbers (with thousandths) as decimals.

E.g.  $\frac{1101}{1000} = 1.101$      $3 \frac{101}{1000} = 3.101$

- Reason about the location of any number with up to 2dp by compare decimal numbers up to three decimal places using greater than, less than and equals signs e.g.  $1.056 > 1.05$
- Order decimal numbers up to three decimal places.
- Compare and order decimals and fractions (tenths, hundredths, thousandths) by converting fractions to decimals. E.g.  $0.34 ? \frac{32}{1000} \frac{32}{1000} = 0.032$  is less than 0.34 as there are no tenths.
- Compare and order decimals, improper fractions and mixed numbers by converting them to decimals first e.g.

$$2 \frac{52}{1000}, 2 \frac{51}{100}, 2.5, \frac{232}{100}$$

Decimal point  
 Decimal places (dp)  
 Place value  
 Tenths  
 Hundredths  
 Thousandths  
 Mixed number  
 Improper fractions  
 Relate  
 See previous fraction vocab

Place value  
 Place holders  
 Greater  
 Less than  
 Smallest  
 Largest  
 Ascending  
 Descending

<p>2.052    2.51    2.5    2.32 (then order)</p> <ul style="list-style-type: none"> <li>Identify the previous and next multiple of 1 and 0.1 in numbers with 2 dp.</li> <li>Round decimals to the nearest whole number.</li> <li>Round decimals with two decimal places to one decimal place.</li> </ul>	<p>Nearest whole Nearest tenth Nearest hundredth</p>
<p><b>Summer Term</b></p>	
<p><b>Percentages</b></p> <ul style="list-style-type: none"> <li>Know that the % symbol means per cent which is the number of parts per 100.</li> <li>Write percentages as a fraction with the denominator 100.</li> <li>Recognise and write percentages as a decimal. E.g. 33 out of 100 squares are shaded = <math>33\% = \frac{33}{100} = 0.33</math>.</li> <li>Know the percentage and decimal equivalences of <math>\frac{1}{2}, \frac{1}{4}, \frac{1}{5}, \frac{2}{5}, \frac{4}{5}</math> and fractions with denominator of a multiple of 10 and 25.</li> <li>Solve problems with percentage and decimal equivalences of <math>\frac{1}{2}, \frac{1}{4}, \frac{1}{5}, \frac{2}{5}, \frac{4}{5}</math> and fractions with denominator of a multiple of 10 and 25.</li> </ul>	<p>Per cent Out of 100 Denominator Numerator Equivalences Multiples</p>
<p><b>Review</b></p>	
<p><b>Geometry - Angles and properties of shape</b></p> <ul style="list-style-type: none"> <li>Know that angles are measured in degrees.</li> <li>Recognise, estimate and compare angles measured in degrees e.g. acute, obtuse and reflex angles and relate them to right angles.</li> <li>Identify: <ul style="list-style-type: none"> <li>–angles at a point and one whole turn total <math>360^\circ</math>.</li> <li>–angles at a point on a straight line and <math>\frac{1}{2}</math> turn total <math>180^\circ</math>.</li> <li>–other multiples of <math>90^\circ</math> e.g. <math>\frac{3}{4}</math> turn = <math>270^\circ</math>.</li> </ul> </li> <li>Know that angles are measured using a protractor.</li> <li>Know and follow the steps to measure angles accurately with a protractor: <ol style="list-style-type: none"> <li>1) Line up the zero line of the protractor with one of the angle lines.</li> <li>2) Line up centre mark with the exact point of the angle.</li> <li>3) Follow scale from the zero mark to the completed turn.</li> <li>4) Read the angle from the correct scale.</li> </ol> </li> <li>Draw given angles and measure them in degrees.</li> <li>Check the accuracy of drawn lines and angles by measuring them with relevant equipment e.g. ruler (in cm/mm), protractor (in degrees).</li> <li>Calculate angles on a straight line and angles around a point.</li> <li>Calculate angles in shapes, applying knowledge of angle facts.</li> </ul>	<p>Angles Measure Protractor Degrees Acute Obtuse Reflex Right angle At/around a point Straight line Shape properties Whole turn Half turn Quarter turn Clockwise Anticlockwise Total Interior angles Knowledge of 2D shapes</p>
<p><b>Decimals</b></p>	

