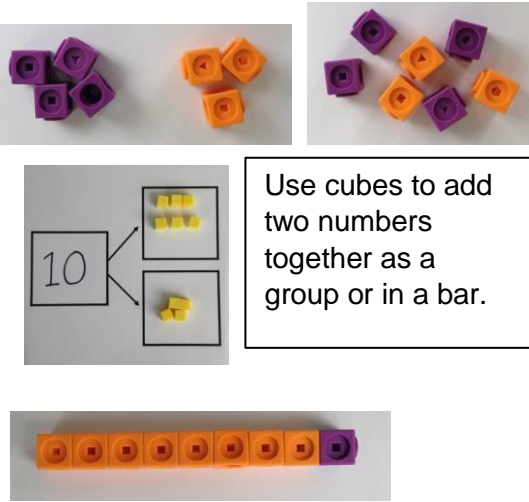
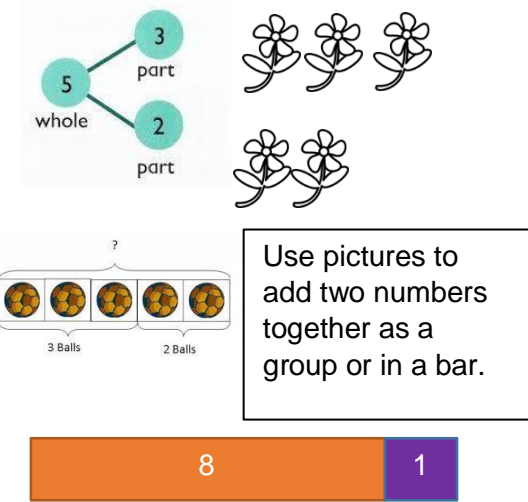


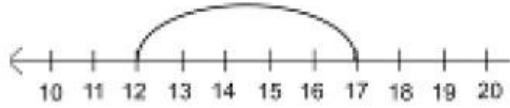
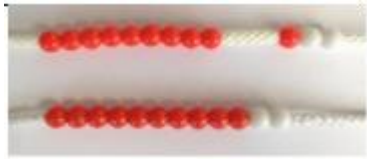


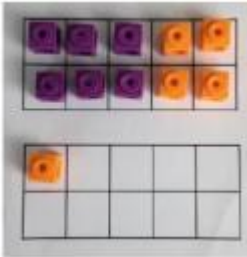
Addition

Objective and Strategies	Concrete	Pictorial	Abstract
<p>Combining two parts to make a whole: part-whole model</p>	 <p>Use cubes to add two numbers together as a group or in a bar.</p>	 <p>Use pictures to add two numbers together as a group or in a bar.</p>	<p>$4 + 3 = 7$</p> <p>$10 = 6 + 4$</p>  <p>Use the part-part whole diagram as shown above to move into the abstract.</p>
<p>Starting at the bigger number and counting on</p>	 <p>Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer.</p>	<p>$12 + 5 = 17$</p>  <p>Start at the larger number on the number line and count on in ones or in one jump to find the answer.</p>	<p>$5 + 12 = 17$</p> <p>Place the larger number in your head and count on the smaller number to find your answer.</p>

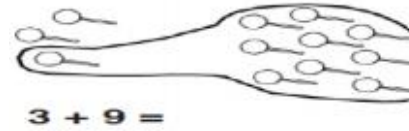
Regrouping to make 10.



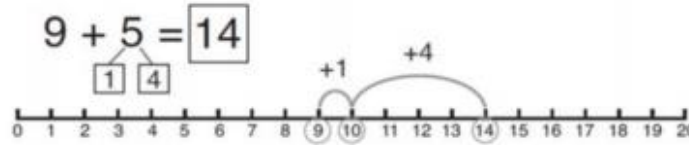
$$6 + 5 = 11$$



Start with the bigger number and use the smaller number to make 10.



