Universal Maths

Vol 1: Numbers to 20

A resource for teachers

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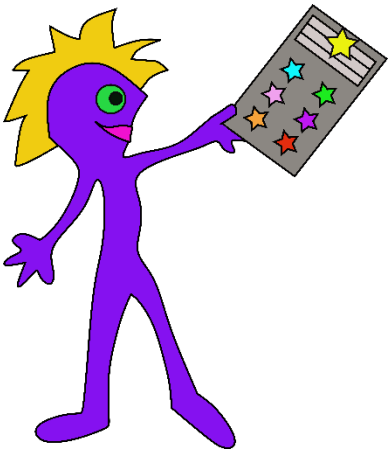
Introduction

Hi, my name is Sam. I am a maths teacher originally from the UK but now living in New Zealand. I began teaching in 2007 at a secondary school as a maths teacher and learnt a lot very quickly thanks to a wonderful maths department. A few years later I took on the role of maths leader at a Special Education Needs school which was a complete game changer for my teaching as I had to completely reset my teaching approach. In 2020 I was appointed as the Numeracy Specialist for the Cayman Islands where I worked with schools to help introduce a new curriculum and in 2022, I moved to New Zealand to go full circle and teach maths at a secondary school again. In New Zealand I have continued to work with primary schools by offering individual support and professional development in mathematics teaching.



Whilst working at the Special Educational Needs school I met James Summerfield, an excellent teacher with an even more excellent beard. One day we ended up writing a maths song for a class who weren't particularly enjoying the subject. To our surprise they loved it! Shortly after, we wrote more songs and then created Adam Up Maths, a website full of maths songs, videos, games and stories which all take place on Planet Numberth.

My number one passion in teaching is making lessons engaging. This is partly through fun and novel activities such as the songs, videos and games we have made but it is equally about giving humans the tools to 'see' and access the maths they are learning.

All of this is not meant to sound like a brag, but moreover to give you some confidence that I have some knowledge and enthusiasm about maths teaching and that hopefully you can trust me to guide you in the right direction.

What is Universal Maths?

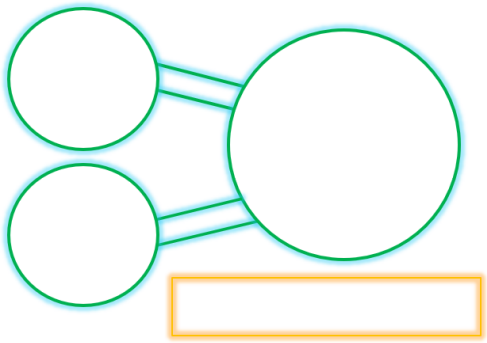
'*Universal Maths'* means maths teaching which works for *everyone*. This book is a guide to various models which I have used in the past to help humans (I use the word humans because we all learn at different times and rates) to understand the subject. The models in this guide are for humans (and aliens if you don't live on Earth) who are working with numbers up to 20. I cover addition, subtraction, a bit of place value, and early multiplication / division. These models should be seen as supports to help these humans eventually count/calculate mentally. Each chapter begins with an overview of the model followed by examples of how it can be used to teach specific skills.

I tried to make the language of this guide as simple as possible, but I did need to use a few words which may be unfamiliar. Please don't be put off by these words – the examples should be clear enough.

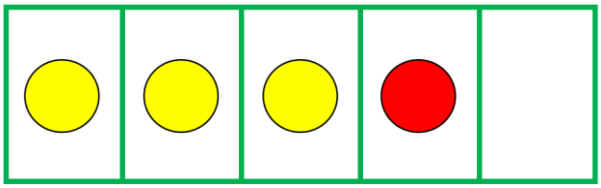
Word	***Meaning***	***Example***
Augend	The number to which another is added	**6** + 3
Addend	The number which is added to another	6 + **3**
Minuend	A number from which another is to be subtracted	**6** - 3
Subtrahend	A number to be subtracted from another	6 – **3**
Multiplicand	The number which is being multiplied	**6** x 3
Multiplier	The number which tells you how many times the multiplicand is multiplied	6 x **3**
Dividend	The number which is being divided	**6** ÷ 3
Divisor	The number that divides the dividend	6 ÷ **3**

The Models

The models featured in this guide can be projected on a screen and used by a teacher, but they will be most effective when used by individual human students. Each model has a space for writing numerals or number sentences which can be a great way for humans to see mathematical connections, providing that the humans involved are either able to write themselves or understand what someone else is writing.



All the models explored in this guide can be found on the Adam Up Maths website **www.adamupmaths.com/teacherzone**. The only other resource you will need are some counters of two different colours (I strongly recommend 2-sided counters).



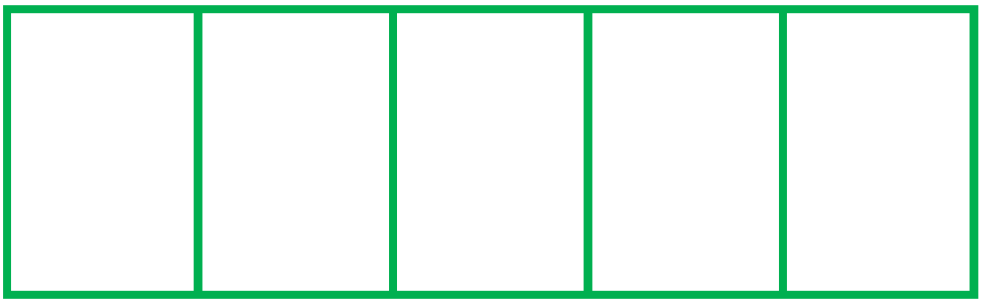
However, you may want to find more creative tools to use in place of counters. You may also want to change the design of the models to suit your class.

Finally, this guide really is an introduction to using the models – there is much more to explore. If you have any questions about the content of this book or the Adam Up Maths website, then please contact me by emailing **sam@adamupmaths.com**.

Enjoy!

Contents

Chapter 1: The 5-Bar

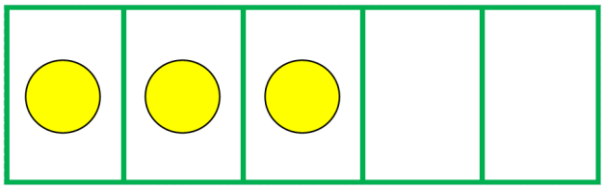


Stage:	Humans working with numbers to 5 who are counting rather than calculating
General skills:	• 1:1 correspondence • Understanding what quantities look like • Visualising an internal number line
Specific skills:	• One more, one less within 5 • Adding and subtracting within 5 • Number bonds to and within 5 • Comparing numbers (using two 5-Bars) • Doubling and halving (using two 5-Bars) • Moving forwards and backwards
Details:	• The green boxes are the ‘bars’ • A variation of the 5-Bar includes numerals written into the ‘bars’ – this is known as a number track

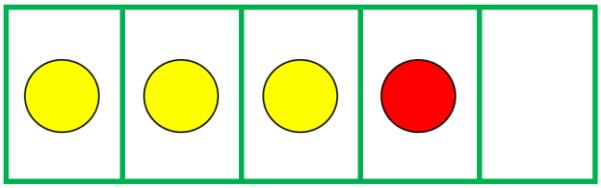
The 5-Bar: One more (or one less)

Example: *1 more than 3*

Step 1: Show the starting amount (3) by placing counters in the boxes

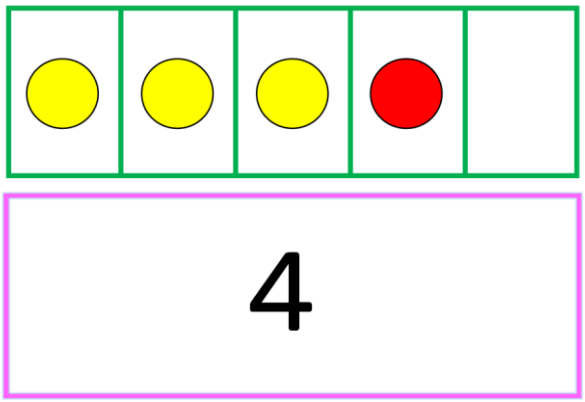


Step 2: Add an extra counter, which is a different colour



Step 3: Talk about what they notice (*1 more than 3 is 4*)

