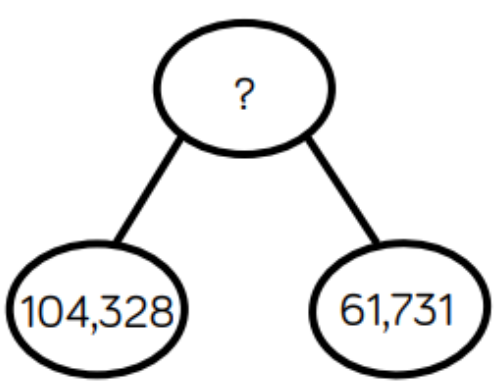
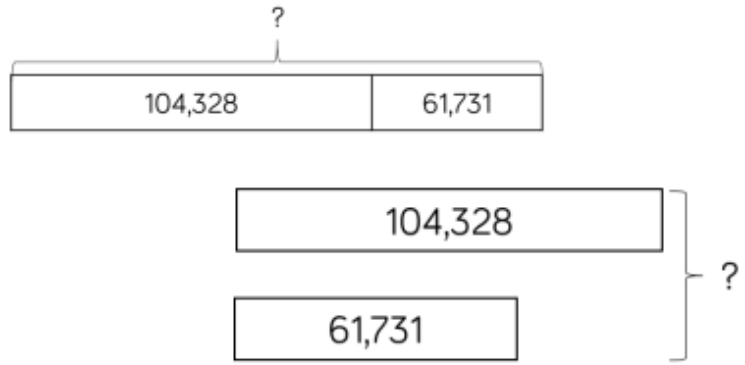
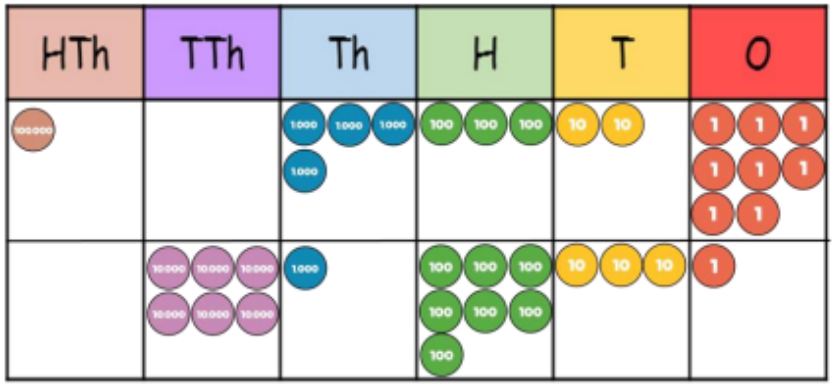
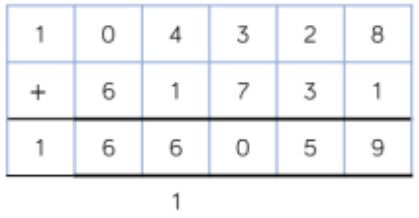
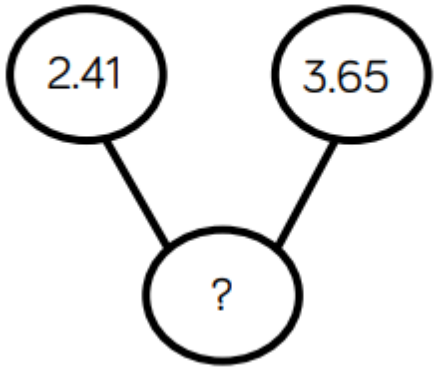
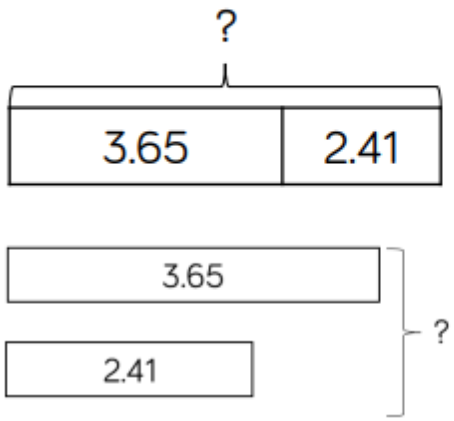
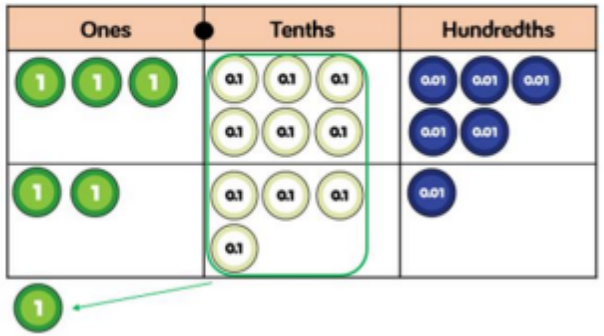
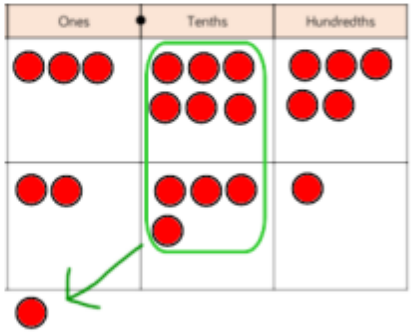
Year 5 Maths