Use pictures or a number line. Regroup or partition the smaller number to make 10.



$$7 + 4 = 11$$

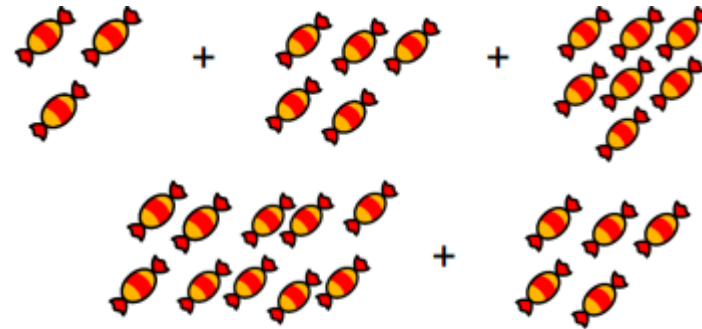
If I am at seven, how many more do I need to make 10. How many more do I add on now?

Adding three single digits

$4 + 7 + 6 = 17$
Put 4 and 6 together to make 10. Add on 7.



Following on from making 10, make 10 with 2 of the digits (if possible) then add on the third digit.



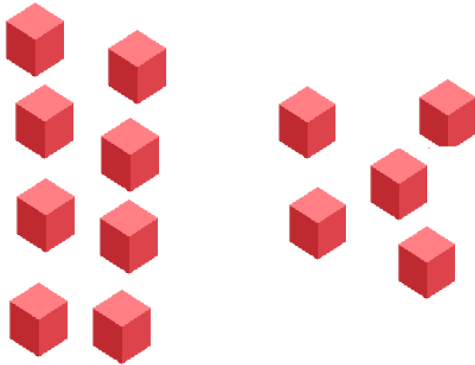
Add together three groups of objects. Draw a picture to recombine the groups to make 10.

$$\textcircled{4} + 7 + \textcircled{6} = \boxed{10} + \boxed{7} \\ = \boxed{17}$$

Combine the two numbers that make 10 and then add on the remainder.

Empty
Number
Line

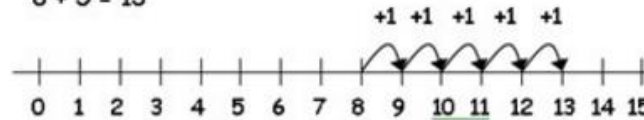
$8 + 5 = 13$



Children begin with 8 objects. Can they add 5 objects counting one at a time saying each number? What number do they finish on?

$8 + 5 = 13$

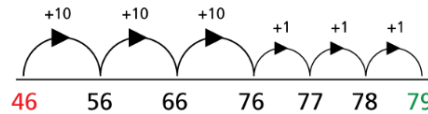
$8 + 5 = 13$



Children begin with the first number and make 5 jumps up to find their answer.

Children can then move on to TU + TU. Children to use their knowledge of place value to partition the second number. Children must add the tens and then the ones.

$46 + 33$



$13 + 5 = 18$

I can put 13 in my head and count on 5 to get to 18.

Partitioning
– TU + TU
Not
bridging 10.

Use dienes to support understanding – children to use knowledge of place value to partition numbers.

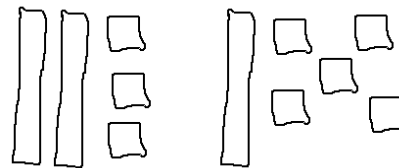
$23 + 15 =$



Children to count the total number of dienes and the number they represent.

Children to draw pictures to represent the numbers and find the total.

$23 + 15 =$



Children should see "I have three tens (10, 20, 30) and 8 units. $30 + 8 = 38$ ".

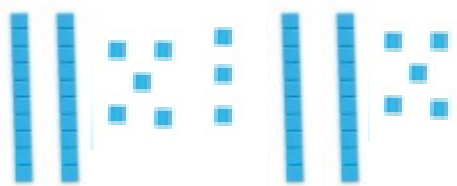
$23 + 15 = 38$
 $20 + 10 = 30$
 $3 + 5 = 8$
 $30 + 8 = 38$

Children need to add the tens, units and then combine the two to find the total.

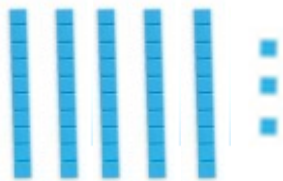
Partitioning
– TU + TU
Bridging
10.