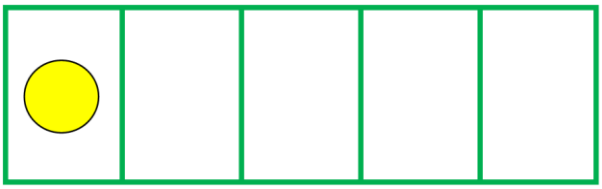
Step 4: Write the total in the purple box (optional)



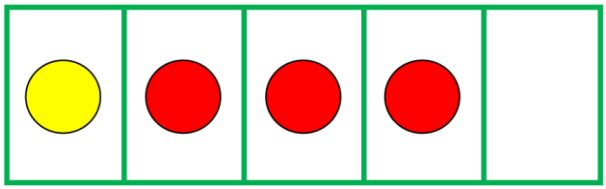
The 5-Bar: Adding within 5

Example: *What is 1 add 3?*

Step 1: Show the augend (1) by placing counters in the boxes

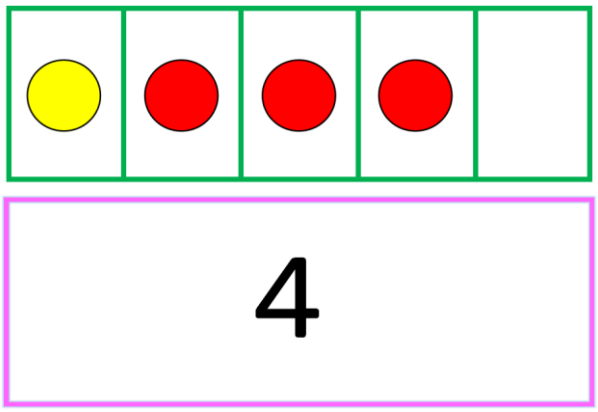


Step 2: Add the number of counters shown by the addend (3)



Step 3: Talk about what they notice (*1 add 3 is 4*)

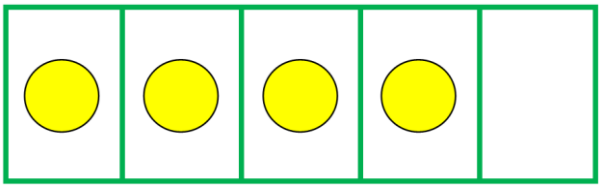
Step 4 (optional): Write the total in the purple box



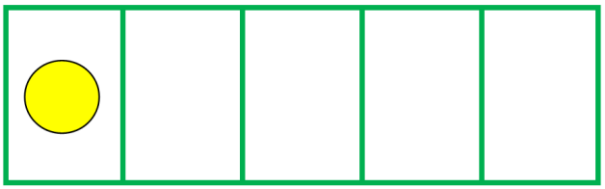
The 5-Bar: Subtracting within 5

Example: *What is 4 take away 3?*

Step 1: Show the minuend (4) by placing counters in the boxes

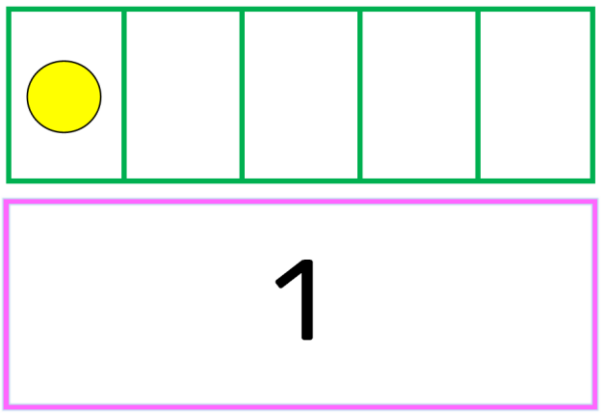


Step 2: Remove the number of counters shown by the subtrahend (3)



Step 3: Talk about what they notice (*4 take away 3 is 1*)

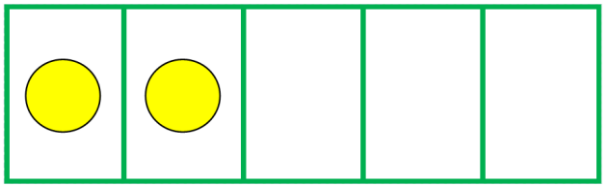
Step 4 (optional): Write the total in the purple box



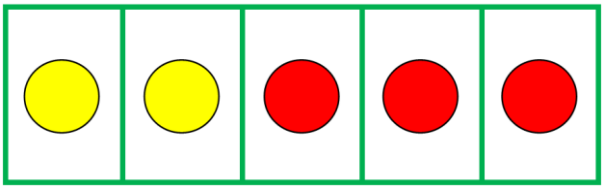
The 5-Bar: Number bonds to and within 5

Example: *2 and 'what' make 5*

Step 1: Show the augend (2) using counters of the same colour

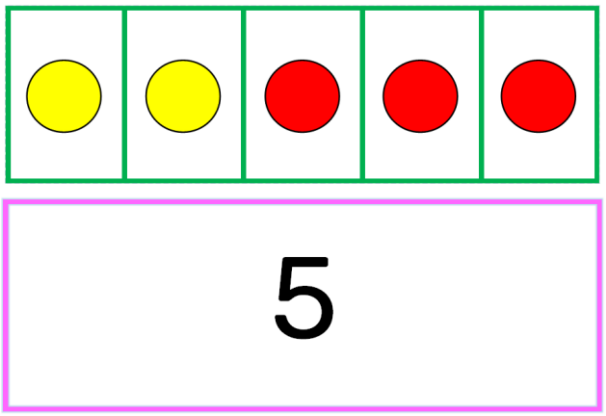


Step 2: Fill the other boxes with counters of a different colour



Step 3: Talk about what they notice (*2 and 3 makes 5*)

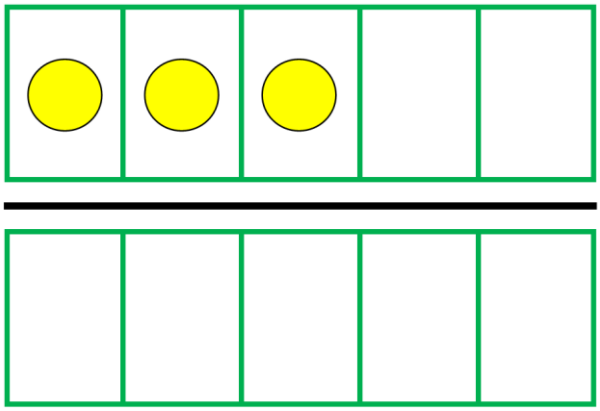
Step 4 (optional): Write the total in the purple box



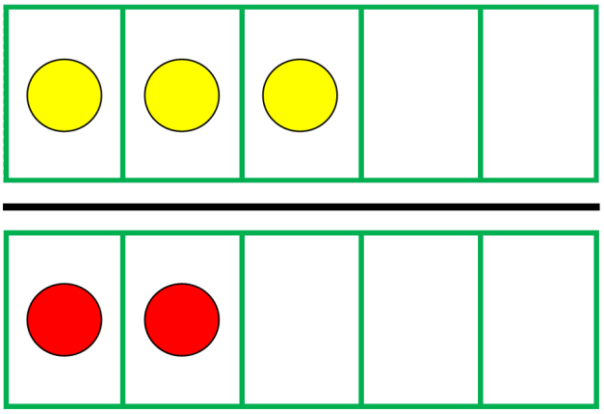
The 5-Bar: Comparing numbers within 5

Example: *What is more, 3 or 2?*

Step 1: Fill in counters for the first amount (3)



