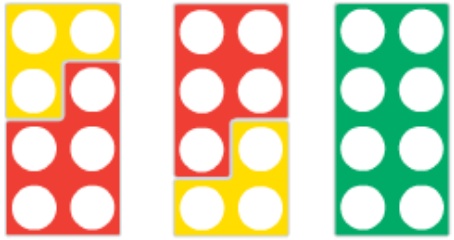
Challenge 1: Addition is commutative.

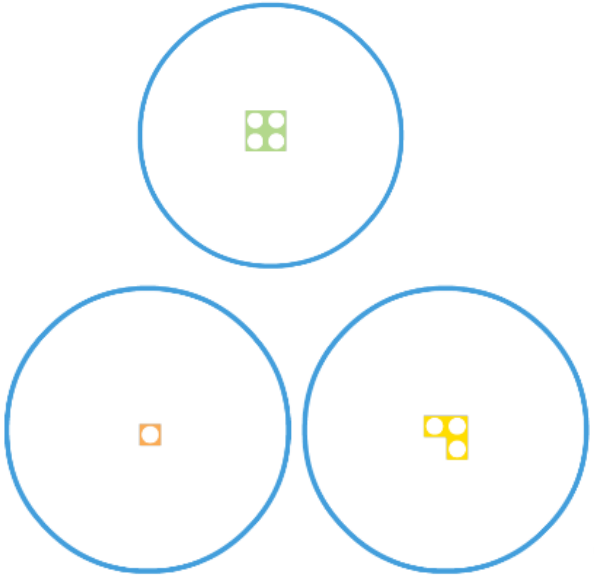
Remember addition can be done in any order;



5 + 3 = 8, 3 + 5 = 8.

Prove this by choosing two shapes and putting these together in different orders.

Now use the 'parts and whole' sheet to show that, regardless of which way you add the numbers, the answer is always larger than the two 'parts'.



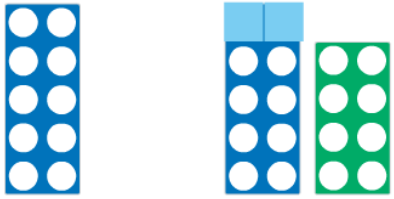
Challenge 2: Subtracting.

There are three different ways to approach subtraction; reducing, finding the difference and 'counting on'.

Reducing / finding the difference: A supermarket has a sale on certain toys.

£10 £2 off!

Show this using shapes and subtracting covers



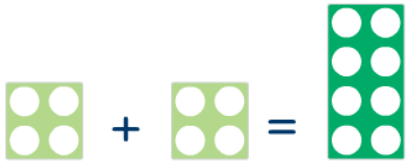
or rods

This can be written as 10 - 2 = 8.

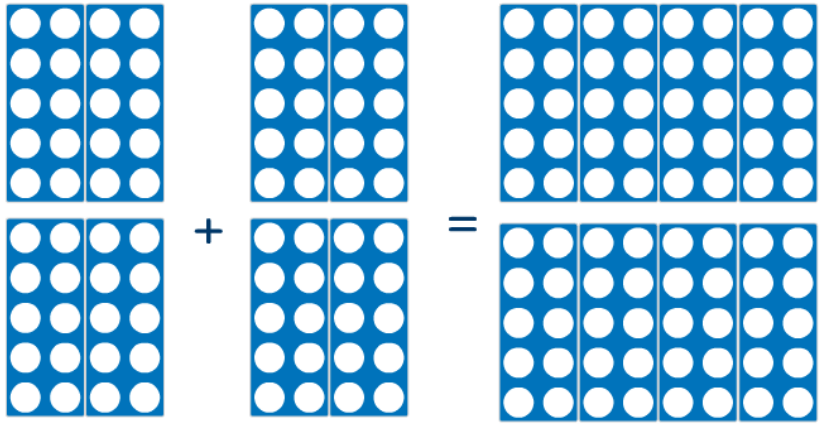
Using the spinners and shapes or rods, create your own subtraction number sentence.

Challenge 3: Use addition (and subtraction) facts within ten to add (and subtract) whole tens.

