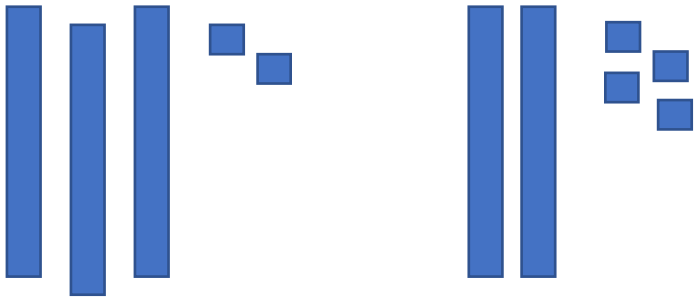
Addition – Using Tens and Ones

T	O		T	O		
3	2	+	2	4	=	56



1. Write T and O above each number to see how many tens and ones each number has.

2. Draw out the tens and the ones for both numbers (the sticks are tens and the cubes are ones)

3. Count them all together. The quickest way to count is to count all the tens first, then continue counting all the ones, e.g. *10, 20, 30, 40, 50 then 51, 52, 53, 54, 55, 56.*

Support: If you are adding a one digit number, remind children this only has ones in it and not tens, so just label with O and draw the cubes. No other support should be needed as children are confident with this method.

Extend: Children may start doing this mentally once they get more confident, e.g. for this number sentence they may work out in their head that 3 tens add 2 tens will make 5 tens for their answer , then 2 ones add 4 ones will make 6 ones. If they do this, be careful if they add up the ones and it makes a number bigger than ten, e.g.:

45 + 37 = 82

Here, they can add the tens mentally and work out their answer will have 7 tens. But then when they add up their ones, it makes 12 ones. As 12 is a ten and 2 ones, we now have 8 tens altogether instead of 7.

Addition – Column Method

	T	O
	3	2
+	2	4
	5	6

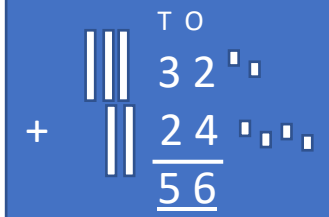
	3	2
+	2	4

1. Record the two numbers directly above each other. Make sure your tens and ones are lined up otherwise you'll add the wrong parts together (write T and O at the top if this helps).

2. ADD THE ONES FIRST by adding down the ones column, e.g. "2 ones add 4 ones makes 6 ones". Record it between the lines in the ones column (so this will be the end of the number).

3. Add up the tens next, e.g. "3 tens add 2 tens makes 5 tens". Record this in between the lines in the tens column (so this will be the start of the number).

Support*: Children may want to still draw the tens and ones at the side to help them visualise the addition, or to check their answer, e.g:



Extend: Children can apply this method to 3-digit number easily. We say "big numbers aren't scary" and we also say "it's not harder, it's just an extra step". The method is exactly the same, but we also have a hundreds column to add up too, e.g:

	H	T	O
	3	6	5
+	2	3	3
	5	**9**	**8**

* = children are only moved onto column method when fully confident working without visuals, so it's unlikely this will be needed.

Addition – Column Method (with regrouping)

	T	O
	3	7
+	2	5
	6	2
	1	

	3	7
+	2	5
	5	12

In this example, "7 ones add 5 ones makes 12 ones".

We can't just stick 12 in the ones column because you can only put one digit in each column!

We know 12 is 'a ten and 2 ones'…

…so we put '1' below the tens column (our extra ten for later) and '2' in the ones column.

Here, we are still using column method, but showing what to do when you add up your ones and get an answer of 10 or more.

1. Add up your ones – "oh look, the answer is more than 10 so that means we've made another group of 10!". We need to split up the number into tens and ones again (this is called 'regrouping').

2. Write a 1 underneath the tens column so you remember you've made one more ten.

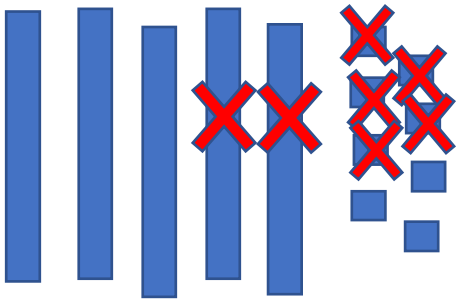
3. Put your ones in the ones column like you did before.