Step 2: Fill in counters for the second amount (2), using a different colour

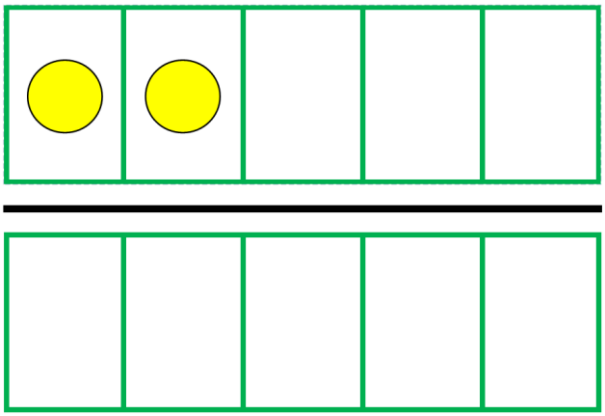


Step 3: Talk about what they notice (*3 is more than 2)*

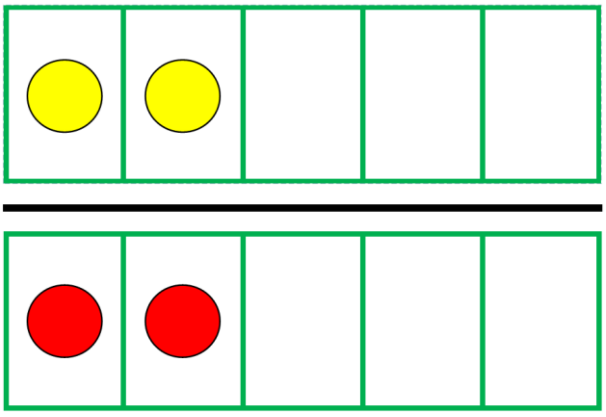
The 5-Bar: Doubling

Example: *What is double 2?*

Step 1: Fill the top 5-bar with 2 counters



Step 2: Fill the lower 5-bar with 2 counters

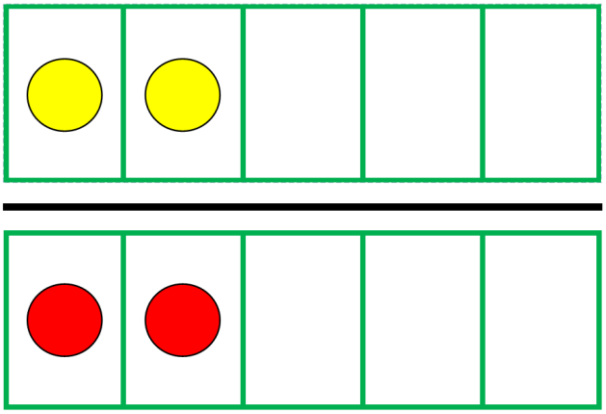


Step 3: Talk about what they notice (*double 2 is 4)*

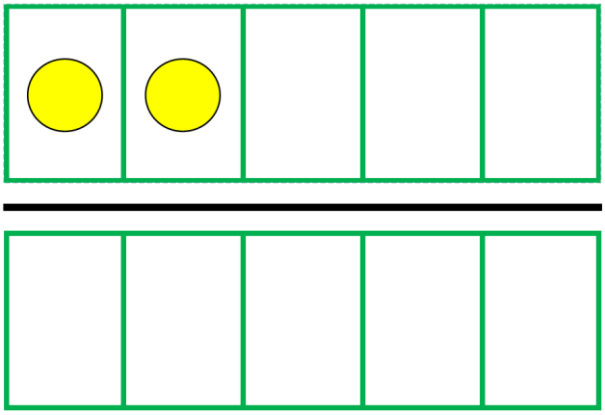
The 5-Bar: Halving

Example: *What is half of 4?*

Step 1: Share out the counters equally into both 5-bars, using different colours as seen in the picture

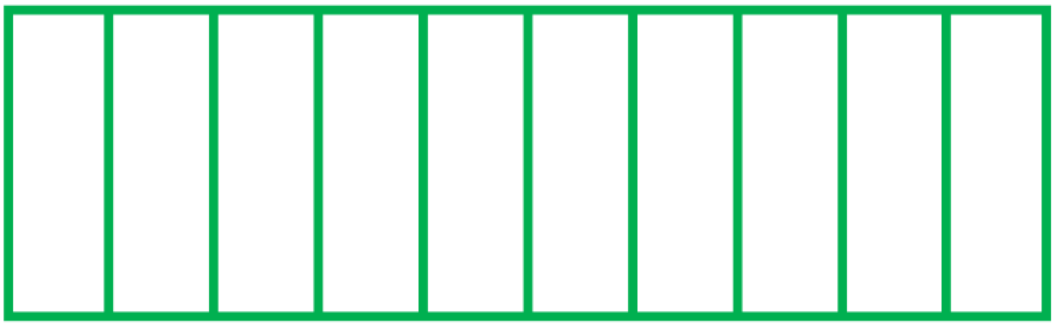


Step 2: Halve the amount by removing the counters from the lower 5-bar



Step 3: Talk about what they notice (*half of 4 is 2)*

The 10-Bar



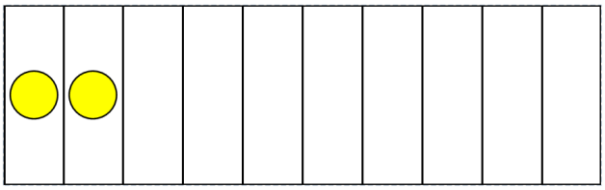
Stage:	Humans working with numbers to 10 who are counting rather than calculating
General skills:	• 1:1 correspondence • Understanding what quantities look like • Visualising an internal number line
Specific skills:	• One more, one less within 10 • Adding and subtracting within 10 • Number bonds to and within 10 • Comparing numbers (using two 10-Bars) • Doubling and halving (using two 10-Bars) • Simple multiples
Details:	• The green boxes are the 'bars' • A variation of the 10-Bar includes numerals written into the 'bars' – this is known as a number track

As the 10-Bar is simply an extension of the '5-Bar Model', I will just do an example for the multiples of 2.

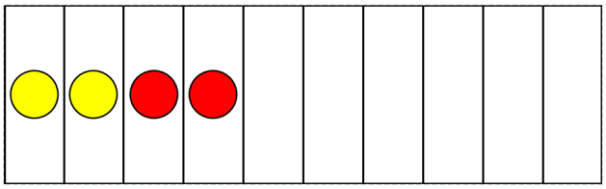
The 10-Bar: Introducing multiples of 2

Example: *Count in 2s up to 10*

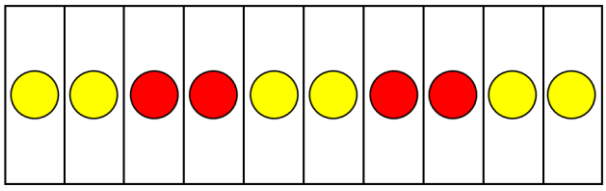
Step 1: Place a counter (same colours) in each of the first 2 boxes



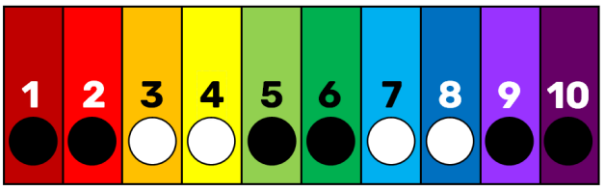
Step 2: Place the next 2 counters using the other colour



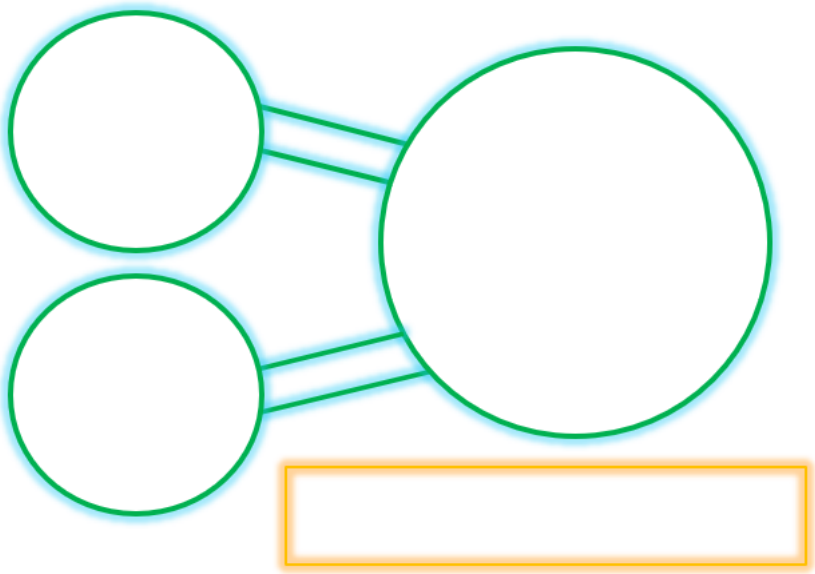
Step 3: Repeat until the bar is full



Step 4: Count in 2s using the counters for support – 2, 4, 6, 8, 10 (or use the number track as seen in this picture