1. Skills
2. Methods
3. National Curriculum expectations for Year 5
4. Useful links

Skills:

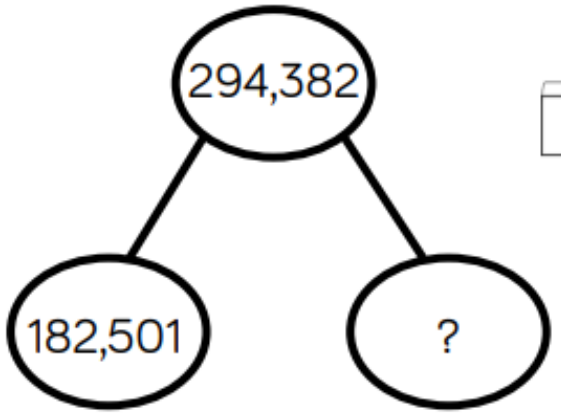
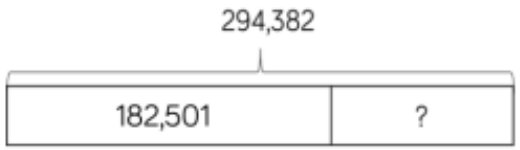
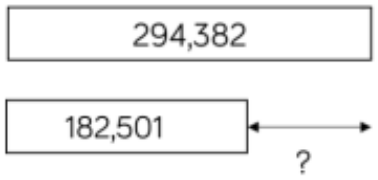
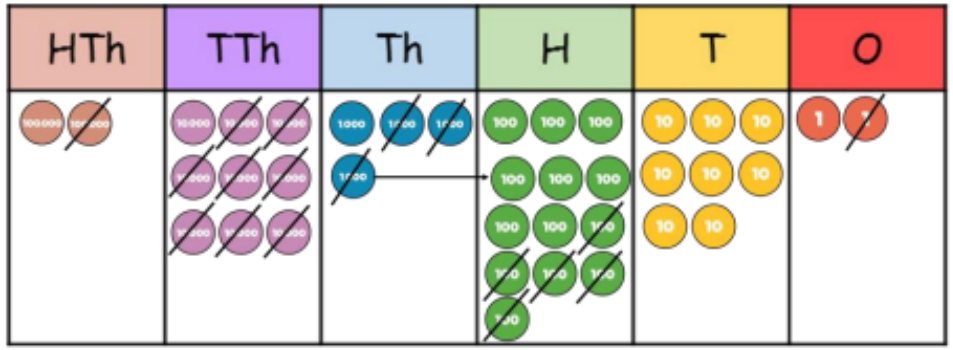
Skill: Add numbers with more than 4 digits	Year: 5/6
  **104,328 + 61,731 = 166,059**  	Place value counters or plain counters on a place value grid are the most effective concrete resources when adding numbers with more than 4 digits. At this stage, children should be encouraged to work in the abstract, using the column method to add larger numbers efficiently.