**In order to problem solve with decimal notation (using all four operations) in different contexts e.g. money:**

- Add decimals with up to 3 decimal places.
- Apply place-value knowledge to known additive number facts (scaling facts by 1 tenth or 1 hundredth), for example:  
 $8 + 6 = 14$      $0.8 + 0.6 = 1.4$      $0.08 + 0.06 = 0.14$
- Subtract decimals with up to 3 decimal places.
- Add and subtract decimals with different numbers of decimal places.
- Use the most efficient method to add and subtract decimals e.g. formal written method/using knowledge of number bonds.
- Multiply decimals by 10, 100 and 1000. Understand this as equivalent to making a number 10 or 100 times the size.
- Divide decimals by 10, 100 and 1000. Understand this as equivalent to 1 tenth or 1 hundredth times the size.
- Apply place-value knowledge to known multiplicative number facts (scaling facts by 1 tenth or 1 hundredth), for example:  
 $3 \times 4 = 12$      $0.3 \times 4 = 1.2$      $0.03 \times 4 = 0.12$

**Measure – converting units**

- Know that to compare or calculate between measurements, first convert them into the same unit of measure.
- Use multiplication and division by 10,100 and 1000 to convert between units of measure using common decimals and fractions:  
 -centimetres and millimetres (length)  
 -metres and centimetres (length)  
 -kilometres and metres (length)  
 -kilograms and grams (mass)  
 -litres and millilitres (capacity)  
 -pounds and pence (money)
- Use all four operations to solve problems involving measure [for example, length, mass, capacity, money] using decimal notation, including scaling.
- Estimate capacity using non-standard units of measure e.g. water.
- Know that imperial units are old units of measure used before metric units of measure.
- Know what could be measured using imperial units.
- Understand and use approximate equivalences between imperial and metric units of measure for length, mass and capacity:
- Know that the symbol for approximate is  $\approx$
- Know that approximate equivalences for units of measure (metric  $\approx$  common imperial units) are:

Decimal places  
 Tenths  
 Hundredths  
 Thousandths  
 Efficiency  
 Formal  
 Mental  
 Moving digits right  
 Moving digits left

Same unit of measure  
 Metric  
 Length  
 Millimetres  
 Centimetres  
 Metres  
 Kilometres  
 Mass  
 Grams  
 Kilograms  
 Capacity  
 Litres  
 Millilitres  
 Four operations  
 Decimal notation  
 Money  
 Scaling  
 Estimate  
 Non-standard  
 Imperial units  
 Approximate  
 Inch  
 Pounds  
 Gallon  
 Pints

2.5 cm  $\approx$  1 inch (length)  
 1 kg  $\approx$  2.2 pounds (mass)  
 4.5 l  $\approx$  1 gallon (capacity) and 1 gallon  $\approx$  8 pints.

- Use knowledge of metric and imperial equivalences, multiplication and division to solve problems.

**Review**

**Converting between units of time**

- To understand fraction and decimal equivalences of minutes and hours e.g.  $\frac{1}{4}$  hour =  $\frac{1}{4}$  of 60 = 15 minutes not 25 minutes.  
 So 4.25 hours = 4  $\frac{1}{4}$  hours = 4 hr 15 mins
- Apply knowledge that  
 60 seconds = 1 minute  
 60 minutes = 1 hour  
 24 hours = 1 day  
 7 days = 1 week  
 12 months = 1 year  
 to solve problems involving converting between different units of time.

**Statistics (tables, including timetables)**

- Interpret information presented in timetables (showing 12 and 24 hour times) and two-way tables (representing more than one data set).
- Using addition and subtraction to answer questions about timetables and two-way tables to include comparing, ordering and working out duration.
- Complete information in tables, including time tables.

**Review**

**Geometry – properties of shapes**

- Identify regular polygons as 2D shapes which have all equal angles and all equal length sides.
- Give examples of a regular polygon and explain its properties e.g. parallel and perpendicular lines, a square is the only regular quadrilateral as it has all equal angles and all equal length sides.
- Identify irregular polygons as 2D shapes which do **not** have all equal angles or all equal length sides.
- Distinguish between regular and irregular polygons based on reasoning.
- Identify and reason about 3D shapes, including cubes and cuboids, from 2D representations.