4. When you add up your tens, don't forget to add on the extra one!

Subtraction – Using Tens and Ones

T O T O

58 - 25 = 33



1. Write T and O above each number to see how many tens and ones each number has.

2. Draw out the tens and the ones for ONLY THE FIRST number. Draw them nice and big so you can see each individual one clearly in its own space.

3. This time we are taking away, so we don't draw the tens and ones for the second number, we CROSS THEM OUT.

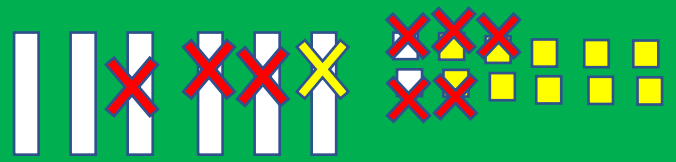
4. Count up the tens and ones that are left.

Support: Children are all confident with this method. Common mistakes usually come from drawing the tens and ones too close together, so it's hard to see which have been crossed out. Just make sure they draw them in space ☺

Extend: Again, children may start doing this mentally once they get more confident.

Some number sentences won't have enough ones in the first number to take away the second number, e.g:

62 - 35 =



We can't cross out 5 ones, because we only have 2! So we need to "swap a ten then start again". Cross or rub out one of the tens and draw ten more ones instead. Then begin the crossing out process again now there's enough ones.

Subtraction – Column Method

	T	O
	6	7
-	2	5
	4	2

	6	7
-	2	5

1. Record the two numbers directly above each other. Make sure your tens and ones are lined up otherwise you'll add the wrong parts together (write T and O at the top if this helps).

2. SUBTRACT THE ONES FIRST by taking away down the ones column, e.g. "7 ones take away 5 ones makes 2 ones". Record the answer between the lines in the ones column.

3. Subtract the tens next, e.g. "6 tens take away 2 tens makes 4 tens". Record this answer in the tens column.

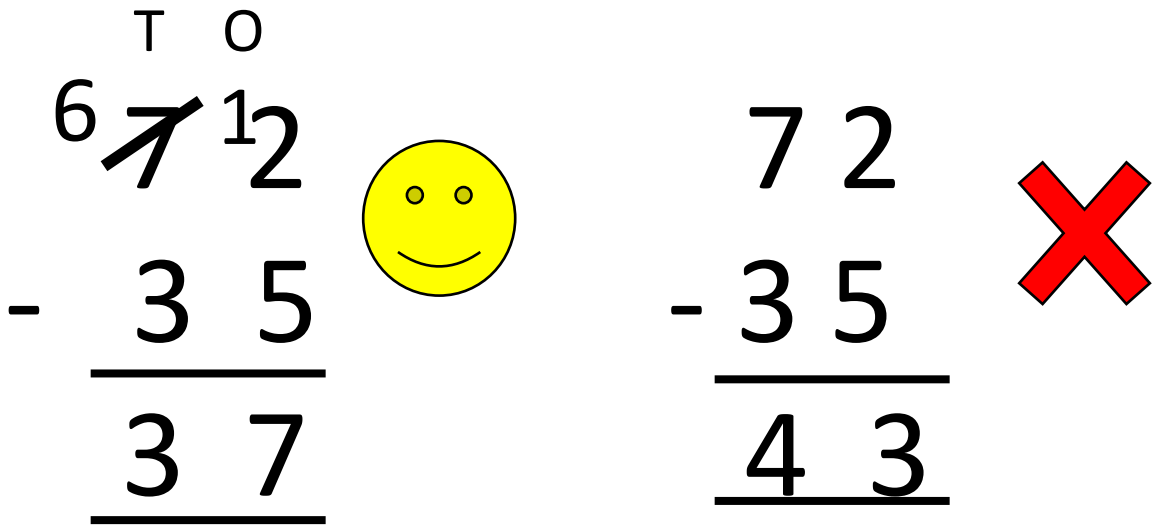
Support*: Again, children may want to still draw the tens and ones at the side then cross them out to help them visualise. Remember, we cross out not draw the second number for taking away.