The Part-Whole



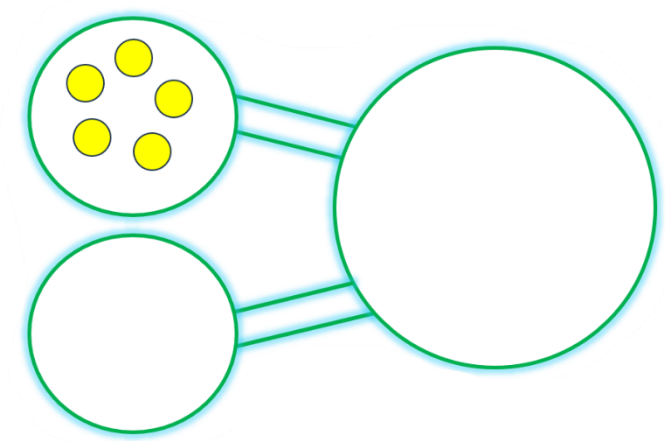
Stage:	Humans working with numbers to 10 who are beginning to understand addition and subtraction*
General skills:	• Understanding what quantities look like • Exploring relationships between numbers • Solving simple worded problems
Specific skills:	• Adding and subtracting within 10 • Number bonds • Inverse relationship of addition and subtraction
Details:	• The smaller circles are the ‘parts’ • The larger circle is the ‘whole’ • The orange box is for doing any written calculations

*The ‘Part-Whole’ can be used for numbers larger than 10, but at this point it would be practical to write in numbers rather than use counters.

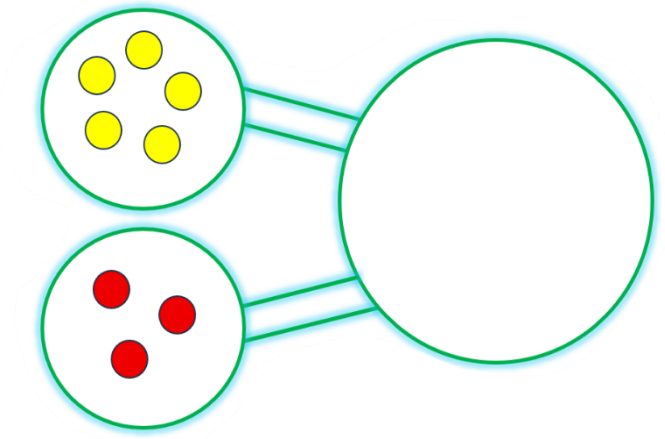
Part-Whole: Adding within 10

Example: *Calculate 5 + 3*

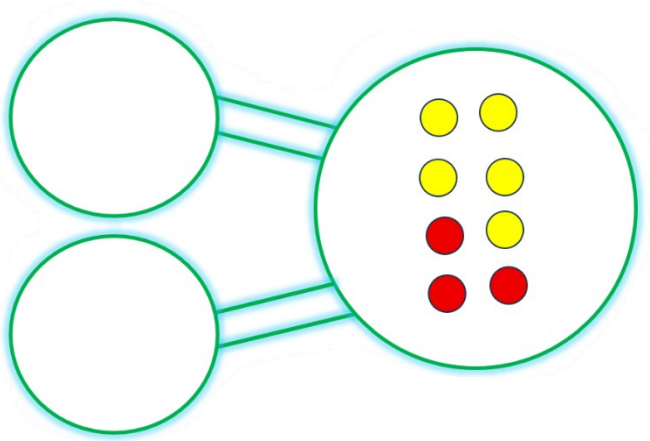
Step 1: Place counters (same colour) in one of the ‘parts’ to show the augend (5)



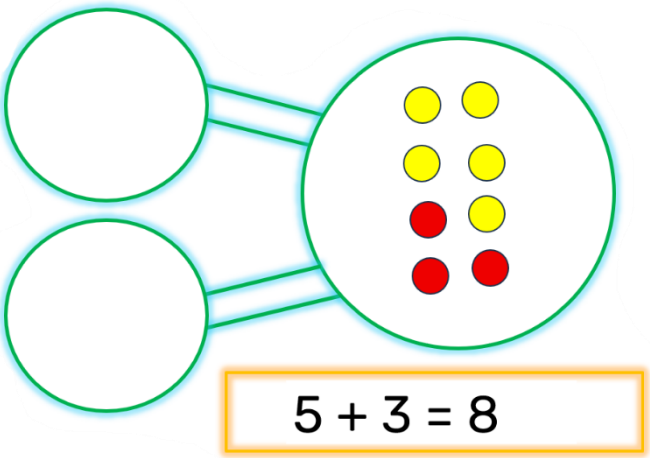
Step 2: Place counters of the same colour, but different to the first group, in the other ‘part’ to show the addend (3)



Step 3: Move the counters from both ‘parts’ into the whole and count them



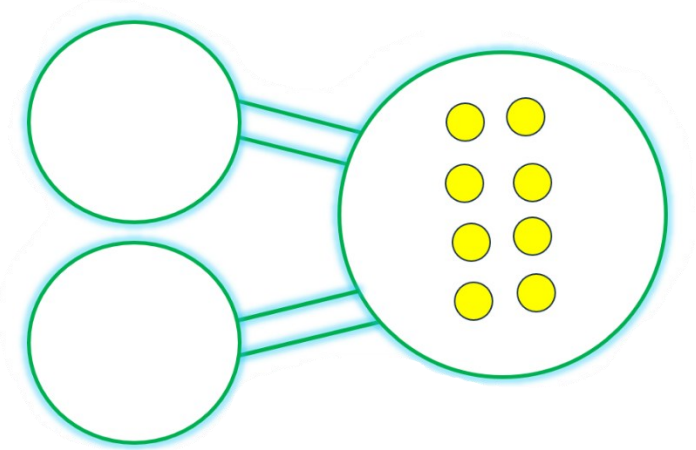
Step 4 (optional): Write a number sentence in the orange box to show what has happened



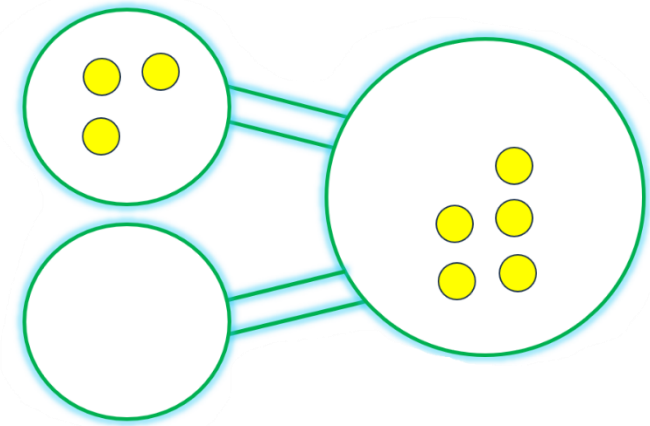
Part-Whole: Subtracting within 10

Example: *Calculate 8 - 3*

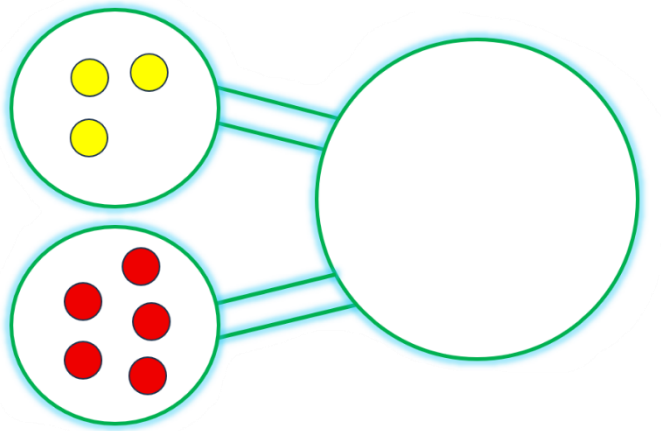
Step 1: Place counters of the same colour in the ‘whole’ to show the minuend (8)