Equivalences  
 Hours  
 Minutes  
 Seconds  
 Days  
 Weeks  
 Months  
 Years  
 Units

Interpret  
 Timetables  
 Two-way tables  
 Data set  
 Addition  
 Subtraction  
 Compare  
 Order  
 Duration

Regular polygons  
 2D shapes  
 Equal angles  
 Equal length sides  
 Parallel lines  
 Perpendicular lines  
 Regular quadrilateral  
 Irregular polygons  
 3D shapes  
 Cubes  
 Cuboids  
 Faces  
 Vertices  
 Sides  
 2D representations



**Measure - volume**

- To know that volume is the amount of space that an object fills.
- Know that volume can be measured in unit cubes, represented with the notation (<sup>3</sup>).
- Compare volume of objects.
- Know that if two shapes are made from the same number of unit cubes, then they have the same volume. The cubes can be arranged differently to make different shapes.
- Estimate volume using non-standard units of measure e.g. 1 cm<sup>3</sup> blocks.
- Use all four operations to solve problems involving volume, using decimal notation and including scaling.

**Review**

**Geometry (position and direction)**

- Identify, describe and represent the position of a shape following a reflection.
- Know that the shape has not changed and the new shape will be at equal distance from the reflection (mirror) line as the original shape.
- Identify and represent the position of a shape following a reflection with co-ordinates, describing using the language of co-ordinates.  
E.g. Calculate the reflection with co-ordinates by calculating the distance from the mirror line to the point and using this to work out the value of the new coordinates, noting which coordinates will change and which ones will stay the same.
- Identify, describe and represent the position of a shape following a translation. Know that the shape has not changed; it has moved in a direction.
- Identify and represent the position of a shape following a translation with co-ordinates, describing using the language of co-ordinates.

**Yearly assess and review**

Volume  
3D shapes  
Unit cubes  
Compare  
Non-standard  
Length / height  
Width  
Depth  
Volume = L x W x D  
Decimal notation  
Scaling

Positioning  
Shape  
Reflection  
Equal distance  
Reflection (mirror) line  
Co-ordinates  
Translation  
Position  
Direction

## Year 5

<b>Key facts (declarative knowledge)</b>	<b>Processes (method)</b>
<p><b><u>Autumn Term- Number and Place value</u></b></p> <ul style="list-style-type: none"><li>• Know the place value of each digit in numbers, including 10,000, 100,000 and 1,000,000.</li><li>• Know Roman numerals to 1000 (M).</li><li>• Recognise years written in Roman numerals.</li><li>• Compare and order numbers up to 1,000,000.</li></ul> <p><b><u>Addition and subtraction</u></b></p> <ul style="list-style-type: none"><li>• Know what the most efficient method is to add and subtract (mental/formal).</li></ul> <p><b><u>Multiplication/division</u></b></p> <ul style="list-style-type: none"><li>• Secure fluency in times tables up to 12 x 12 and corresponding division facts.</li><li>• Understand multiplying numbers by 10,100 and 1000 this as equivalent to making a number 10 or 100 times the size.</li><li>• Understand multiplying whole numbers by 10,100 and 1000 as equivalent to making a number 1 tenth or 1 hundredth times the size.</li><li>• To know the multiples and factors of numbers.</li><li>• Know that a prime number only has two factors (itself and 1) and therefore, can only be divided by itself and 1.</li><li>• To know prime numbers up to 19.</li><li>• Know that a composite number is a whole number that is not prime (has more than one factor).</li><li>• Know that prime factors are factors that are also prime numbers.</li></ul> <p><b><u>Statistics</u></b></p> <ul style="list-style-type: none"><li>• Know that a line graph shows change over time.</li></ul> <p><b><u>Multiplication</u></b></p> <ul style="list-style-type: none"><li>• Know that a square number is a whole number multiplied by itself and the notation is <sup>2</sup>.</li><li>• Know that a cube number is a whole number multiplied by itself twice e.g. 4 x 4 x 4 and the notation is <sup>3</sup>.</li></ul>	<p><b><u>Number and Place value</u></b></p> <ul style="list-style-type: none"><li>• Know how to count forwards and backwards in powers of 10 for numbers up to 1,000,000.</li><li>• Know how to round any number up to 1,000,000 to the nearest 10, 100, 1000, 10,000 and 100,000.</li></ul> <p><b><u>Addition and subtraction</u></b></p> <ul style="list-style-type: none"><li>• Know how to add and subtract whole numbers with more than 4 digits mentally (using knowledge of place value).</li><li>• Know how to use formal written method of column addition to add and subtract numbers with more than 4 digits (using exchange).</li></ul> <p><b><u>Check answers to calculations (+ and -)</u></b></p> <ul style="list-style-type: none"><li>• Know how to use rounding to check answers.</li></ul> <p><b><u>Multiplication/division</u></b></p> <ul style="list-style-type: none"><li>• Know how to multiply whole numbers by 10,100 and 1000.</li><li>• Know how to divide whole numbers by 10, 100 and 1000.</li><li>• Know how to find factors pairs of a number and the common factors of two numbers.</li><li>• Know how to express a given number as a product of 2 or 3 factors.</li><li>• Know how to multiply and divide numbers mentally drawing upon known facts e.g. 30 x 4 (use fact 3 x 4 = 12)</li><li>• Find prime factors of a number.</li></ul> <p><b><u>Statistics</u></b></p> <ul style="list-style-type: none"><li>• Know how to read a line graph using knowledge of axes and scales.</li></ul> <p><b><u>Multiplication</u></b></p> <ul style="list-style-type: none"><li>• Know how to find a square and cube number.</li></ul>