Extend: Just like addition, children can apply this method to 3-digit number easily. The method is exactly the same, but we also have a hundreds column to take away too, e.g:

	H	T	O
	3	6	5
-	2	3	2
	1	**3**	**3**

* = children are only moved onto column method when fully confident working without visuals, so it's unlikely this will be needed.

Subtraction – Column Method (with borrowing)



In this example, we can't do "2 take away 5" because 2 is too small to take 5 away from.

So we borrow a ten from the tens column. This means that there's now only 6 tens in the tens column.

We add the ten we've borrowed onto our ones number. So now we don't have 2 any more, we have 12.

Now we can subtract our ones (12 – 5) and our tens (6 – 3), remembering to use the new numbers instead of the original ones.

Here, we are still using column method, but showing what to do when you can't subtract the ones because the number at the top is too small! This is a very tricky method!

1. Subtract your ones. "Oh no, we can't do it because the number at the top is too small". **RESIST THE TEMPTATION TO SWAP THE NUMBERS AROUND!!**

2. "Pop next door" to the tens column. Knock on the door and say "please can I borrow a ten?".

3. Your tens column will now have one less ten in it, so cross the digit out and change it to one less.

4. "Bring the ten back and add it onto your ones digit". Remember, you are adding ten, not one, so don't make the digit one more, make it ten more by putting a 1 in front of it.

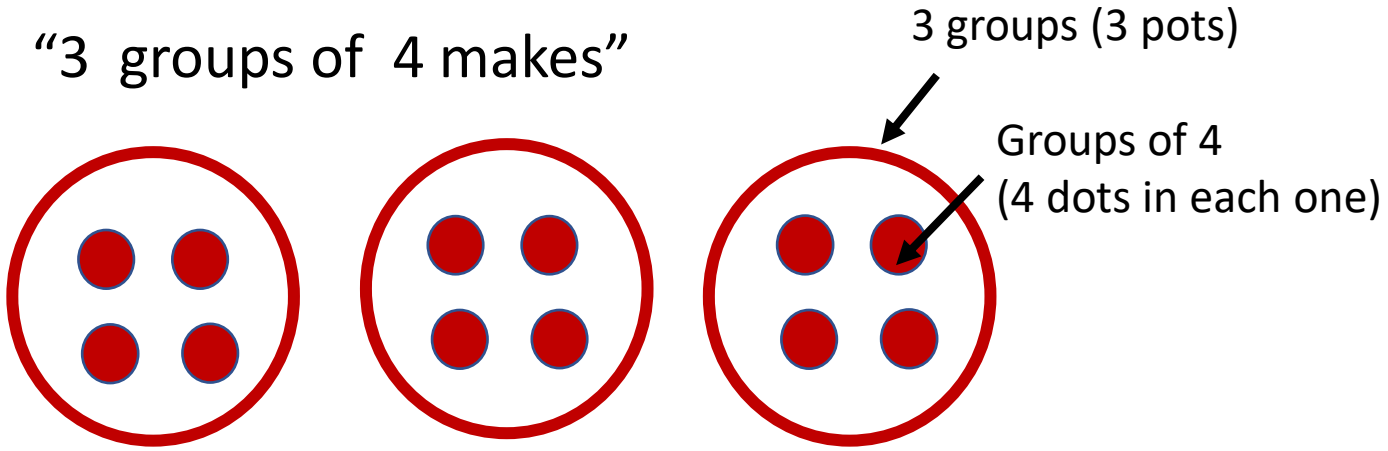
5. Now you can do your subtractions. Subtract your ones, then your tens, like before.

Multiplication – Pots and Dots

For this method, we think of the 'x' symbol as meaning "groups of"

3 x 4 = 12

"3 groups of 4 makes"



1. Read the number sentence aloud, using the term 'groups of' where the multiplication symbol is, e.g. "3 groups of 4 equals".
2. Think about how many groups you need. Draw this number of pots.
3. Think about what they are 'groups of'. Draw this number of dots inside each pot.
4. Count all the dots altogether!

Extend: Children may notice faster ways to count, e.g. if there's 5 in each pot, they can count up in fives to find the answer. They can begin to pre-empt this and save time by recording the number inside each pot instead of drawing the dots, e.g. "oh wait, I know I'm going to count this in 5s so there's no point drawing out the dots, I'll just write a number 5 in each pot instead". When they are confident with this, they can then start swapping the numbers around to do it the fastest way, e.g. 3 x 4, we can't count in 4s so it's better to do "4 groups of 3" instead because then we can use the shortcut and count in 3s.