In a hall there were 40 children sitting on one side and 40 sitting on the other. What addition facts can we use to help us?



So make it 10x bigger



4 + 4 = 8

40 + 40 = 80

Use this strategy to solve 30 + 50 and 60 + 10.

Can you adapt this strategy to help solve;

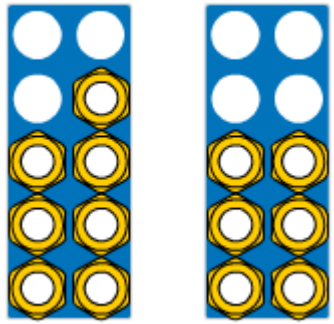
There were seventy children in the hall and 40 left to go to their classes. How many children were left?

Use the rods or shapes and subtraction covers to help you.

Challenge 4: Balancing addition.

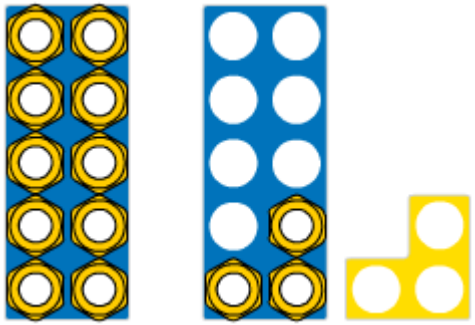
Imagine the 10 shape is a box of chocolates and the counters are chocolates.

Now, if the chocolate box has two layers it might look like this.

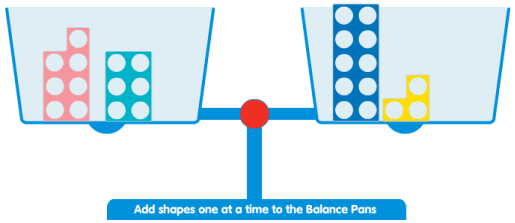


How could you find the total number of chocolates without counting?

Fill up one layer and look for the shape that is left in the other layer.



So 7 + 6 = 13. Check this using the balance scales.



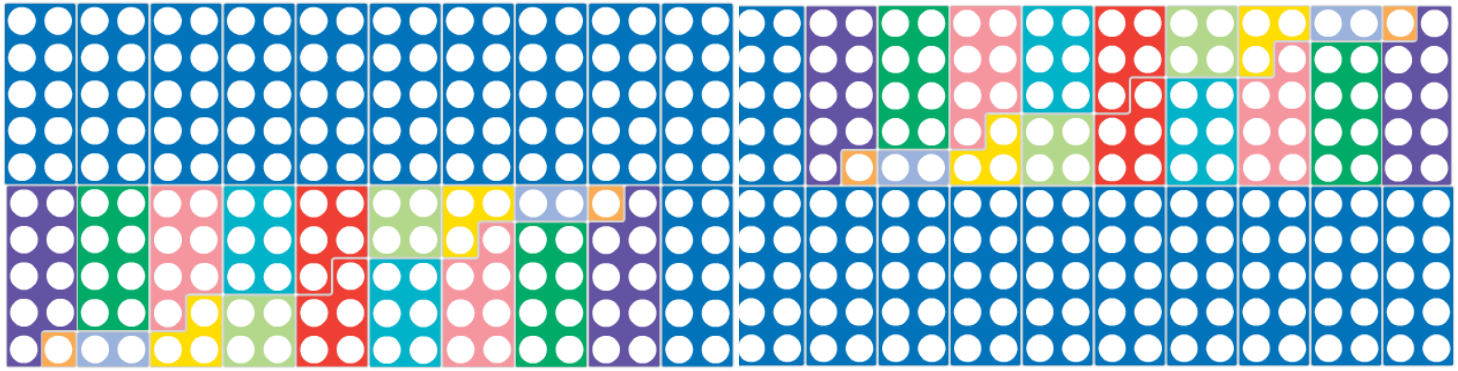
Use the spinner to choose two numbers and use the shapes and pegs to work out the answer without adding. Check your answers using the scales.

Challenge 5: Adding facts for 20 and subtracting using the inverse.

You have 20 balls, some red and some blue. Find all the different combinations you can, using the shapes or rods to help you.

