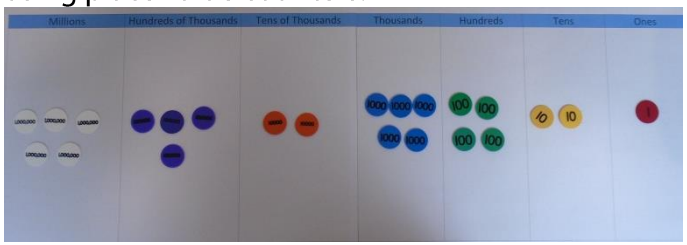
Year 6 Addition

Concrete

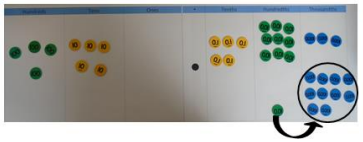
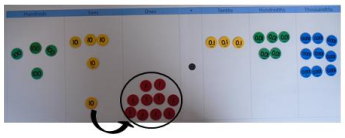
When introducing the millions column to the children in subtraction questions, it may be beneficial to show them using place value counters.



Children will need a lot of practice with subtracting decimals and understanding what to do when there are different amounts of decimals in the numbers that they are subtracting. Using practical equipment as shown below encourages them to place a 0 in these columns.

450.603 — 27.244 =


You can't subtract 4 thousandths from 3 thousandths without going into a decimal answer. There are no tenths to exchange so they need to exchange 1 tenth for 10 hundredths first.

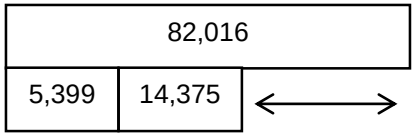
They can then take away the thousandths, hundredths and tenths. However, there are no ones in the column so they need to exchange 1 ten for ten ones to complete the subtraction.

Pictorial

As in Year 5, children can begin by showing the calculations using pictorial representations. However, they should beginning to realise that this is not the most efficient way of solving the problem.

They should be able to use the bar model to solve problems that require multi-steps of both addition and subtraction. They should be able to use this to help them to solve problems where they need to find how much is left.

e.g
England recruited 82,016 soldiers over a year, trained 5, 399 nurses and 4, 375 pilots. What is the difference in the amount of soldiers compared with the amount of pilots and nurses combined?



Abstract

Children will be expected to calculate with numbers that have numbers in the millions column where there are multiple 0s.

$$\begin{array}{r} 7\,6\,3\,0\,3\,0\,0 \\ -\;\;4\,2\,1\,7\,8\,5 \\ \hline 7\,2\,0\,8\,5\,1\,5 \end{array}$$

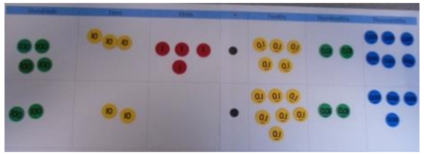
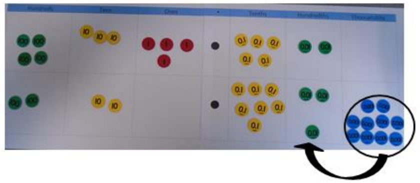
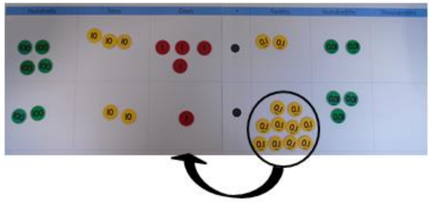
They should also use the compact column method to subtract money and measures, including decimals with 3 or more decimal places. They should ensure that all decimals are placed in the correct columns.

$$\begin{array}{r} 2\,0\,5.4\,0\,0 \\ -\;\;9\,7.5\,7\,9 \\ \hline 1\,0\,7.8\,2\,1 \end{array}$$

Children can fill empty decimal places with zeros to show the place value in each column. Shown here in red.

Year 6 Subtraction

<table>
<tr><th>Concrete</th><th>Pictorial</th><th>Abstract</th></tr>
<tr>
<td>
Children can begin to add 7 digit numbers together using practical resources. However, they should now be fully skilled to transfer this straight into the abstract representation.

When adding decimals, the children can begin with place value counters to build on knowledge from Year 5 and thousandths should be introduced.

Create the numbers.

This shows the process of exchanging 10 thousandths for 1 hundredth.