Step 2: Move the amount shown by the subtrahend (3) into one of the parts

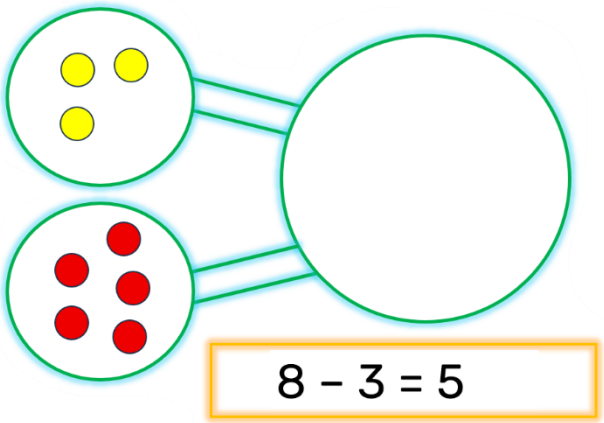


Step 3: Move the remaining counters from the whole into the other ‘part’ and count them (in this picture I have used 2-sided counters, but this is not essential)



Step 4: Talk about what has happened

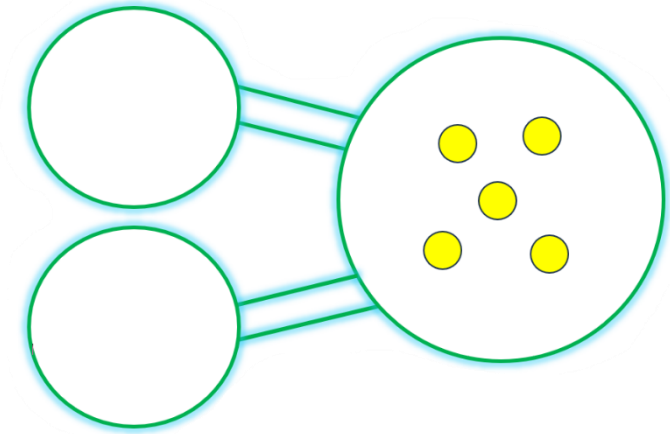
Step 5: Write a number sentence in the orange box to show what has happened



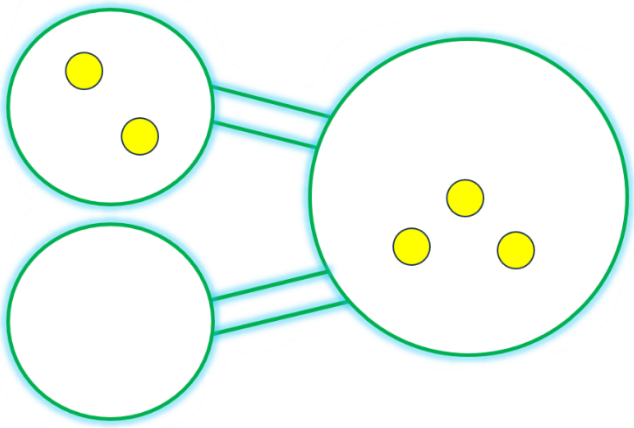
Part-Whole: Number bonds

Example: *Show the number bonds to 5*

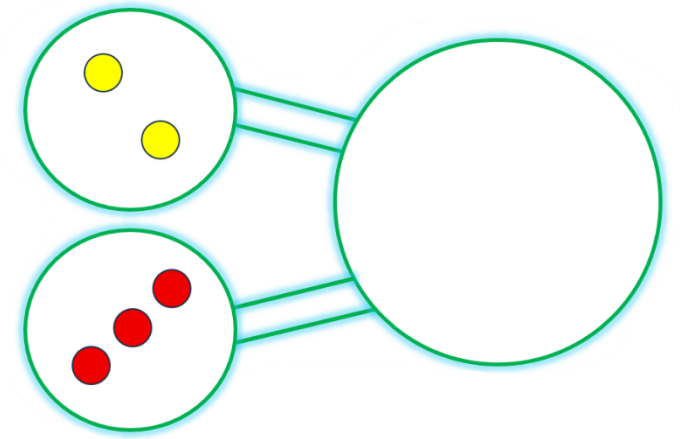
Step 1: Place counters in the ‘whole’ to show your number (5)



Step 2: Move any number of counters into one of the ‘parts’

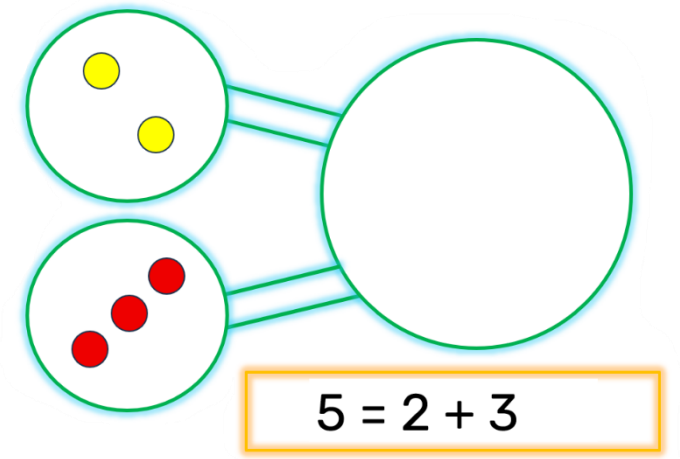


Step 3: Move the remaining counters from the whole into the other ‘part’



Step 4: Talk about what has happened and repeat to find the other number bonds

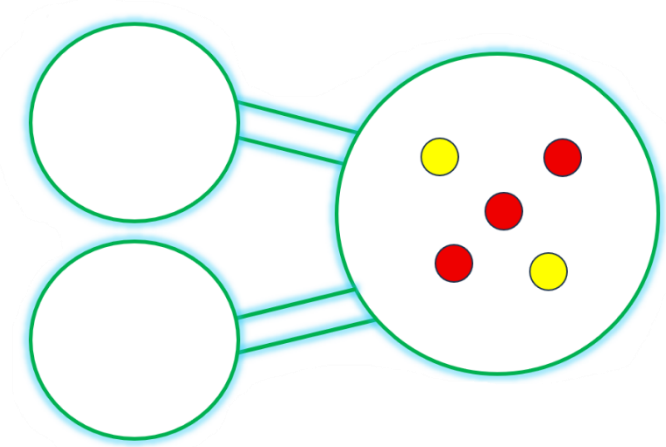
Step 5 (optional): Write a number sentence in the orange box to show what has happened



Part-Whole: Inverse relationship with addition and subtraction

Example: *If 2 + 3 = 5, what else do you know?*

Step 1: Place counters in the 'parts' model to show the calculation, using different colours for each 'part'

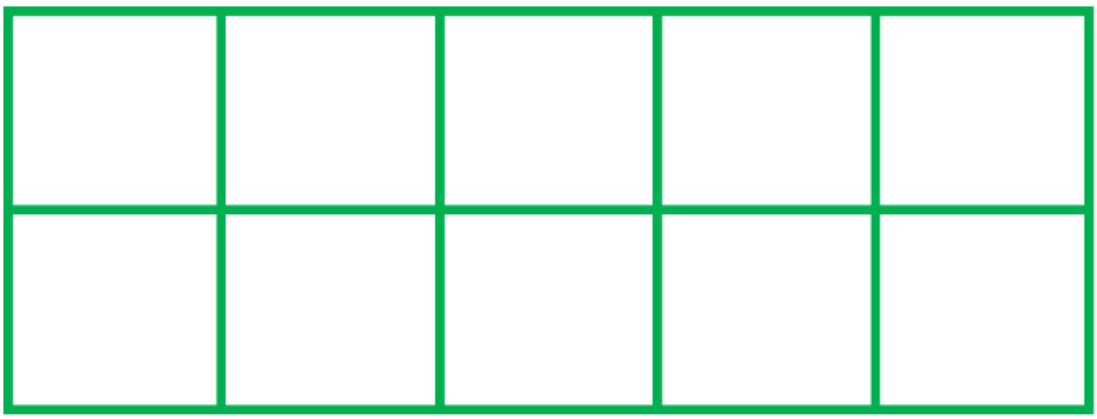


Step 2: Move the counters around and discuss what other addition number sentence can be made (eg. 2 + 3 = 5)

