# Year 5 Mathematics
How to support your child at home

We have been really impressed by the number of parents who have been taking an interest in supporting their child with their mathematics learning at home. This year, we have changed the way we teach Mathematics to really focus on reasoning and problem solving. To teach mathematical fluency, we are now using a CPA (Concrete, Pictorial, Abstract) approach. This is shown in the calculation strategies outlined in this document. Understandably, it is really important the strategies used at home are the same as the strategies we are using in school.
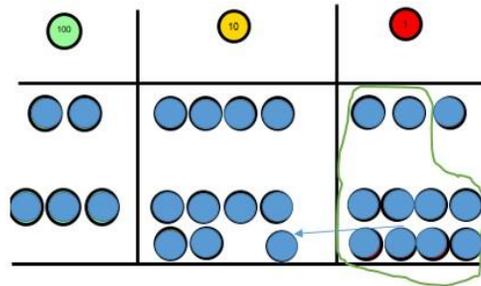
Addition-

Key language which should be used: sum, total, parts and wholes, plus, add, altogether, more than, 'is equal to' 'is the same as'
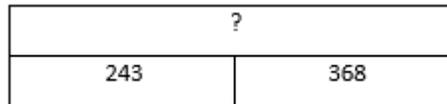
Use of place value counters to add HTO + TO, HTO + HTO etc. once the children have had practice with this, they should be able to apply it to larger numbers and the abstract
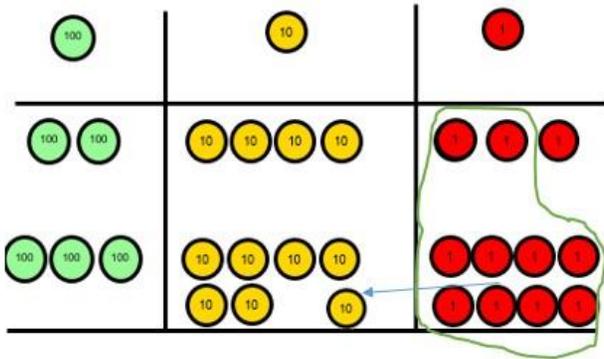
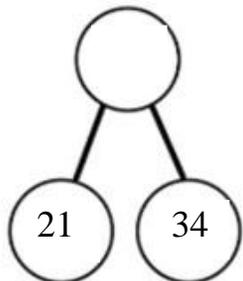Chidren to represent the counters e.g. like the image below

If the children are completing a word problem, draw a bar model to represent what it's asking them to do

?	
243	368

$$243$$
$$+368$$
$$\overline{611}$$
$$11$$

Fluency variation, different ways to ask children to solve 21+34:

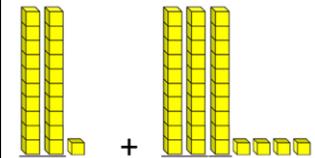| ?	
21	34

(part-whole model with 21 and 34)

Sam saved £21 one week and £34 another. How much did he save in total?

21+34=55. Prove it! (reasoning but the children need to be fluent in representing this)

$$21$$
$$+34$$
$$\overline{}$$

21 + 34 =

= 21 + 34

What's the sum of twenty one and thirty four?

Always use missing digit problems too:

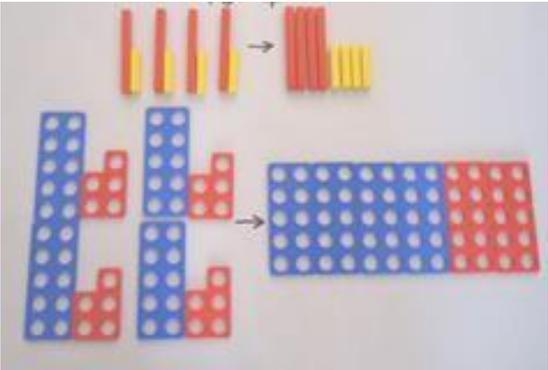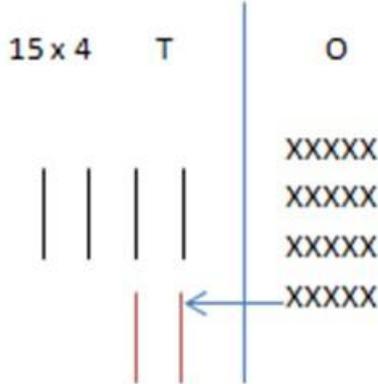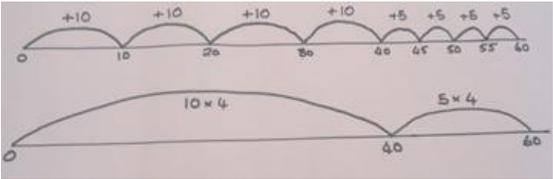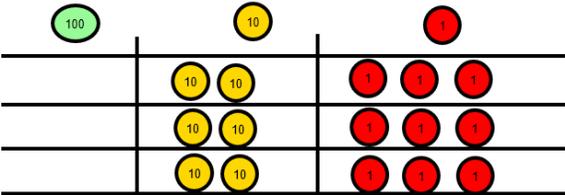| Tens	Ones
(10) (10)	(1)
(10) (10) (10)	?
?	4