**Spring Term**  
**Multiplication**

- Identify the most efficient multiplication method to answer questions e.g. known facts, short multiplication, long multiplication, moving digits.

**Division**

- Know that when the divisor is not a multiple of the dividend, there will be remainders e.g.  $123 \div 2$ .
- Identify and use most efficient division method to answer questions e.g. using known facts or short division.

**Measurement– perimeter and area**

- Know that the perimeter of a 2D shape is the distance all around it.
- Know that the area is the total surface of/space inside a shape.
- Know that area can be calculated using number of squares (non-standard unit of measure), square centimetres (cm<sup>2</sup>) or square metres (m<sup>2</sup>).

**Fractions**

- Identify, name and write equivalent fractions (visually represented) of a given fraction, including tenths and hundredths; understand that they have the same value and the same position in the linear number system.
- Know that a mixed number consists of wholes and parts (fraction).
- Know that improper fractions have a greater numerator than denominator.

**Multiplication**

- Know how to use the formal written method of multiplication to multiply up to 4 by 2 digit numbers.
- Know how to multiply numbers, drawing upon known facts (done previously).

**Division**

- Know how to use the formal written method of short division to divide up to 4 digits by a 1 digit number.
- Know how to interpret remainders appropriately for the context.
- Know how to divide 2 digit numbers mentally, drawing upon known facts (done previously).

**Measurement– perimeter and area**

- Know how to measure and calculate the perimeter of composite, rectilinear shapes in centimetres and metres.
- Know how to use 2D shape properties to calculate lengths of missing shape sides and the perimeter.
- Know how to calculate the area of rectangles (including squares) using the formula **Area = base x height**.
- Know how to estimate the area of irregular shapes using non-standard units of measure (squares/half squares).

**Fractions**

- Convert from improper fractions to mixed numbers and vice versa.
- Compare and order fractions with denominators that are all multiples of the same number.
- Write mathematical statements  $> 1$  as a mixed number e.g.  $\frac{3}{4} + \frac{2}{4} = \frac{5}{4} = 1\frac{1}{4}$
- Add and subtract fractions with the same and different denominators (multiples of same number).
- Multiply proper fractions and mixed numbers by whole numbers.
- Calculate fractions of amounts.
- Use fractions as operators (when fractions act as a function in a calculation) e.g. know that  $\frac{1}{4}$  of 8 means  $\frac{1}{4} \times 8$ .