Skills:

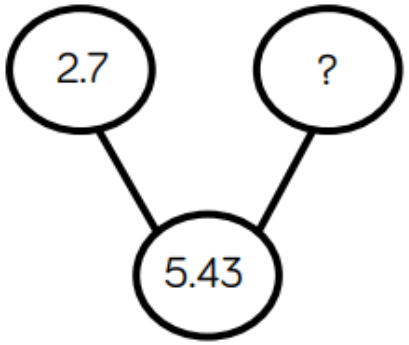
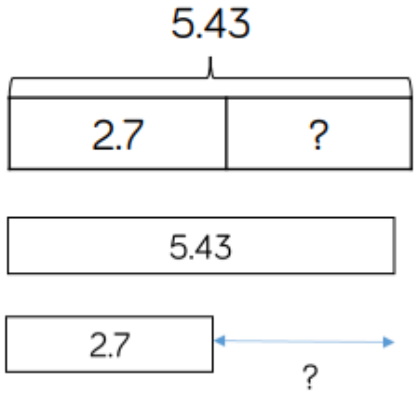
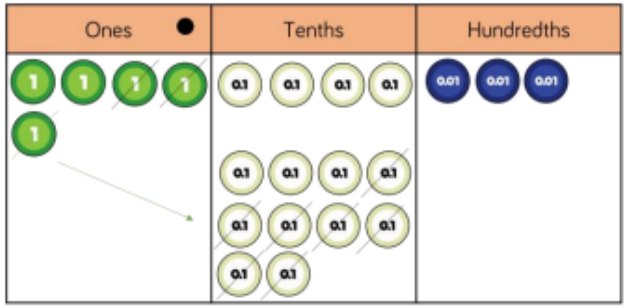
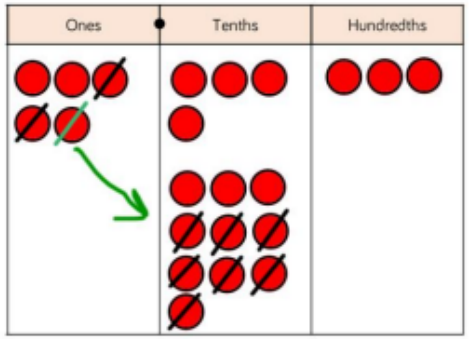
Skill: Add with up to 3 decimal places	Year: 5
  $3.65 + 2.41 = 6.06$  	Place value counters and plain counters on a place value grid are the most effective manipulatives when adding decimals with 1, 2 and then 3 decimal places. Ensure children have experience of adding decimals with a variety of decimal places. This includes putting this into context when adding money and other measures.

$$\begin{array}{r} 3.65 \\ +\ 2.41 \\ \hline 6.06 \\ \hline 1 \end{array}$$

Skills:

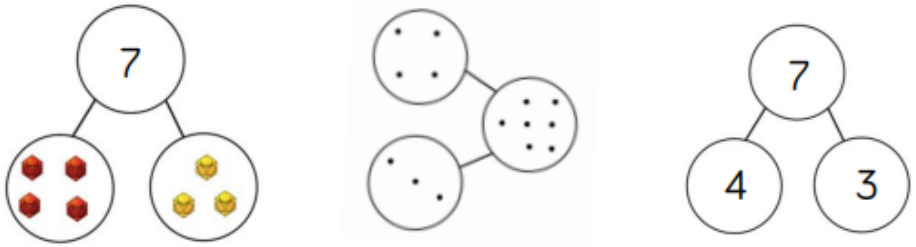
Skill: Subtract numbers with more than 4 digits	Year: 5/6
   **294,382 − 182,501 = 111,881**  		2	9	~~3~~ 4	1 3	8	2
–	1	8	2	5	0	1
	1	1	1	8	8	1		Place value counters or plain counters on a place value grid are the most effective concrete resource when subtracting numbers with more than 4 digits. At this stage, children should be encouraged to work in the abstract, using column method to subtract larger numbers efficiently.

Skills:

Skill: Subtract with up to 3 decimal places	Year: 5/6
  $^{4}\not{5}.^{1}43 - 2.7 = 2.73$ **5.43 − 2.7 = 2.73**  	Place value counters and plain counters on a place value grid are the most effective manipulative when subtracting decimals with 1, 2 and then 3 decimal places. Ensure children have experience of subtracting decimals with a variety of decimal places. This includes putting this into context when subtracting money and other measures.