Step 3: Move the counters around and discuss what other subtraction number sentences can be made (eg. 5 – 2 = 3)

Step 4 (optional): Write number sentences in the orange box to show what has happened

The 10-Frame

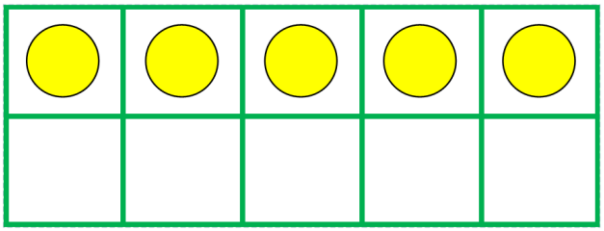


Stage:	Humans working with numbers to 20 who are moving from counting to calculating
General skills:	• Helps to recognise amounts without counting • Visualising addition and subtraction • Understanding how numbers from 11 to 20 are formed
Specific skills:	• Adding and subtracting within 10 • Number bonds to and within 10 and 20 • Comparing numbers • Addition and subtraction by bridging 10 • Place Value for numbers to 20 • Subtracting 10s and 1s • Doubling and halving
Details:	• The green boxes are the ‘frame’ • Double 10-Frames are used when working with numbers from 11 to 20

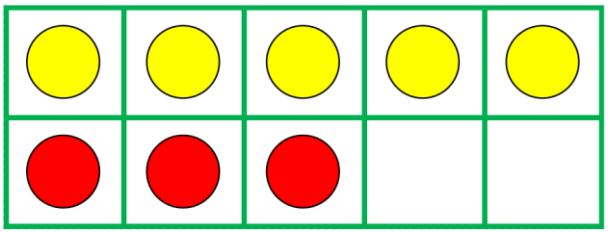
The 10-Frame: Adding within 10

Example: *Calculate 5 + 3*

Step 1: Place counters of the same colour to show the augend (5)

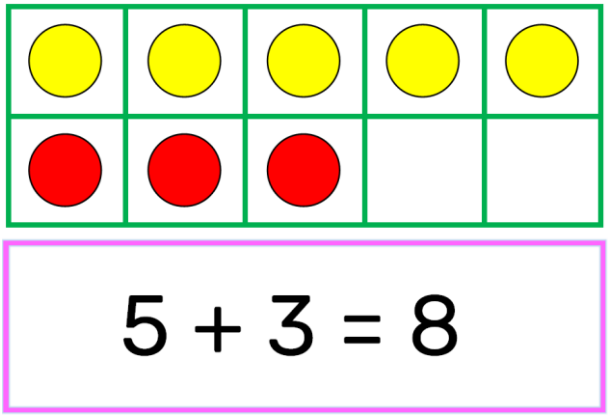


Step 2: Add counters to show the number being added (3), using a different colour



Step 3: Add the counters together, encouraging children to **count on from 5**

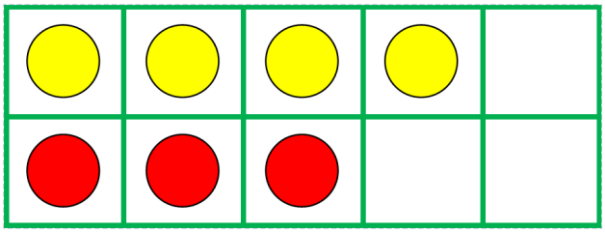
Step 4: Write a number sentence in the purple box (optional)



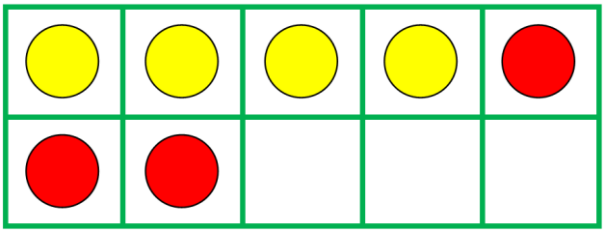
The 10-Frame: Adding within 10 (again)

Example: *Calculate 4 + 3*

Step 1: Place counters in the 10-Frame to show the calculation

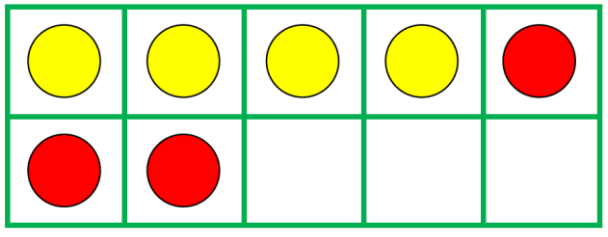


Step 2: Move a counter from the lower row to make 5 on the top row



Step 3: Add the counters together, encouraging children to **count on from 5**

Step 4: Write a number sentence in the purple box (optional)

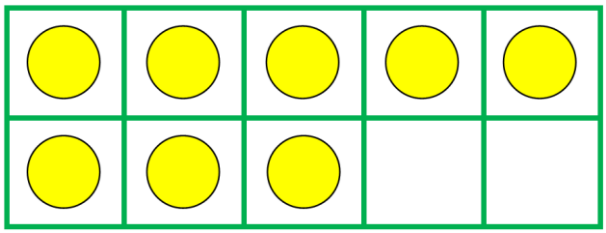


$$4 + 3 = 7$$

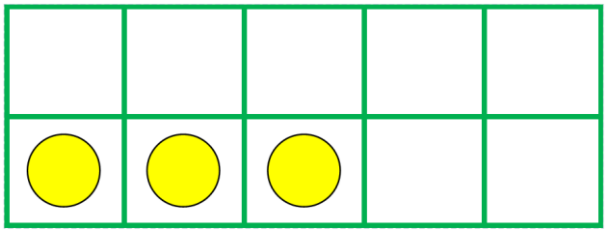
The 10-Frame: Subtracting within 10

Example: *Calculate 8 - 5*

Step 1: Place counters in the 10-Frame showing the minuend (8)

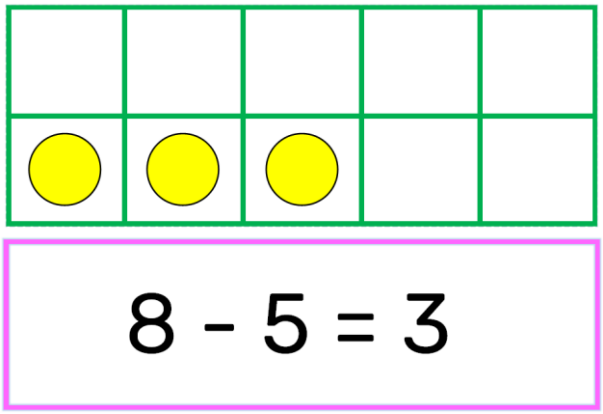


Step 2: Remove the subtrahend (5) – in this case it is easiest to remove the top row



Step 3: Encourage the class to write down their answer without counting individual counters

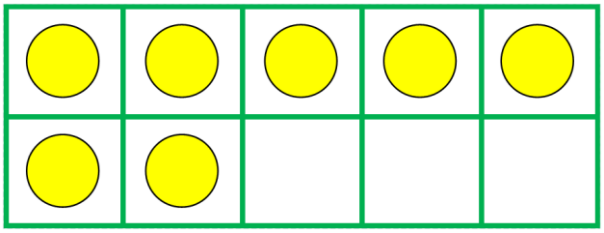
Step 4: Write a number sentence in the purple box (optional)



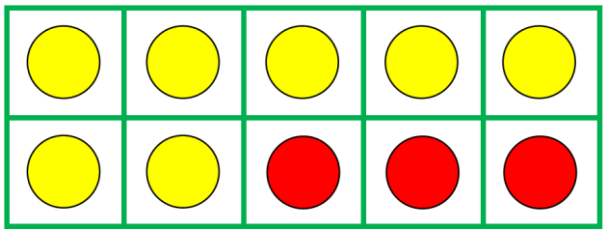
The 10-Frame: Number Bonds to 10

Example: *7 + ? = 10*

Step 1: Place counters in the 10-Frame to show the starting number (7)