<p><b>Decimals</b></p> <ul style="list-style-type: none"> <li>• Read and write numbers with up to three decimal places.</li> <li>• Identify and read the decimal place value columns as tenths, hundredths and thousandths. E.g. In 0.5, there are 5 tenths.</li> <li>• Recognise, use and write thousandths as decimals</li> </ul> <p>-Know that 0.004 is equivalent to <math>\frac{4}{1000}</math>.</p> <ul style="list-style-type: none"> <li>• Identify the previous and next multiple of 1 and 0.1 in numbers with 2 dp.</li> <li>• Know equivalences: -10 tenths = 1 one -1 is 10 times greater 0.1. -100 hundredths = 1 one, 1 is 100 times the size of 0.01. -10 hundredths = 1 tenth -0.1 is 10 times greater than 0.01.</li> </ul>	<p><b>Decimals</b></p> <ul style="list-style-type: none"> <li>• Partition decimal numbers in standard and non standard ways.</li> <li>• Divide 1 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in units of 1 with 2, 4, 5 and 10 equal parts.</li> <li>•</li> <li>• Read and write decimal numbers (up to 3dp) as fractions, mixed numbers and improper fractions e.g. <math>0.71 = \frac{71}{100}</math></li> <li>• Relate decimal equivalences of thousandths to tenths and hundredths. <math>0.2 = 0.20 = 0.200</math> <math>\frac{2}{10} = \frac{20}{100} = \frac{200}{1000} (= \frac{1}{5})</math></li> <li>• Write improper fractions and mixed numbers with thousandths as decimals. E.g. <math>\frac{1101}{1000} = 1.101</math>   <math>3 \frac{101}{1000} = 3.101</math></li> <li>• Compare and order decimal numbers up to three decimal places e.g. <math>1.056 &gt; 1.05</math></li> <li>• Compare and order decimals and fractions (tenths, hundredths, thousandths) by converting fractions to decimals. E.g. <math>0.34 ? \frac{32}{1000}</math></li> <li>• Compare and order decimals, improper fractions and mixed numbers <math>2 \frac{52}{1000}</math> , <math>2 \frac{51}{100}</math> , 2.5, <math>\frac{232}{100}</math></li> <li>• Round decimals with two decimal places to the nearest whole number and one decimal place.</li> </ul>
<p><b>Summer Term</b></p> <p><b>Percentages</b></p> <ul style="list-style-type: none"> <li>• Know that the % symbol means per cent which is the number of parts per 100.</li> <li>• Know the percentage and decimal equivalences of <math>\frac{1}{2}</math>, <math>\frac{1}{4}</math>, <math>\frac{1}{5}</math>, <math>\frac{2}{5}</math>, <math>\frac{4}{5}</math> and fractions with denominator of a multiple of 10 and 25.</li> </ul> <p><b>Geometry - Angles and properties of shape</b></p> <ul style="list-style-type: none"> <li>• Know that angles are measured in degrees.</li> <li>• Know that angles are measured using a protractor.</li> </ul>	<p><b>Percentages</b></p> <ul style="list-style-type: none"> <li>• Write percentages as a fraction with the denominator 100.</li> <li>• Recognise and write percentages as a decimal. E.g. 33 out of 100 squares are shaded = <math>33\% = \frac{33}{100} = 0.33</math>.</li> </ul> <p><b>Geometry - Angles and properties of shape</b></p> <ul style="list-style-type: none"> <li>• Recognise, estimate and compare acute, obtuse and reflex angles and relate them to right angles.</li> <li>• Identify: –angles at a point and one whole turn total <math>360^\circ</math>. –angles at a point on a straight line and <math>\frac{1}{2}</math> turn total <math>180^\circ</math>. –other multiples of <math>90^\circ</math> e.g. <math>\frac{3}{4}</math> turn = <math>270^\circ</math>.</li> <li>• Know how to measure accurately using a protractor.</li> </ul>

### Decimals

**In order to problem solve with decimal notation (using all four operations) in different contexts e.g. money:**

- Know that place value facts can be applied to additive number facts (scaling facts by 1 tenth or 1 hundredth), for example:  
 $8 + 6 = 14$   
 $0.8 + 0.6 = 1.4$   
 $0.08 + 0.06 = 0.14$
- Know that place-value knowledge can be applied to known multiplicative number facts (scaling facts by 1 tenth or 1 hundredth), for example:  
 $3 \times 4 = 12$      $0.3 \times 4 = 1.2$      $0.03 \times 4 = 0.12$
- Know that multiplying/dividing decimals by 10, 100, 1000 involves moving digits to left/right a set number of places.