Use dienes to support understanding – children to use their knowledge of place value to partition numbers.

$$28 + 25 =$$



Children to count the total number of dienes. Children need to spot there are 13 ones. They can make a 10 from the two 5s. The number would then look like this...

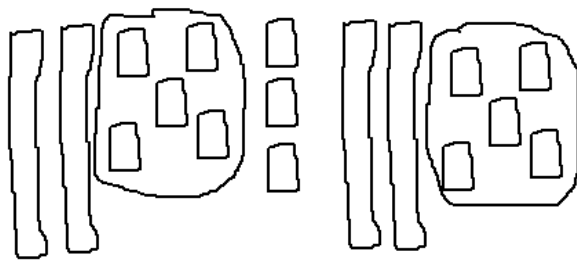


Children can then count the dienes to get to 53.

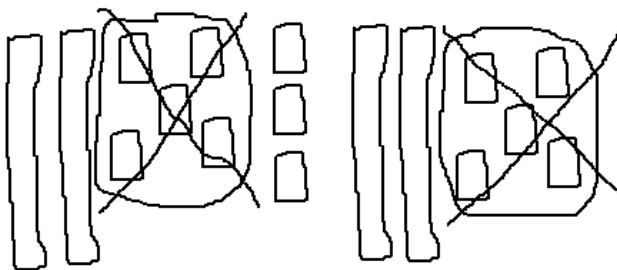
Children to draw pictures to represent the numbers and find the total.

$$28 + 25 =$$

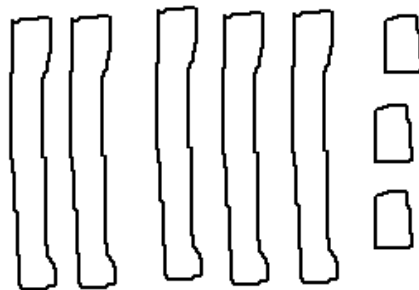
Step one:



Step two:



Step three:



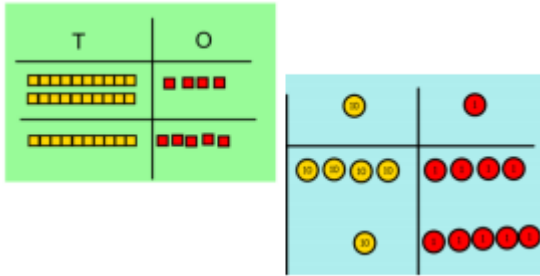
$$\begin{aligned} 28 + 25 &= \\ 20 + 20 &= 40 \\ 8 + 5 &= 13 \\ 40 + 13 &= 53 \end{aligned}$$

Children need to add the tens, units and then combine the two to find the total.

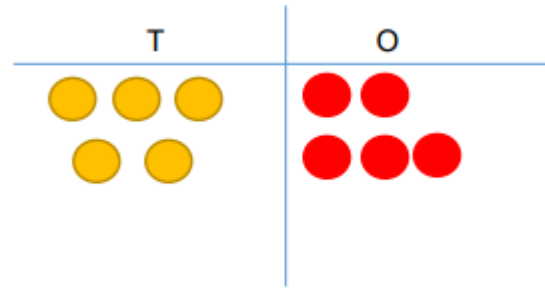
Column method- no regrouping

$24 + 15 =$

Add together the ones first then add the tens. Use the Base 10 blocks first before moving onto place value counters.



After practically using the base 10 blocks and place value counters, children can draw the counters to help them to solve additions.



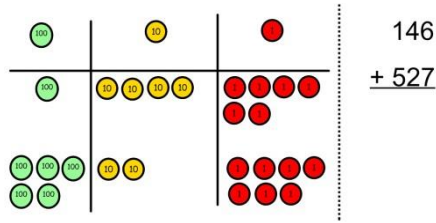
Calculations

$21 + 42 =$

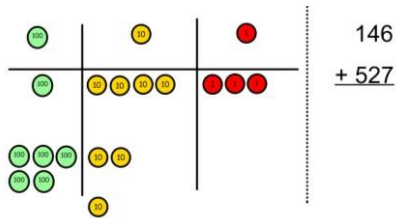
$$\begin{array}{r} 21 \\ + 42 \\ \hline \end{array}$$

Column method- regrouping

Make both numbers on a place value grid.