This then shows the process of exchanging 10 tenths for 1 whole one.
They should be aware that the answer is 654.25 as there is no need to place a 0 where there is nothing in the thousandths column.
</td>
<td>
Again, children can draw the place value counters in the correct place value columns to help them with adding.

The children will use the bar model to represent complicated word problems including addition.

e.g
England recruited 82,016 soldiers, trained 5,399 nurses and 14, 375 pilots. What is the total amount of people?
<table>
<tr><td colspan="3">?</td></tr>
<tr><td>5,399</td><td>14,375</td><td>82,016</td></tr>
</table>
</td>
<td>
Children should use column addition to add 7 digit numbers confidently, exchanging numbers that are larger than 1.

1
7 6 3 0 3 4 9
7 8 2 1 7 8 5
+ 9 0 8 6 7 8
1 6 3 6 0 8 1 2
' 2 1 1 2 2

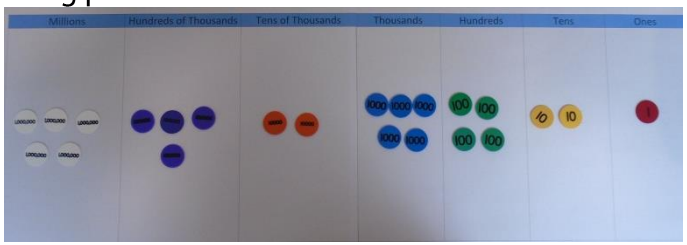
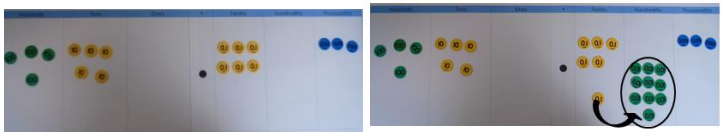
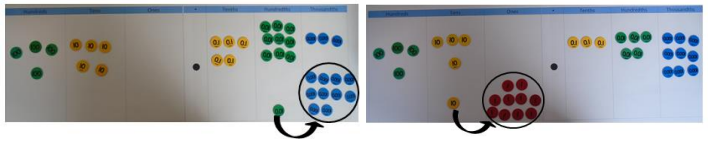
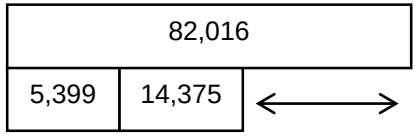
They should also be able to add numerous decimal numbers together and be more effcient with their calculating, putting in place holders where necessary. They should be reminded the importance of lining up the decimal point to ensure that the numbers are placed in the correct columns.

2 3 . 3 6 1
9 . 0 8 0
5 9 . 7 7 0
+ 1 . 3 0 0
9 3 . 5 1 1
2 1 2

Place holders can be added in red to make the calculation more clear for the children.

Children should now have mastered exchanging and should be able to do this confidently multiple times within a calculation.
</td>
</tr>
</table>

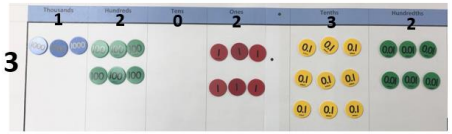
Year 6 Multiplication

Concrete	Pictorial	Abstract
When introducing the millions column to the children in subtraction questions, it may be beneficial to show them using place value counters.  Children will need a lot of practice with subtracting decimals and understanding what to do when there are different amounts of decimals in the numbers that they are subtracting. Using practical equipment as shown below encourages them to place a 0 in these columns. 450.603 — 27.244 =  You can't subtract 4 thousandths from 3 thousandths without going into a decimal answer. There are no tenths to exchange so they need to exchange 1 tenth for 10 hundredths first.  They can then take away the thousandths, hundredths and tenths. However, there are no ones in the column so they need to exchange 1 ten for ten ones to complete the subtraction.	As in Year 5, children can begin by showing the calculations using pictorial representations. However, they should beginning to realise that this is not the most efficient way of solving the problem. They should be able to use the bar model to solve problems that require multi-steps of both addition and subtraction. They should be able to use this to help them to solve problems where they need to find how much is left. e.g England recruited 82,016 soldiers over a year, trained 5, 399 nurses and 4, 375 pilots. What is the difference in the amount of soldiers compared with the amount of pilots and nurses combined?  	Children will be expected to calculate with numbers that have numbers in the millions column where there are multiple 0s. $$\begin{array}{r} {}^{2}{}^{9}{}^{1}{}^{2}{}^{9} \\ 7\,6\,\cancel{3}^{1}\,0\,\cancel{3}^{1}\,\cancel{0}^{1} \\ -\;\;4\,2\,1\,7\,8\,5 \\ \hline 7\,2\,0\,8\,5\,1\,5 \end{array}$$ They should also use the compact column method to subtract money and measures, including decimals with 3 or more decimal places. They should ensure that all decimals are placed in the correct columns. $$\begin{array}{r} {}^{1}{}^{9}{}^{4}\quad{}^{3}{}^{9} \\ 2\,\cancel{0}^{1}\,\cancel{5}^{1}\,.\,\cancel{4}^{1}\,\cancel{0}^{1} \\ -\;\;9\,7\,.\,5\,7\,9 \\ \hline 1\,0\,7\,.\,8\,2\,1 \end{array}$$ Children can fill empty decimal places with zeros to show the place value in each column. Shown here in red.