### Measure – converting units

- Know that to compare or calculate between measurements, first convert them into the same unit of measure.
- Know that imperial units are old units of measure used before metric units of measure.
- Know what could be measured using imperial units.
- Know that the symbol for approximate is  $\approx$
- Know  $\approx$  at approximate equivalences for units of measure (metric    common imperial units) are:  
 $2.5 \text{ cm} \approx 1 \text{ inch}$  (length)  
 $1 \text{ kg} \approx 2.2 \text{ pounds}$  (mass)  
 $4.5 \text{ l} \approx 1 \text{ gallon}$  (capacity) and 1 gallon 8 pints.

### Converting between units of time

- Know fraction and decimal equivalences of minutes and hours e.g.  $\frac{1}{4}$  hour =  $\frac{1}{4}$  of 60 = 15 minutes.
- Know that

- Check the accuracy of drawn lines and angles by measuring them with relevant equipment e.g. ruler (in cm/mm), protractor (in degrees).
- Calculate angles on a straight line and angles around a point.
- Calculate angles in shapes, applying knowledge of angle facts.

### Decimals

- Add and subtract decimals with up to 3 decimal places and different number of decimal places.
- Use the most efficient method to add and subtract decimals e.g. formal written method/using knowledge of number bonds.
- Multiply decimals by 10, 100 and 1000. Understand this as equivalent to making a number 10 or 100 times the size.
- Divide decimals by 10, 100 and 1000. Understand this as equivalent to 1 tenth or 1 hundredth times the size.

### Measure – converting units

- Use multiplication and division by 10, 100 and 1000 to convert between metric units.
- Use all four operations to solve problems involving measure [for example, length, mass, capacity, money] using decimal notation, including scaling.
- Estimate capacity using non-standard units of measure e.g. water.
- Understand and use approximate equivalences between imperial and metric units of measure for length, mass and capacity.

### Converting between units of time

- Convert between units of time using known facts.

60 seconds = 1 minute

60 minutes = 1 hour

24 hours = 1 day

7 days = 1 week

12 months = 1 year

### **Statistics (tables, including timetables)**

- Know that timetables show time durations and can represent more than one data set.

### **Geometry – properties of shapes**

- Know that regular polygons have 2D shapes which have all equal angles and all equal length sides and examples as these.
- Know irregular polygons as 2D shapes which do **not** have all equal angles or all equal length sides and examples of these.
- Identify and reason about 3D shapes, including cubes and cuboids, from 2D representations.

### **Measure - volume**

- To know that volume is the amount of space that an object fills.
- Know that volume can be measured in unit cubes, represented with the notation ( $^3$ ).
- Know that if two shapes are made from the same number of unit cubes, then they have the same volume. The cubes can be arranged differently to make different shapes.

### **Geometry (position and direction)**

- Identify and describe the position of a shape following a reflection, using language of co-ordinates.
- Know that the shape has not changed and the new shape will be at equal distance from the reflection (mirror) line as the original shape.
- Identify, describe (using language of co-ordinates) the position of a shape following a translation. Know that the shape has not changed; it has moved in a direction.

### **Statistics (tables, including timetables)**

- Interpret information presented in timetables (showing 12 and 24 hour times) and two-way tables (+1 data set)
- Use addition and subtraction to answer questions about timetables and two-way tables to include comparing, ordering and working out duration.
- Complete information in tables, including time tables.

### **Geometry – properties of shapes**

- Distinguish between regular and irregular polygons based on reasoning.

### **Measure - volume**

- Compare volume of objects.
- Estimate volume using non-standard units of measure e.g.  $1\text{ cm}^3$  blocks.
- Use all four operations to solve problems involving volume, using decimal notation and including scaling.

### **Geometry (position and direction)**

- Represent the position of a shape following a reflection at an equal distance from the reflection (mirror) line as the original shape.
- Represent the position of a shape following a translation (shape moved in a direction).