What shape did you use the most? Why?

Did you lay out your shapes using a logical order (like below)?



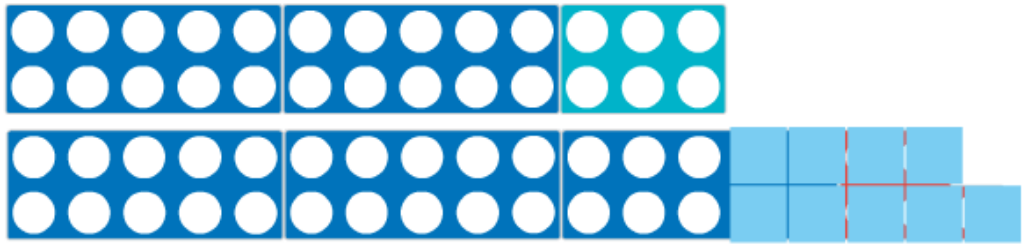
Do you spot a pattern? Can you explain what it tells us about addition?

Can you use the inverse to find subtraction facts to 20?

Challenge 6: subtracting 9

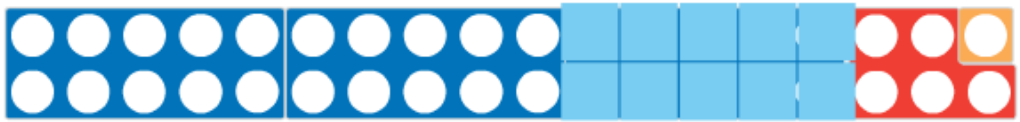
Shapes or rods can be used to illustrate different strategies for subtracting 9.

Look at 35 – 9 =



Recognising the remaining shape

Bridging through multiples of 10



Taking away 10 and adding back 1

Look at these number sentences and choose which strategy to use. Don't forget to use shapes and subtraction covers or rods to help you.

21 – 9 = 48 – 9 = 154 – 9 = 137 – 9 =

Challenge 7: Near doubles.

Rasheed and Annie collected one pen from each child in the class. Rasheed collected 14 and Annie collected 15. How many pens did they collect altogether?

Look for near doubles.

14 + 15 can be calculated by

14 + 14 + 1

re-arranged becomes

15 + 15 -1

adjust by - 1

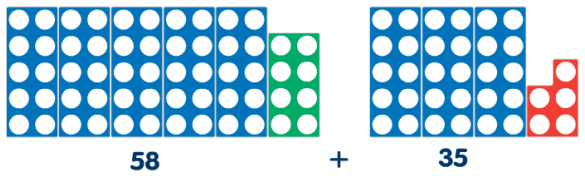
Imagine you are playing darts. What would your score be if you scored double 16, double 17, double 19, double 25?

Challenge 8: developing mental strategies to add or subtract 2 digit numbers crossing 10s.

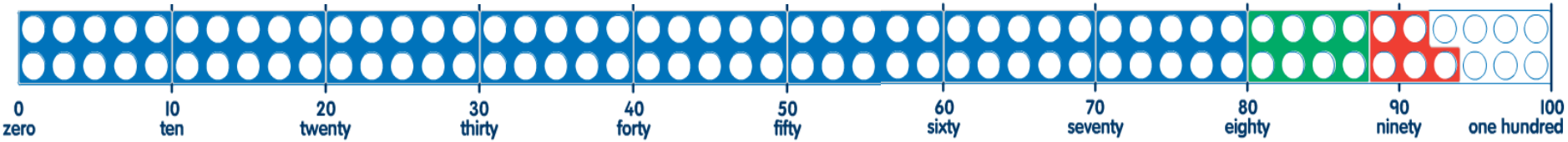
Two numbers from the list below will have the total closest to 100 when added together.

27 69 35 81 55 58

We need to develop a strategy to help us work this out quickly. Consider 58 + 35.



Put the shapes onto the number line, tens first. This is partitioning and adding tens then ones.



Knowing relationships between numbers can make calculating even easier. 35 + 58 is the same as 35 + 55 + 3. Check this using the balance scales if you want to.

Using the above strategy and shapes or rods, decide which two numbers have the total closest to 100.