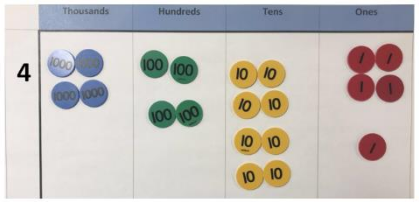
Year 6 Division		
Concrete	**Pictorial**	**Abstract**

Children will begin by recapping short division from previous year. They will then progress to dividing decimals using this method.

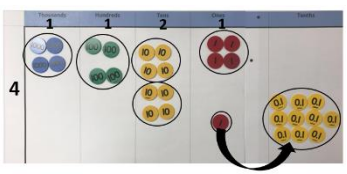
3606.96 ÷ 3 = 1202.32

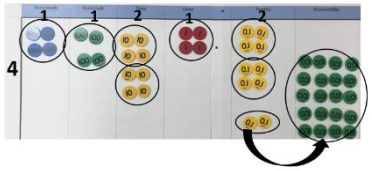


The children should then progress to dividing whole numbers to find decimal answers.

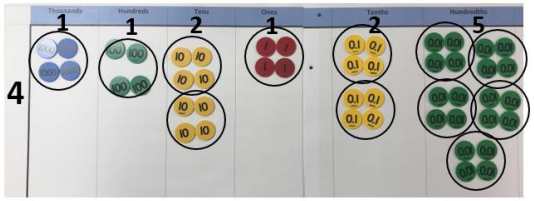


The one will need to be exchanged for 10 tenths and then the extra 2 tenths for 20 hundredths. .





They continue working through the decimal places until there is no remainder.



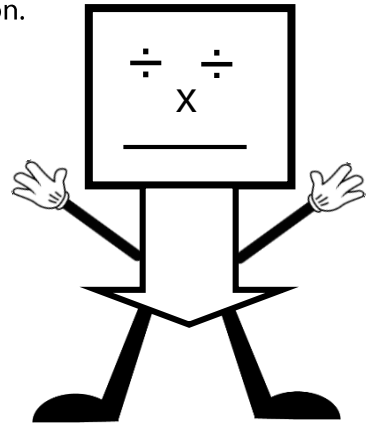
The children will then have their answer.

With deep understanding being built upon from previous years, it is unlikely that the chidren will need practical resources and pictorial representations.

When calculating with decimals, children can show the division using pictorial representations of the place value counters to support their learning. This should be used alongside the concrete.

They can use this alongside the method of long divison. However, it should be explored that this may not be the most efficient use of time.

The children like to use the visual representation of the 'Division Man' to the help them to remember the steps to long division.



When dividing to find remainders, the children should be able to record these in different forms. E.g.

With a remainder:

$$5\overline{)9^{4}5\,2^{2}2} = 1\,9\,0\,4 \text{ r } 2$$

As a fraction:

$$5\overline{)9^{4}5\,2^{2}2} = 1\,9\,0\,4 \text{ r } \frac{2}{5}$$

As a decimal:

$$5\overline{)9^{4}5\,2^{2}2^{2}0} = 1\,9\,0\,4{\cdot}4$$

When the children are confident with this method, they will then move onto long division.

Step 1:
Divide

Step 2:
Multiply

Step 3:
Subtract

Step 4:
Bring down

$$25\overline{)425} = 017$$

0↓
42
25↓
175
175
000

Help Box
1 x 25 = 25
2 x 25 = 50
5 x 25 = 125
10 x 25 = 250

To help them, the children can write known facts in a help box to support them with their division.