Multiplication – Counting On

For this method, we think of the 'x' symbol as meaning "counts of". It can be used for number sentences with any number that we can count in, e.g. 2s, 5s, 10s, 3s.

7 x 2 = 14

"7 counts of 2 makes"

Support: Link back to pots and dots method. Imagine each finger is your pot, and on each finger, you're going to put your groups. You could even draw them on your finger until confident.

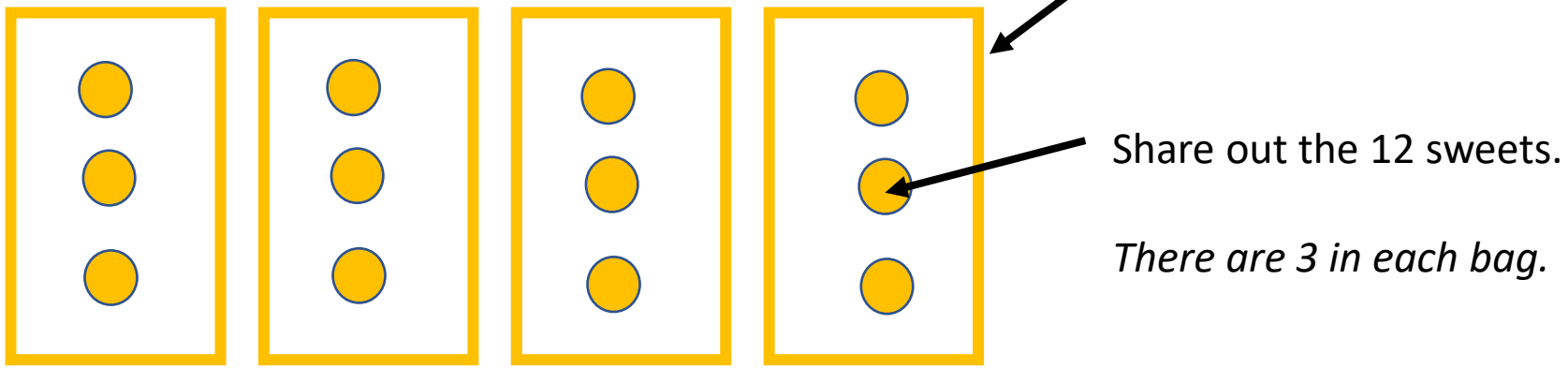
Extend: Remind children that you can swap the numbers round to use this method even more often! e.g. If you saw 3 x 8, we can't do "3 counts of 8" because we can't count in 8s, but we can swap them round and do "8 counts of 3".

1. Read the number sentence out aloud, using the term 'counts of' where the multiplication symbol is, e.g. "7 counts of 2 equals".
2. Think about how many counts you need to do and get this number ready on your fingers. So for this example, you'd hold up 7 fingers.
3. Think about what you're counting in. Count along the fingers you've held up in that number. So for this example, you've put up 7 fingers and now you'd count your fingers in 2s.
4. You get your answer on your last finger!

Division – Sharing Bags

12 ÷ 4 = 3

"12 sweets shared between 4 bags"



1. Read the number sentence out aloud, using "shared between" where the division symbol is. *Using the idea of sweets and bags is helpful here, e.g. 12 sweets shared between 4 bags.*
2. Imagine you have the starting number in your hand, *e.g. "right I have 12 sweets in my hand…".*
3. Draw out the number of bags you need to share between, e.g. *"…and we're sharing between 4 so we need 4 bags".* Draw them in a row to make sharing easier.
4. Share them out across the bags one at a time, *e.g. "one for you, one for you, one for you, one for you".*
5. Your answer is how many each bag gets!

