

## Year 5 - Maths

### Number - Number and Place Value

Pupils should be taught to:

- read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit
- count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000
- interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero
- round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000
- solve number problems and practical problems that involve all of the above
- read Roman numerals to 1000 (M) and recognise years written in Roman numerals.

### Number - Addition and Subtraction

Pupils should be taught to:

- 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.

## Number – Multiplication and Division

Pupils should be taught to:

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

## 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,  $\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1\frac{1}{5}$  ]
- 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,  $0.71 = \frac{71}{100}$  ]
- recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents
- round decimals with two decimal places to the nearest whole number and to one decimal place
- read, write, order and compare numbers with up to three decimal places
- solve problems involving number up to three decimal places
- recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal
- solve problems which require knowing percentage and decimal equivalents of  $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{1}{5}$ ,  $\frac{2}{5}$ ,  $\frac{4}{5}$  and those fractions with a denominator of a multiple of 10 or 25.

## 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), and including using standard units, square centimetres ( $\text{cm}^2$ ) and square metres ( $\text{m}^2$ ) and estimate the area of irregular shapes
- estimate volume [for example, using  $1 \text{ cm}^3$  blocks to build cuboids (including cubes)] and capacity [for example, using water]
- solve problems involving converting between units of time
- use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.

## Geometry – 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 one whole turn (total  $360^\circ$ )
  - angles at a point on a straight line and  $\frac{1}{2}$  a turn (total  $180^\circ$ )

- other multiples of  $90^\circ$  use the properties of rectangles to deduce related facts and find missing lengths and angles
- distinguish between regular and irregular polygons based on reasoning about equal sides and angles.

### **Geometry - Position and Direction**

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.

**Note: Please see appendices for Year 5 Termly Instant Recall Facts**

## Year 5 Calculations

### Addition

#### Key Instant Recall Facts

In preparation for secure methods of calculation, children will develop instant recall of the following facts during Year 2:

- Decimal number bonds to 1 and 10

Missing number / digit problems- including decimals

**Mental methods** should continue to develop, supported by a range of models and images, including the number line. Children should practise with increasingly large numbers to aid fluency.

e.g.  $12462 + 2300 = 14762$

Children need to be secure in rounding and encouraged to use this method to check for accuracy when solving problems.

#### Written methods (progressing to more than 4 digits)

Continue to develop this formal written method using larger than 4 digit numbers and decimals. Begin with numbers of same decimal places.

As Year 4, progressing when understanding of the expanded method is secure, children will move on to the formal columnar method for whole numbers and decimal numbers as an efficient written algorithm.

$$\begin{array}{r} 172.83 \\ + 54.68 \\ \hline 227.51 \\ \hline \end{array}$$

Then move onto numbers with different number of decimal places. Teach children to fill in gaps with Os.

$$\begin{array}{r} 159.5 \\ + 23.27 \\ \hline \end{array}$$

$$\begin{array}{r} 159.50 \\ + 23.27 \\ \hline \end{array}$$

## Year 5 Calculations

### Subtraction

#### Key Instant Recall Facts

In preparation for secure methods of calculation, children will develop instant recall of the following facts during Year 5:

- Decimal number bonds to 1 and 10.

Missing number / digit problems- including decimals.

$$6.45 = 6 + 0.4 + \blacksquare \quad 119 - \blacksquare = 86 \quad 1\,000\,000 - \blacksquare = 999\,000$$

$$600\,000 + \blacksquare + 1000 = 671\,000 \quad 12\,462 - 2\,300 = \blacksquare$$

Mental methods should continue to develop, supported by a range of models and images, including the number line.