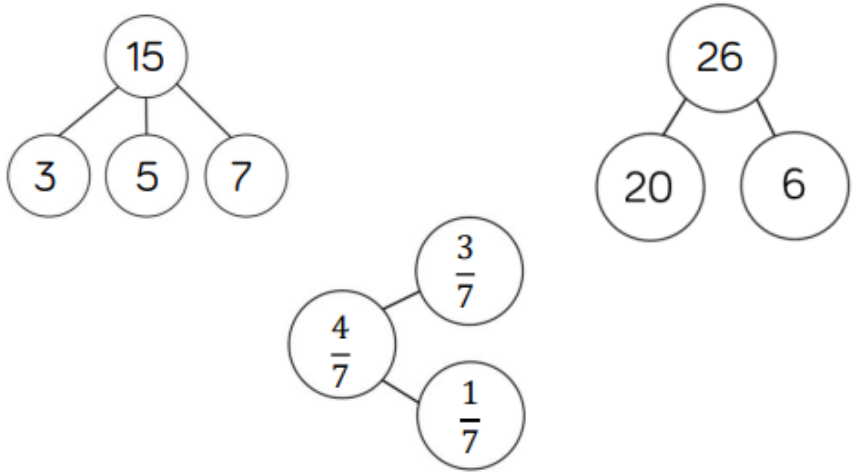
Methods:

Part-Whole Model



$7 = 4 + 3$ $\quad$ $7 - 3 = 4$

$7 = 3 + 4$ $\quad$ $7 - 4 = 3$



Benefits

This part-whole model supports children in their understanding of aggregation and partitioning. Due to its shape, it can be referred to as a cherry part-whole model.

When the parts are complete and the whole is empty, children use aggregation to add the parts together to find the total.

When the whole is complete and at least one of the parts is empty, children use partitioning (a form of subtraction) to find the missing part.

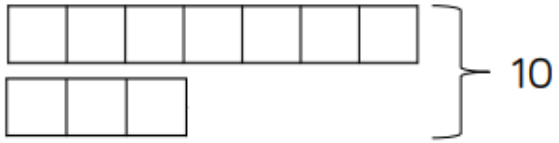
Part-whole models can be used to partition a number into two or more parts, or to help children to partition a number into tens and ones or other place value columns.

In KS2, children can apply their understanding of the part-whole model to add and subtract fractions, decimals and percentages.

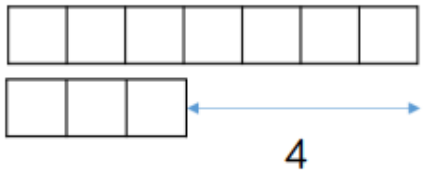
Methods:

Bar Model (multiple)

Discrete

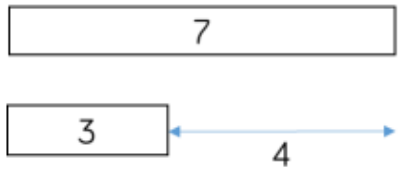


$7 + 3 = 10$

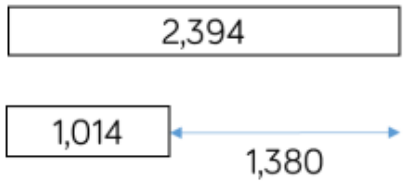


$7 - 3 = 4$

Continuous



$7 - 3 = 4$



$2{,}394 - 1{,}014 = 1{,}380$

Benefits

The multiple bar model is a good way to compare quantities whilst still unpicking the structure.

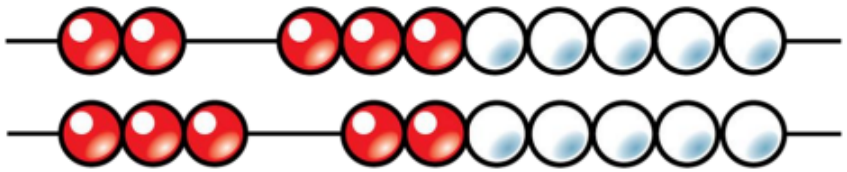
Two or more bars can be drawn, with a bracket labelling the whole positioned on the right hand side of the bars. Smaller numbers can be represented with a discrete bar model whilst continuous bar models are more effective for larger numbers.

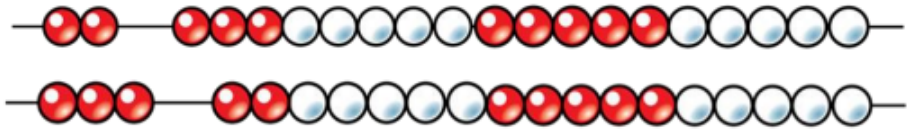
Multiple bar models can also be used to represent the difference in subtraction. An arrow can be used to model the difference.