Subtraction-

Key language which should be used: take away, less than, the difference, subtract, minus, fewer, decrease, '7 take away 3, the difference is four'
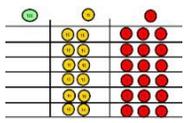
Column method (using place value counters) 234-88	Once the children have had practice with the concrete, they should be able to apply it to any subtraction. Like the other pictorial representations, children to represent the counters.	$$\begin{array}{r} 2\overset{2}{}\overset{1}{}4 \\ 2\cancel{3}4 \\ -88 \\ \hline 6 \end{array}$$

Fluency variation, different ways to ask children to solve 391-186:

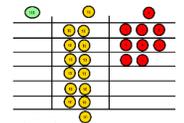|	Raj spent £391, Timmy spent £186. How much more did Raj spend? I had 391 metres to run. After 186 I stopped. How many metres do I have left to run?	391 – 186 = 391 – 186 $$\begin{array}{r} 391 \\ -186 \\ \hline \end{array}$$ Find the difference ebtween 391 and 186 Subtract 186 from 391. What is 186 less than 391?	What's the calculation? What's the answer?

Multiplication-

Key language which should be used: double times, multiplied by, the product of, groups of, lots of, 'is equal to' 'is the same as'

| Concrete	Pictorial	Abstract
Partition to multiply (use numicon, base 10, Cuisenaire rods) 4 x 15 	Children to represent the concrete manipulatives in a picture e.g. base 10 can be represented like: 	Children to be encouraged to show the steps they have taken 4 x 15 10 5 10 x 4 = 40 5 x 4 = 20 40 + 20 = 60 A number line can also be used
Formal column method with place value counters or base 10 (at the first stage- no exchanging) 3 x 23 Make 23, 3 times. See how many ones, then how many tens 	**Children to represent the counters in a pictorial way** 	Children to record what it is they are doing to show understanding 3 x 23 3 x 20 = 60 3 x 3 = 9 20 3 60 + 9= 69 $\begin{array}{r} 23 \\ \times\ 3 \\ \hline 69 \end{array}$
Formal column method with place value counters (children need this stage, initially, to understand how the column method works)	Children to represent the counters/base 10, pictorially e.g. the image below.	**6 x 23** 6 x 3 = 18 6 x 20 = 120 120 + 18 = 138

6 x 23

Step 1: get 6 lots of 23

Step 2: 6 x 3 is 18. Can I make an exchange? Yes! Ten ones for one ten....
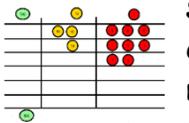
Step 3: 6 x 2 tens and my extra ten is 13 tens. Can I make an exchange? Yes! Ten tens for one hundred…
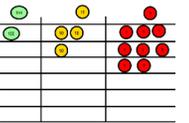
Step 4- what do I have I each column?

Hundreds	Tens	Ones
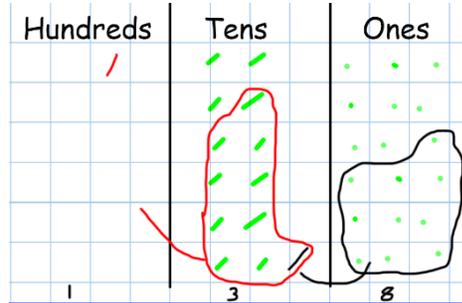
The aim is to get to the formal method but the children need to understand how it works.

$$6 \times 23 =$$

$$\begin{array}{r} 23 \\ \times\ \ 6 \\ \hline 138 \\ \hline \end{array}$$

1   1

When children start to multiply 3d x 3d and 4d x 2d etc, they should be confident with the abstract:

To get 744 children have solved 6 x 124
To get 2480 they have solved 20 x 124

$$\begin{array}{r} 1\ 2\ 4 \\ \times\ \ \ \ 2\ 6 \\ \hline 7\ 4\ 4 \\ 2\ 4\ 8\ 0 \\ \hline 3\ 2\ 2\ 4 \\ \hline \end{array}$$

Answer: 3224

Fluency variation, different ways to ask children to solve 6 x 23:

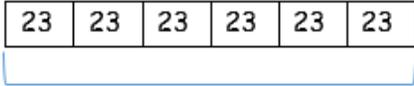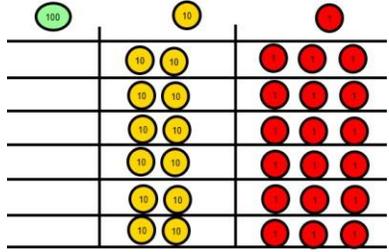| 23 | 23 | 23 | 23 | 23 | 23 |

?

With the counters, prove that 6 x 23 = 138

Why is 6 x 23 = 32 x 6?

Mai had to swim 23 lengths, 6 times a week. How many lengths did she swim in one week?

Tom saved 23p three days a week. How much did he save in 2 weeks?