#### Written methods of decomposition (progressing to more than 4 digits)

$$\begin{array}{r} 5\ 1\ 2\ 1 \\ 6\ 2\ 3\ 2 \\ - 4\ 8\ 1\ 4 \\ \hline 1\ 4\ 1\ 8 \end{array}$$

Use examples of numbers where exchange has to move across more than one column.

$$\begin{array}{r} 3\ 9\ 9\ 1 \\ 4\ 0\ 0\ 2 \\ - 2\ 9\ 8\ 6 \\ \hline 1\ 0\ 1\ 6 \end{array}$$

Progress to calculating with decimals, including those with different numbers of decimal places.

$$\begin{array}{r} 6\ 1\ 7\ 1 \\ 1\ 7\ 2\ .\ 8\ 3 \\ - 5\ 4\ .\ 6\ 8 \\ \hline 1\ 1\ 8\ .\ 1\ 5 \end{array}$$

$$\begin{array}{r} 4\ 1 \\ 1\ 5\ 9\ .\ 5\ 0 \\ - 2\ 3\ .\ 2\ 7 \\ \hline \end{array}$$

## Year 5 Calculations

### Multiplication

#### Key Instant Recall Facts

In preparation for secure methods of calculation, children will develop instant recall of the following facts during Year 5:

- Multiplication facts to 12x12
- Recall prime numbers to 20
- Identify prime numbers to 100

#### Missing number problems

Continue with a range of equations as in Year 2 but with appropriate numbers. Also include equations with missing digits.

$$\square 2 \times 5 = 60$$

$$28 \times \square \square = 280$$

$$2 \square \times 3 = 72$$

$$1 \square \times 5 = 75$$

#### Mental methods

- x by 10, 100, 100 using the moving digits
- Use practical resources and jottings to explore equivalent statements e.g.  $4 \times 35 = 2 \times 2 \times 35$
- Recall prime numbers up to 19 and identify prime numbers up to 100 (with reasoning)
- Solve practical problems where children need to scale up
- Relate to known number facts
- Identify factor pairs for numbers

#### Written methods (progressing to 4 digit x 2 digit)

Continue to develop short multiplication (use expanded version for any children who need support).



$$\begin{array}{r}
 37 \\
 \times 23 \\
 \hline
 21 \text{ (3} \times 7\text{)} \\
 90 \text{ (3} \times 30\text{)} \\
 140 \text{ (20} \times 7\text{)} \\
 \underline{600} \text{ (20} \times 30\text{)} \\
 \underline{851}
 \end{array}$$

$$\begin{array}{r}
 37 \\
 \times 23 \\
 \hline
 111 \\
 \quad 2 \\
 \hline
 740
 \end{array}$$

In short method teach children to place 0 in units column when multiplying by power of 10.

## Year 5 Calculations

### Division

#### Key Instant Recall Facts

In preparation for secure methods of calculation, children will develop instant recall of the following facts during Year 4/5:

- Division facts  $\div 6, \div 9, \div 11, \div 7, \div 12$

#### $\div$ = signs and missing numbers

Continue using a range of equations as in Year 2/3 but with appropriate numbers.

#### Sharing, grouping and using a number line

Children will continue to explore division as sharing and grouping, and to represent calculations on a number line until they have a secure understanding. By Year 5, the children should be encouraged to stop using the number line. Children should progress in their use of written division calculations:

#### Towards a written method

We can **use multiplication facts that we already know** to work out bigger division calculations using **short division** of a 2-digit number divided by a 1-digit number with whole numbers.

e.g.

$$\begin{array}{r} 23 \\ 3 \overline{)69} \end{array}$$

We say: How many 3s go into 6?  
How many 3s go into 9?  
so  $69 \div 3 = 23$

Leading to:

$$\begin{array}{r} 26 \\ 3 \overline{)78} \\ \quad 1 \end{array}$$

We say: How many 3s in 7? 2 remainder 1. Add the 1 in front of the next number. So 8 becomes 18.

How many 3s in 18?  
so  $78 \div 3 = 26$

Leading to **short division** of a 2-digit number divided by a 1-digit number where there is a remainder.

$$\begin{array}{r} 26 \text{ r}1 \\ \underline{3 \overline{)79}} \\ 6 \\ \hline 19 \\ 18 \\ \hline 1 \end{array}$$

Leading to:

- Using the **short division** method to divide a 4/5 digit number by a 1 digit number with no remainder
- Using the **short division** to divide a 4/5 digit number by a 1 digit number where there is a remainder