Add up the units and exchange 10 ones for one 10.

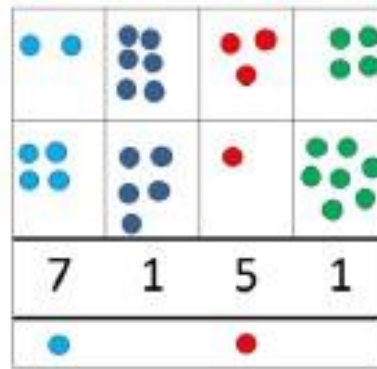


Add up the rest of the columns, exchanging the 10 counters from one column for the next place value column until every column has been added.

This can also be done with Base 10 to help children clearly see that 10 ones equal 1 ten and 10 tens equal 100.

As children move on to decimals, money and decimal place value counters can be used to support learning.

Children can draw a pictorial representation of the columns and place value counters to further support their learning and understanding.



Start by partitioning the numbers before moving on to clearly show the exchange below the addition.

$$\begin{array}{r} 20 + 5 \\ 40 + 8 \\ \hline 60 + 13 = 73 \end{array}$$

$$\begin{array}{r} 536 \\ + 85 \\ \hline 621 \\ 11 \end{array}$$

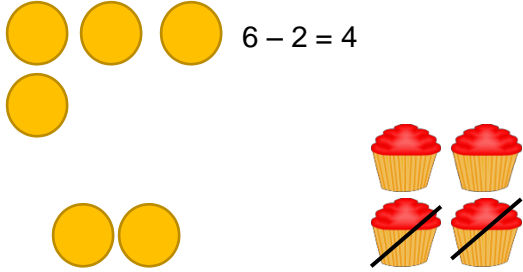
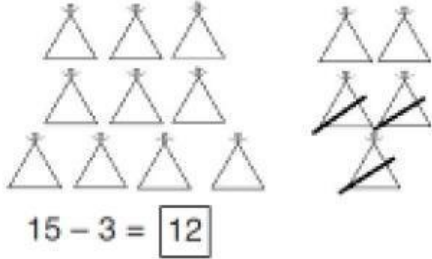


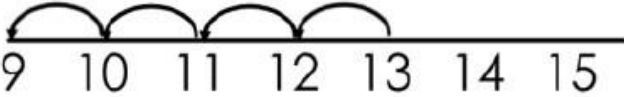
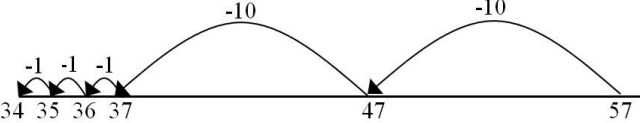
As the children move on, introduce decimals with the same number of decimal places and different. Money can be used here.

$$\begin{array}{r} 72.8 \\ + 54.6 \\ \hline 127.4 \end{array}$$

£	2	3	.	5	9
+	£	7	.	5	5
<hr/>					
£	3	1	.	1	4
	1	1		1	

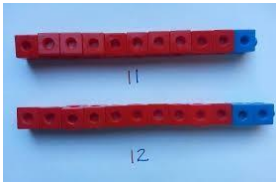
$$\begin{array}{r} 23.361 \\ 9.080 \\ 59.770 \\ + 1.300 \\ \hline 93.511 \\ 212 \end{array}$$

Subtraction

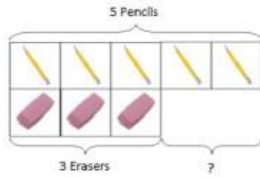
Objective and Strategies	Concrete	Pictorial	Abstract
<p>Taking away ones</p>	<p>Use physical objects, counters, cubes etc to show how objects can be taken away.</p>  <p>$6 - 2 = 4$</p>	<p>Cross out drawn objects to show what has been taken away.</p>  <p>$15 - 3 = 12$</p>	<p>$18 - 3 = 15$</p> <p>$8 - 2 = 6$</p>
<p>Counting back / Empty Number Line</p>	<p>Make the larger number in your subtraction. Move the beads along your bead strip in ones.</p>  <p>$13 - 4$</p> <p>Use counters and move them away from the group as you take them away counting backwards as you go.</p> 	<p>Count back on a number line or number track</p> <p>$13 - 4 = 9$</p>  <p>Start at the bigger number and count back the smaller number showing the jumps on the number line.</p> <p>$57 - 23 = 34$</p>  <p>This can progress all the way to counting back using two 2 digit numbers.</p>	<p>Put 13 in your head, count back 4. What number are you at? Use your fingers to help.</p>