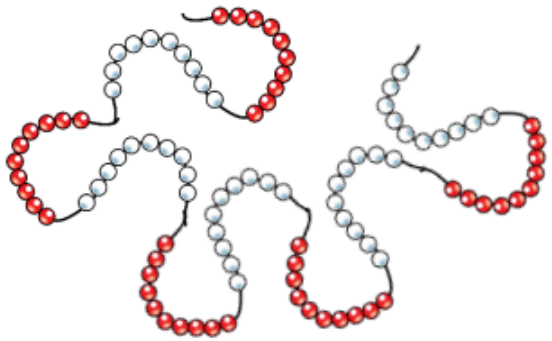
When working with smaller numbers, children can use cubes and a discrete model to find the difference. This supports children to see how counting on can help when finding the difference.

Method:

Bead Strings







Benefits

Different sizes of bead strings can support children at different stages of addition and subtraction.

Bead strings to 10 are very effective at helping children to investigate number bonds up to 10.
They can help children to systematically find all the number bonds to 10 by moving one bead at a time to see the different numbers they have partitioned the 10 beads into e.g. 2 + 8 = 10, move one bead, 3 + 7 = 10.

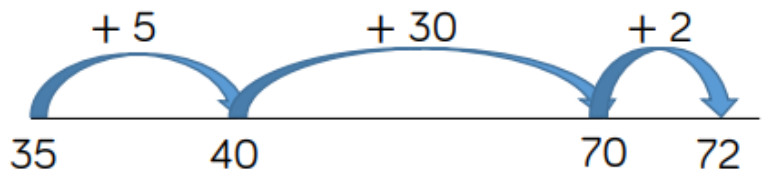
Bead strings to 20 work in a similar way but they also group the beads in fives. Children can apply their knowledge of number bonds to 10 and see the links to number bonds to 20.

Bead strings to 100 are grouped in tens and can support children in number bonds to 100 as well as helping when adding by making ten. Bead strings can show a link to adding to the next 10 on number lines which supports a mental method of addition.

Methods:

Number Lines (blank)

35 + 37 = 72



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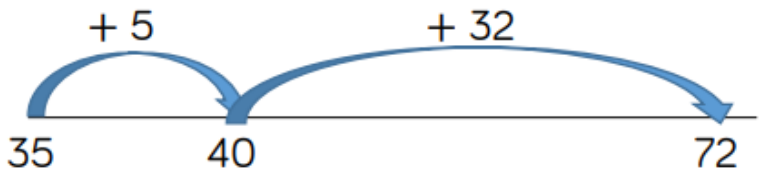
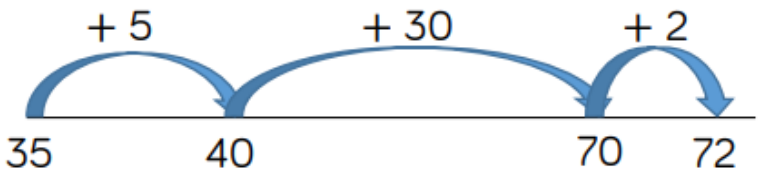


72 − 35 = 37



Benefits

Blank number lines provide children with a structure to add and subtract numbers in smaller parts.

Developing from labelled number lines, children can add by jumping to the nearest 10 and then adding the rest of the number either as a whole or by adding the tens and ones separately.

Children may also count back on a number line to subtract, again by jumping to the nearest 10 and then subtracting the rest of the number.

Blank number lines can also be used effectively to help children subtract by finding the difference between numbers. This can be done by starting with the smaller number and then counting on to the larger number. They then add up the parts they have counted on to find the difference between the numbers.

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Number Lines (blank)

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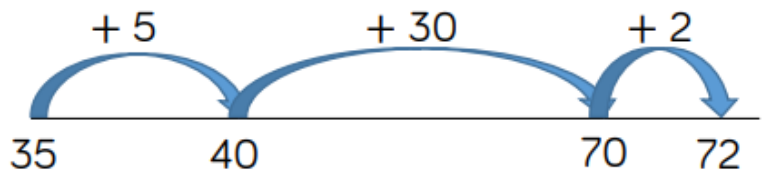

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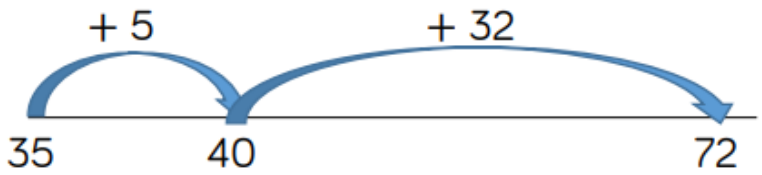