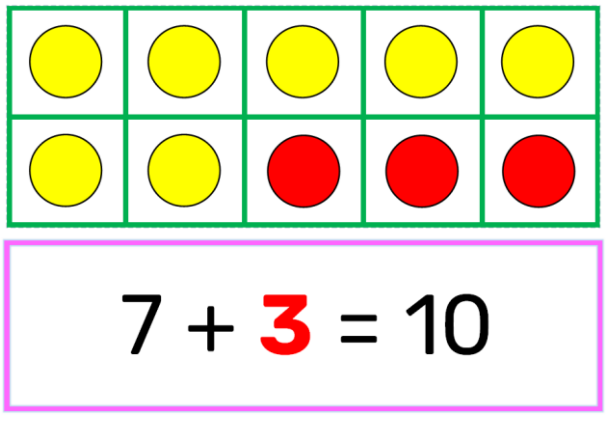


Step 2: Fill in the rest of the 10-Frame using a different colour



Step 3: Identify the amount of the second colour, without counting individual counters

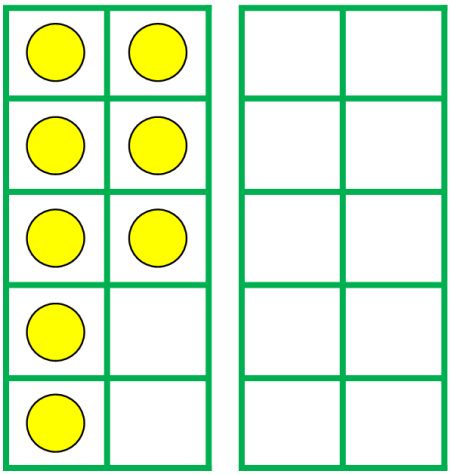
Step 4: Write a number sentence in the purple box (optional)



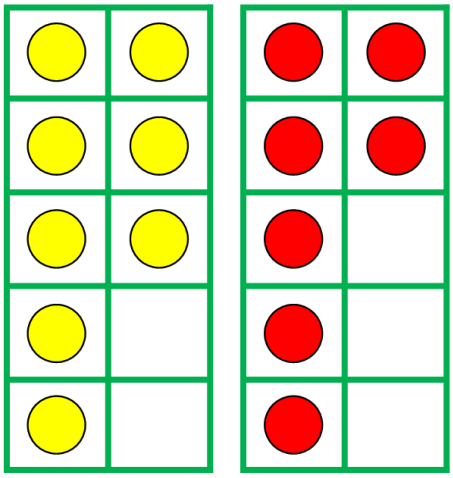
The 10-Frame: Comparing numbers

Example: *Compare the size of 8 and 7*

Step 1: Place counters in the first 10-Frame to show the first amount (8)



Step 2: Place counters in the second 10-Frame to show the second amount (7)



Step 3: Write an inequality statement in the purple box (e.g. 8 > 7)

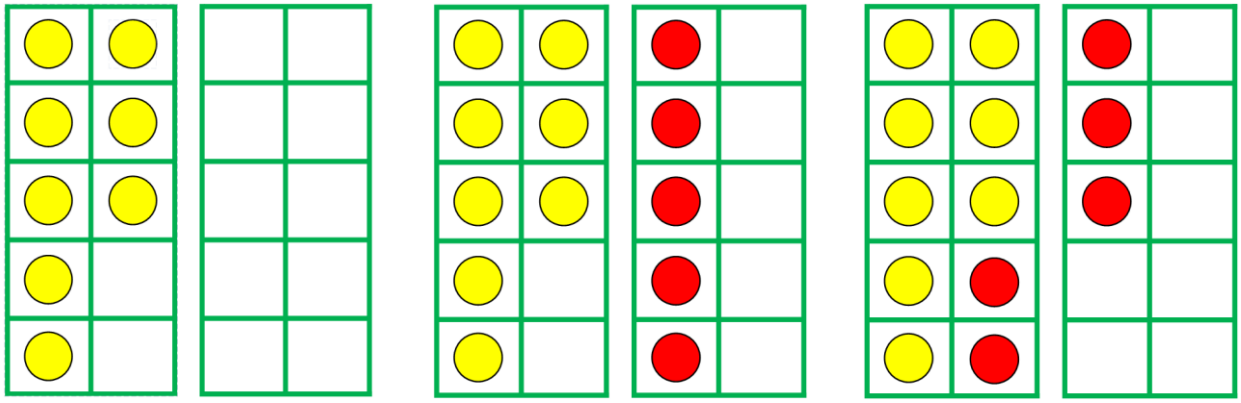
The 10-Frame: Addition by bridging 10

Example: *8 + 5 =*

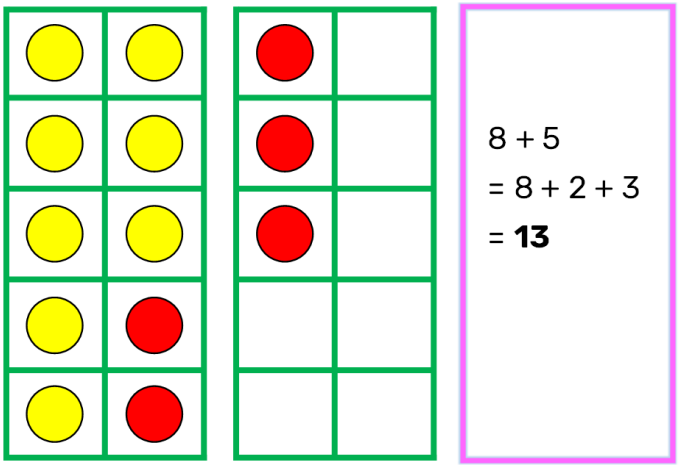
Step 1: Place counters in the first 10-Frame to show the larger amount (8)

Step 2: Place counters in the second 10-Frame to show the other amount (5)

Step 3: Move counters from the second 10-Frame into gaps on the first 10-Frame



Step 4: Write a number sentence in the purple box



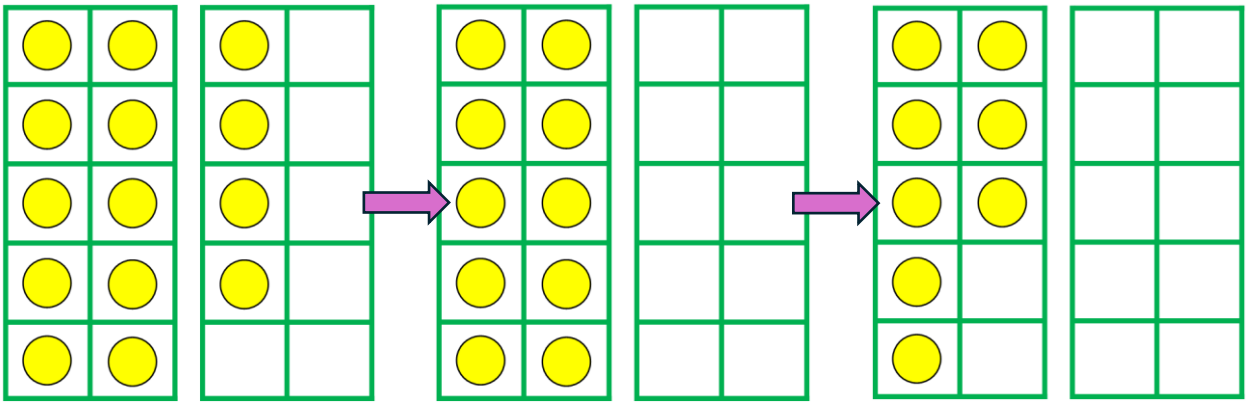
Step 5: Talk about how the smaller number was broken down to make a number bond to 10 (e.g. 8 + 5 = 8 + 2 + 3 = 13)