Find the difference

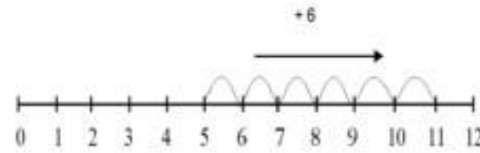
Compare amounts and objects to find the difference.



Use cubes to build towers or make bars to find the difference



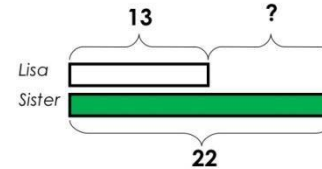
Use basic bar models with items to find the difference



Count on to find the difference.

Comparison Bar Models

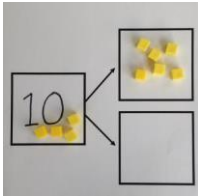
Lisa is 13 years old. Her sister is 22 years old. Find the difference in age between them.



Draw bars to find the difference between 2 numbers.

Hannah has 23 sandwiches, Helen has 15 sandwiches. Find the difference between the number of sandwiches.

Part Part Whole Model

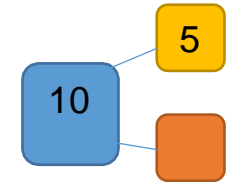
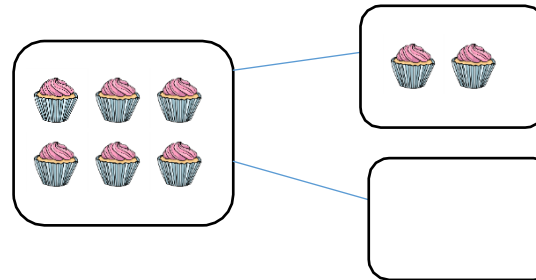


Link to addition- use the part whole model to help explain the inverse between addition and subtraction.

If 10 is the whole and 6 is one of the parts. What is the other part?

$$10 - 6 =$$

Use a pictorial representation of objects to show the part part whole model.



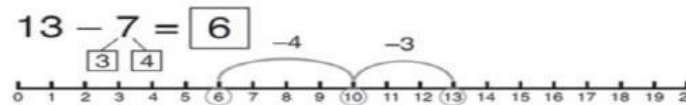
Move to using numbers within the part whole model.

Make 10

$$14 - 9 =$$



Make 14 on the ten frame. Take away the four first to make 10 and then takeaway one more so you have taken away 5. You are left with the answer of 9.



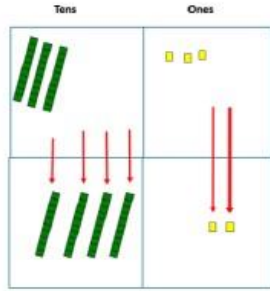
Start at 13. Take away 3 to reach 10. Then take away the remaining 4 so you have taken away 7 altogether. You have reached your answer.

$$16 - 8 =$$

How many do we take off to reach the next 10?

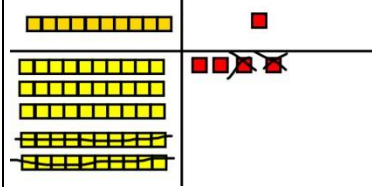
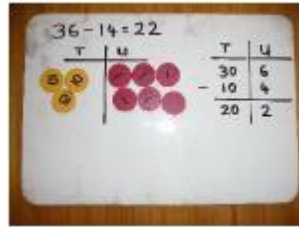
How many do we have left to take off?

Column method without regrouping



Use Base 10 to make the bigger number then take the smaller number away.