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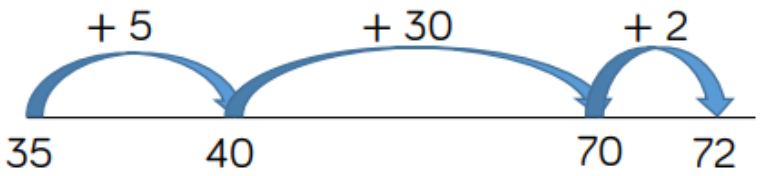

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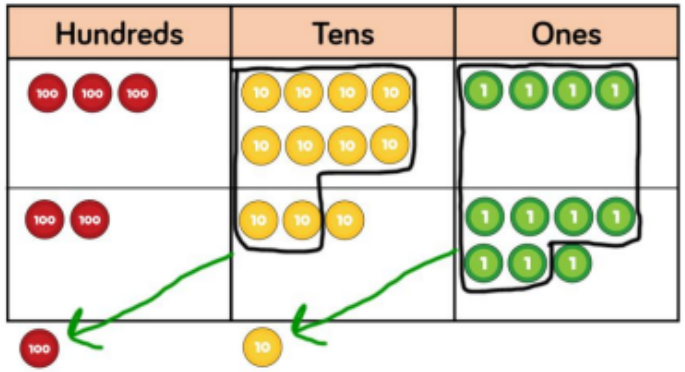
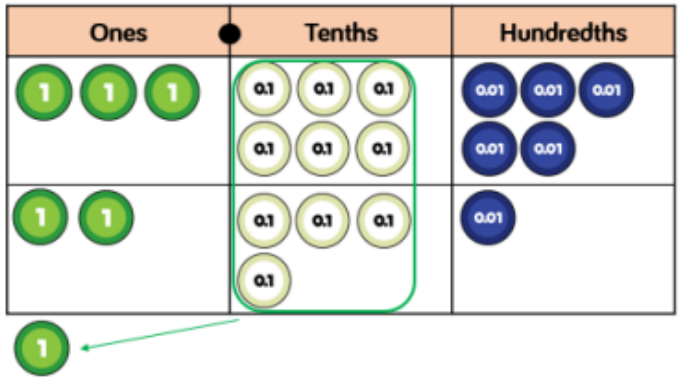
Methods:

Place Value Counters (addition)



$$\begin{array}{r} 384 \\ +\ 237 \\ \hline 621 \\ \hline 1\ \ 1 \end{array}$$



$$\begin{array}{r} 3.65 \\ +\ 2.41 \\ \hline 6.06 \\ \hline 1 \end{array}$$

Benefits

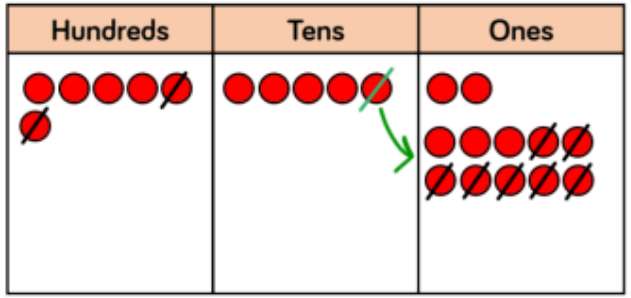
Using place value counters is an effective way to support children's understanding of column addition. It is important that children write out their calculations alongside using or drawing counters so they can see the clear links between the written method and the model.

Children should first add without an exchange before moving on to addition with exchange. Different place value counters can be used to represent larger numbers or decimals. If you don't have place value counters, use normal counters on a place value grid to enable children to experience the exchange between columns.

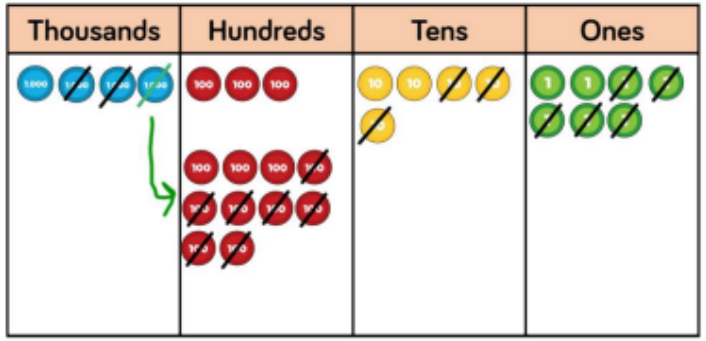
When adding money, children can also use coins to support their understanding. It is important that children consider how the coins link to the written calculation especially when adding decimal amounts.