Find the product of 6 and 23

6 x 23 =

= 6 x 23

$$\begin{array}{r} 6 \\ \times\ 23 \\ \hline \end{array}$$

$$\begin{array}{r} 23 \\ \times\ 6 \\ \hline \end{array}$$

What's the calculation? What's the answer?

Division-

Key language which should be used: share, group, divide, divided by, half, 'is equal to' 'is the same as'

Concrete	Pictorial	Abstract
Sharing using place value counters. 42 ÷ 3= 14 1. Make 42. Share the 4 tens between 3. Can we make an exchange with the extra 10? Exchange the ten for 10 ones and share out the 12 ones.	Exchange the ten for 10 ones and share out 12 ones	42 ÷ 3 42 = 30 + 12 30 ÷ 3 = 10 12 ÷ 3 = 4 10 + 4 = 14
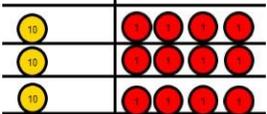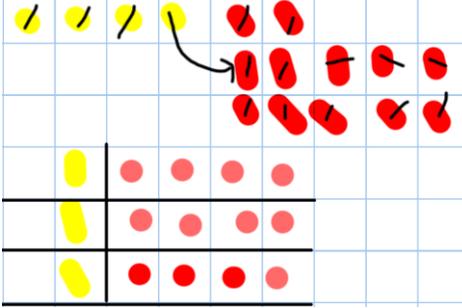
Use of the 'bus stop method' using grouping and counters. Key language for grouping- how many groups of X can we make with X hundreds'- *this can also be done using sharing!* 615 ÷ 5 Step 1: make 615 Step 2: Circle your groups of 5 Step 3: Exchange 1H for 10T and circle groups of 5 Step 4: exchange 1T for 10ones and circles groups of 5	This can easily be represented pictorially until the children no longer to do it. It can also be done to decimal places if you have a remainder!	$$\begin{array}{r} 123 \\ 5\overline{)6^1 1^1 5} \end{array}$$
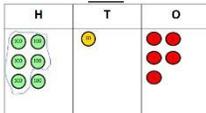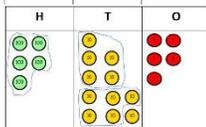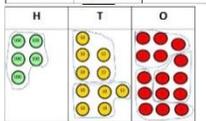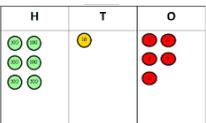
Fluency variation, different ways to ask children to solve 615 ÷ 5:

Using the part whole model below, how can you divide 615 by 5 without using the 'bus stop' method? 	I have £615 and share it equally between 5 bank accounts. How much will be in each account? 615 pupils need to be put into 5 groups. How many will be in each group?	$5\overline{)615}$ 615 ÷ 5 = = 615 ÷ 5 How many 5's go into 615?	What's the calculation? What's the answer?
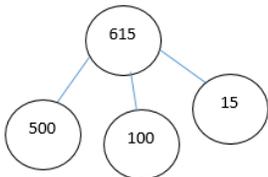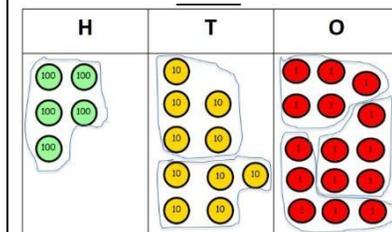
Year 5 Age-Related Expectations

Number and Place Value

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

Addition and Subtraction

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

Multiplication and Division

- identify multiples and factors, including finding all factor pairs of a number, and common factors of 2 numbers
- know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers
- establish whether a number up to 100 is prime and recall prime numbers up to 19
- multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
- multiply and divide numbers mentally, drawing upon known facts
- divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context
- multiply and divide whole numbers and those involving decimals by 10, 100 and 1,000

- recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3})
- solve problems involving multiplication and division, including using their knowledge of factors and multiples, squares and cubes
- solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
- solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates

Fractions (including decimals and percentages)

- 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 2 decimal places to the nearest whole number and to 1 decimal place
- read, write, order and compare numbers with up to 3 decimal places
- solve problems involving number up to 3 decimal places
- recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per 100', and write percentages as a fraction with denominator 100, and as a decimal fraction
- solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}, \frac{2}{5}$, $\frac{4}{5}$ and those fractions with a denominator of a multiple of 10 or 25

Measurement

- convert between different units of metric measure [for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre]
- understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints

- measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres
- calculate and compare the area of rectangles (including squares), including using standard units, square centimetres (cm^2) and square metres (m^2), and estimate the area of irregular shapes
- estimate volume [for example, using 1 cm^3 blocks to build cuboids (including cubes)] and capacity [for example, using water]
- solve problems involving converting between units of time
- use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling

Geometry – Properties of Shapes

- 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 (°)
- identify:
  o angles at a point and 1 whole turn (total 360°)
  o angles at a point on a straight line and half a turn (total 180°)
  o other multiples of 90°
  o use the properties of rectangles to deduce related facts and find missing lengths and angles
  o distinguish between regular and irregular polygons based on reasoning about equal sides and angles

Geometry – Position and Direction

- identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed

Statistics

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