Show how you partition numbers to subtract. Again make the larger number first.



Calculations

$$\begin{array}{r} 54 \\ - 22 \\ \hline 32 \end{array}$$

Draw the Base 10 or place value counters alongside the written calculation to help to show working.

$$47 - 24 = 23$$

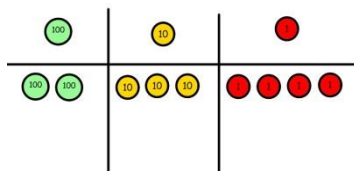
$$\begin{array}{r} 40 + 7 \\ - 20 + 4 \\ \hline 20 + 3 \end{array}$$

This will lead to a clear written column subtraction.

Column method with regrouping

Use Base 10 to start with before moving on to place value counters. Start with one exchange before moving onto subtractions with 2 exchanges.

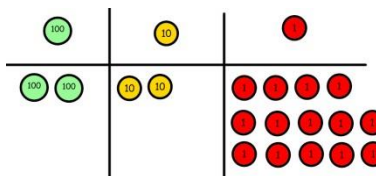
Make the larger number with the place value counters



Calculations

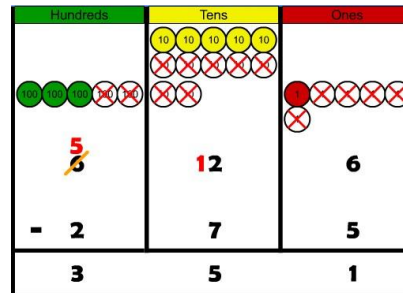
$$\begin{array}{r} 234 \\ - 88 \\ \hline \end{array}$$

Start with the ones, can I take away 8 from 4 easily? I need to exchange one of my tens for ten ones.



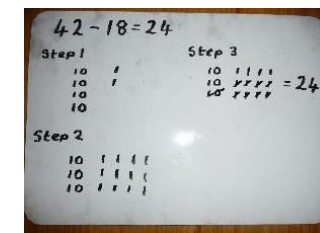
Calculations

$$\begin{array}{r} 234 \\ - 88 \\ \hline \end{array}$$



Draw the counters onto a place value grid and show what you have taken away by crossing the counters out as well as clearly showing the exchanges you make.

Children can start their formal written method by partitioning the number into clear place value columns.

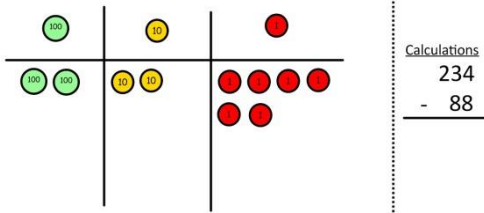


When confident, children can find their own way to record the exchange/regrouping.

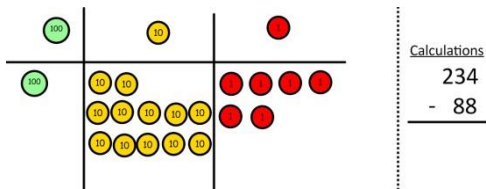
Just writing the numbers as shown here shows that the child understands the method and knows when to exchange/regroup.

Moving forward the children use a more compact method.

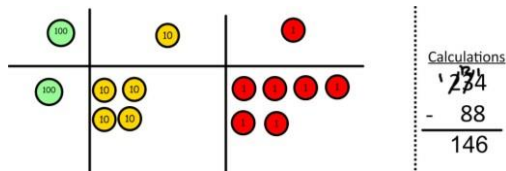
Now I can subtract my ones.



Now look at the tens, can I take away 8 tens easily? I need to exchange one hundred for ten tens.



Now I can take away eight tens and complete my subtraction



Show children how the concrete method links to the written method alongside your working. Cross out the numbers when exchanging and show where we write our new amount.

This will lead to an understanding of subtracting any number including decimals.

$$\begin{array}{r} 5 \quad 12 \quad 1 \\ 2 \quad \cancel{6} \quad \cancel{3} \quad . \quad \color{red}{0} \\ - \quad 2 \quad 6 \quad . \quad 5 \\ \hline 2 \quad 3 \quad 6 \quad . \quad 5 \end{array}$$