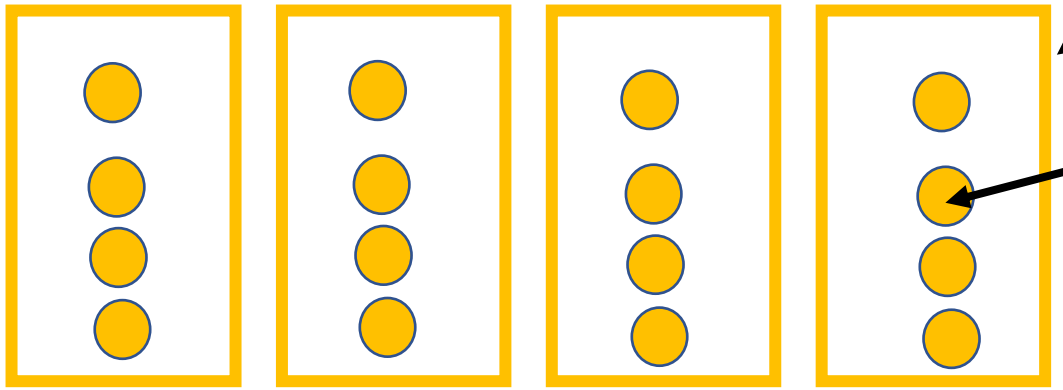
Support: Use real life objects to share out.

Extend: Use this method for bigger numbers by sharing out then tens first, then the ones, e.g. for 84 ÷ 4, draw 4 sharing bags and share out 8 tens then 4 ones. For GO questions e.g. 50 ÷2, you may end up needing to split the last ten between 2 sharing bags to make it fair, so putting a 5 in each one!

Fractions – Sharing Bags

¼ of 16 = 4

"16 sweets shared between 4 bags"



Draw out 4 sharing bags in a row

Share out the 16 'sweets'.

Each quarter is 4.

<u>Support:</u> Use real life objects to share out.

<u>Extend</u>: Start to help children see the link between fractions and division. Practise re-writing the fraction as a division number sentence, e.g. this one would be 16 ÷ 4 = 4.

We use exactly the same sharing bags method for fractions. The bottom part of the fraction (denominator) tells you how many sharing bags you need, then you just share out your number between the bags.

Be careful of the top part of the fraction (numerator)! This part tells you how many of the bags you need to count at the end, once you've shared out the dots. Often, it's just a 1, but sometimes it's different…

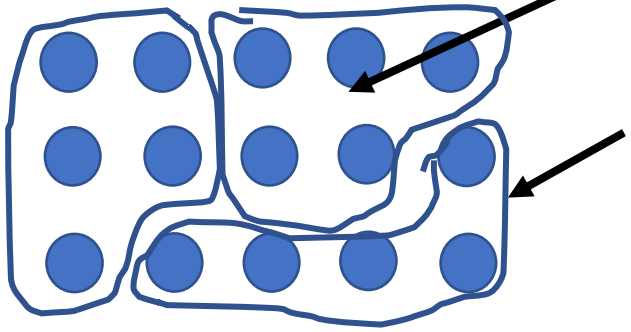
If this number sentence said 2/4 of 16, you would need to count 2 of the bags at the end, so the answer would be 8.

If it said ¾ of 16, you would count 3 of the bags at the end so the answer would be 12.

Division – Sharing Into Groups

15 ÷ 5 = 3

"15 shared into groups of 5"



Extend: This method is used to help children visualise mental division. Talk to children about what they are doing here: "well we have the number 15, and we're splitting it into groups of 5, so really we are trying to find out how many 5s makes 15… could we use our fingers instead to find out how many 3s makes 15 by counting in 5s?".

We usually only use this method if the question has already provided us with a picture of the group of objects we need to share out. If you have a picture already, this way will be faster than drawing out sharing bags. It's also a good method to bridge onto mental division (see 'extend').

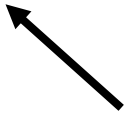
1. Read the number sentence aloud, saying 'shared into groups of' for the ÷ symbol, e.g. "15 shared into groups of 5".
2. Draw out the number of objects you have (or look at the picture that's already there).
3. Circle objects to put them into groups. Make sure you check your groups are accurate!
4. Count how many groups you have made.

Division – Mental

14 ÷ 2 = 7

"14 shared into groups of 2"

Starting with 14



Putting it into groups of 2…

… so how many 2s will 14 be?

1. *Read the number sentence.*

2. *'Talk to yourself' about what is going on in the number sentence:*

   "So I am starting with…."
   (14)

   "and I am splitting it into groups of…"
   (2)

   "so I need to work out how many ___s makes ___"
   (how many 2s makes 14)

3. *Use your fingers to count, e.g. for this example, count how many 2s will make 14.*