Methods:

Place Value Counters (Subtraction)



$$\begin{array}{r} {}^{4}\not{6}\,{}^{1}\not{5}2 \\ -\ 207 \\ \hline 445 \end{array}$$



$$\begin{array}{r} {}^{3}\not{4}\,{}^{1}357 \\ -\ 2735 \\ \hline 1622 \end{array}$$

Benefits

Using place value counters is an effective way to support children's understanding of column subtraction. It is important that children write out their calculations alongside using or drawing counters so they can see the clear links between the written method and the model.

Children should first subtract without an exchange before moving on to subtraction with exchange. If you don't have place value counters, use normal counters on a place value grid to enable children to experience the exchange between columns.

When building the model, children should just make the minuend using counters, they then subtract the subtrahend. Children start with the smallest place value column. When there are not enough ones/tens/hundreds to subtract in a column, children need to move to the column to the left and exchange e.g. exchange 1 ten for 10 ones. They can then subtract efficiently.

Place Value

Count

Year 5
• count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000 • count forwards and backwards with positive and negative whole numbers, including through zero
Autumn 1 Summer 4

Represent

Year 5
• read, write, (order and compare) numbers to at least 1 000 000 and determine the value of each digit • read Roman numerals to 1000 (M) and recognise years written in Roman numerals
Autumn 1

Use and compare

Year 5
• (read, write) order and compare numbers to at least 1 000 000 and determine the value of each digit
Autumn 1

Problems/rounding

Year 5
• interpret negative numbers in context • 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
Autumn 1

Addition and Subtraction

Calculation

Year 5
• 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
Autumn 2

Problems

Year 5
• 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 and a combination of these, including understanding the meaning of the equals sign
Autumn 2

Multiplication and Division

Recall/use

Year 5
• 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 (non-prime) numbers • establish whether a number up to 100 is prime and recall prime numbers up to 19 • recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3})
Autumn 3

Calculations

Year 5
• 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
Autumn 3 Spring 1

Problems

Year 5
• solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes • solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates
Autumn 3 Spring 1

Combined

Year 5
• solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
Spring 1

Fractions, Decimals and Percentages

Recognise and write

Year 5

- 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, $\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1\frac{1}{5}$]

Autumn 4

Compare

Year 5

- compare and order fractions whose denominators are all multiples of the same number

Autumn 4

Calculations

Year 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

Autumn 4
Spring 2

Decimals

Year 5

- 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

Spring 3
Summer 3

FDP

Year 5

- 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

Spring 3

Measurement

Using measures

Year 5
• convert between different units of metric measure • understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints • use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling
Spring 4 Summer 5 Summer 6

Money

Year 5
• use all four operations to solve problems involving measure [for example, money]
Summer 3

Time

Year 5
• solve problems involving converting between units of time
Summer 5

Perimeter, area, volume

Year 5
• 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 (cm^2) and square metres (m^2) and estimate the area of irregular shapes • estimate volume [for example, using blocks to build cuboids] and capacity [for example, using water]
Spring 4 Summer 6

Geometry

2D Shapes

Year 5
• distinguish between regular and irregular polygons based on reasoning about equal sides and angles. • use the properties of rectangles to deduce related facts and find missing lengths and angles
Summer 1

3D Shapes

Year 5
• identify 3-D shapes, including cubes and other cuboids, from 2-D representations
Summer 1

Angles and Lines

Year 5
• know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles • draw given angles, and measure them in degrees • identify: ➢ angles at a point and one whole turn (total 360°) ➢ angles at a point on a straight line and $\frac{1}{2}$ a turn (total 180°) ➢ other multiples of 90°
Summer 2

Position and Direction

Year 5
• 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
Summer 2

Statistics

Present and interpret data

Year 5
• complete, read and interpret information in tables, including timetables
Spring 5

Solve problems

Year 5
• solve comparison, sum and difference problems using information presented in a line graph
Spring 5