The 10-Frame: Subtraction by bridging 10

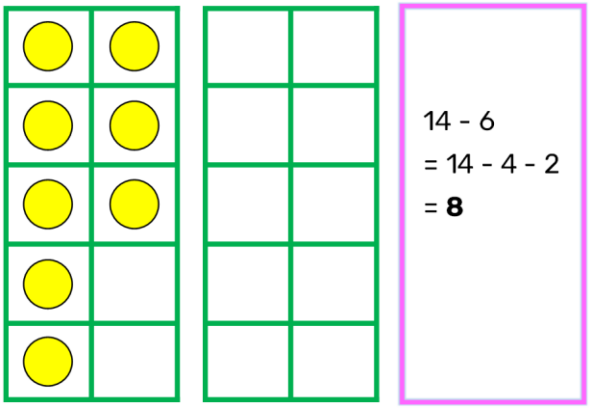
Example: *14 - 6 =*

Step 1: Place counters to show the minuend (14)

Step 2: Remove the counters shown by the subtrahend (6) – remove any from the second 10-Frame first



Step 3: Write a number sentence in the purple box which describes the movement of the counters



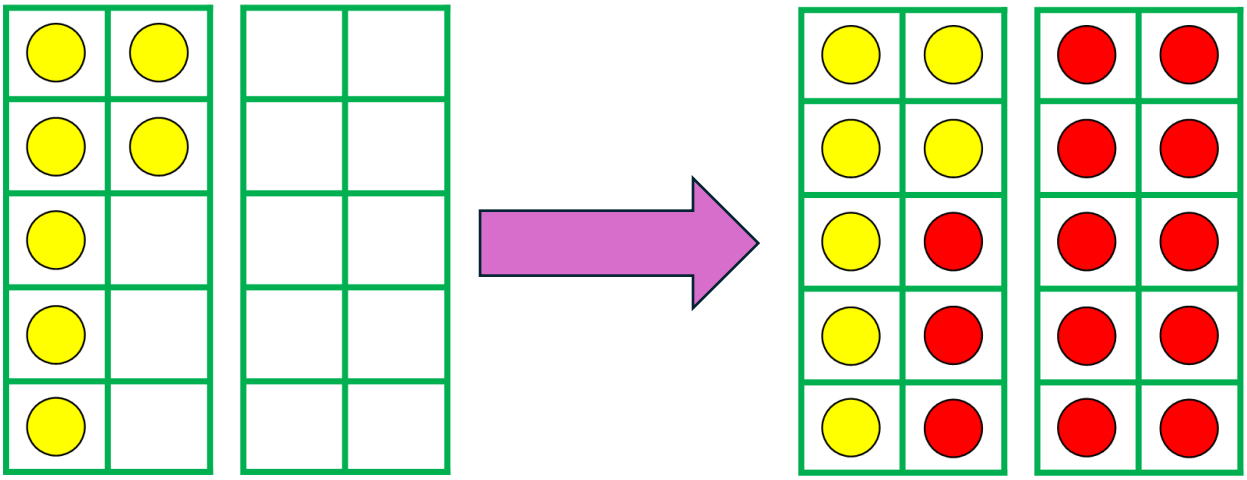
Step 4: Talk about how the number that was subtracted was broken down so that it first reached 10 before removing the final counters (e.g. 14 - 6 = 14 - 4 - 2 = 8)

The 10-Frame: Number bonds to 20

Example: *7 + ? = 20*

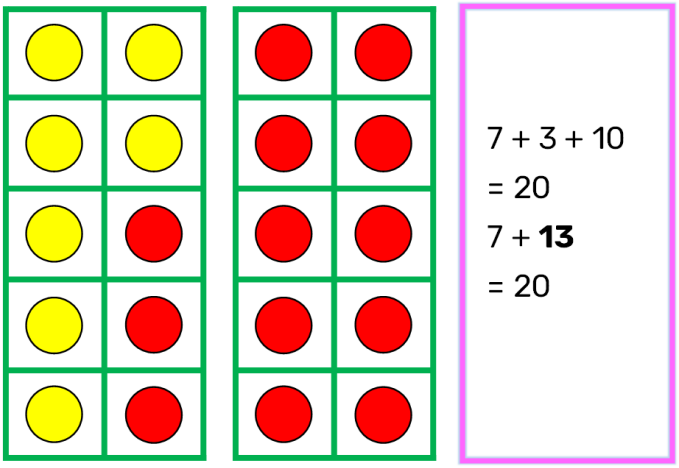
Step 1: Place counters in the 10-Frame to show the starting amount (7)

Step 2: Fill in the rest of the 10-Frame using a different colour – some children may not need to use the second set of counters as they will see the amount remaining



Step 3: Identify the amount of the second colour, without counting individually

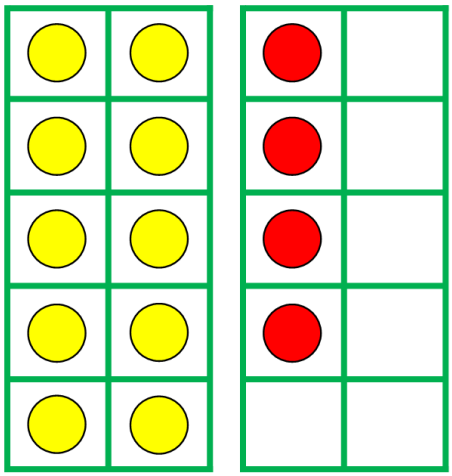
Step 4: Write a number sentence in the purple box



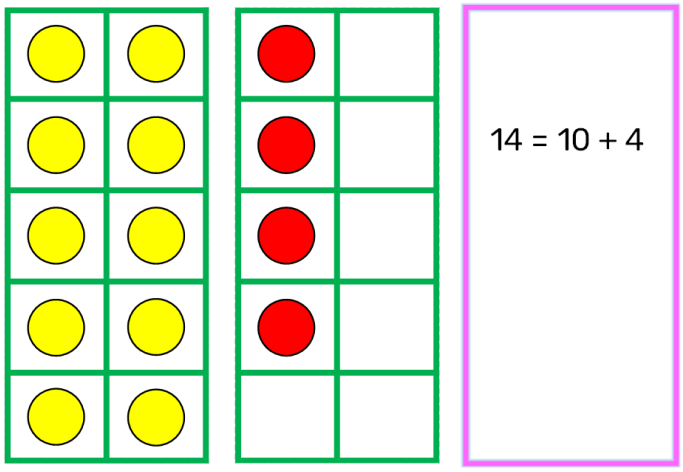
The 10-Frame: Place value to 20

Example: *Break the number 14 into 10s and 1s*

Step 1: Place counters in the 10-Frame to show the amount (14) – use of 2 different colours is optional



Step 2: Write a number sentence in the purple box which show the number breaking into 10s and 1s – encourage children to 'see' and not 'count' the counters



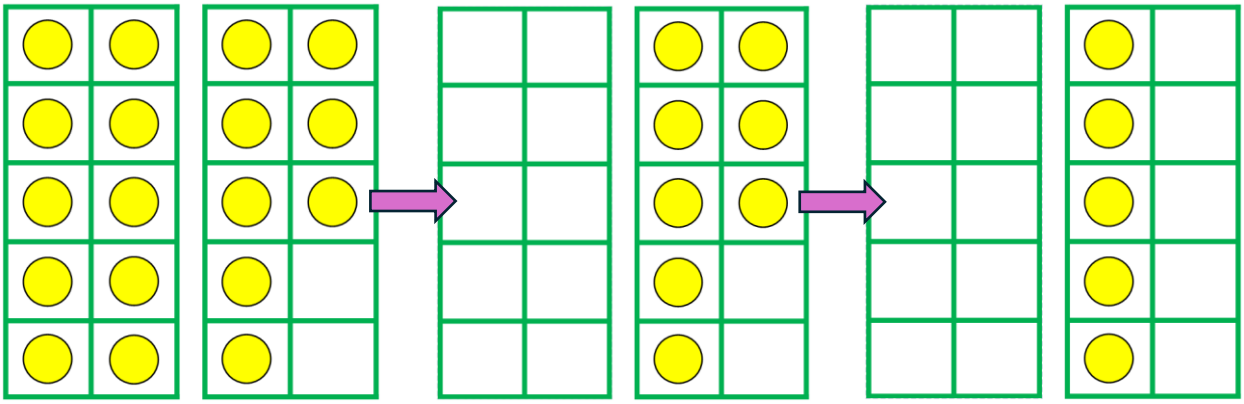
Step 3: Talk about what they notice ie. The '1' in '14' always represents '10'

The 10-Frame: Subtracting 10s and 1s

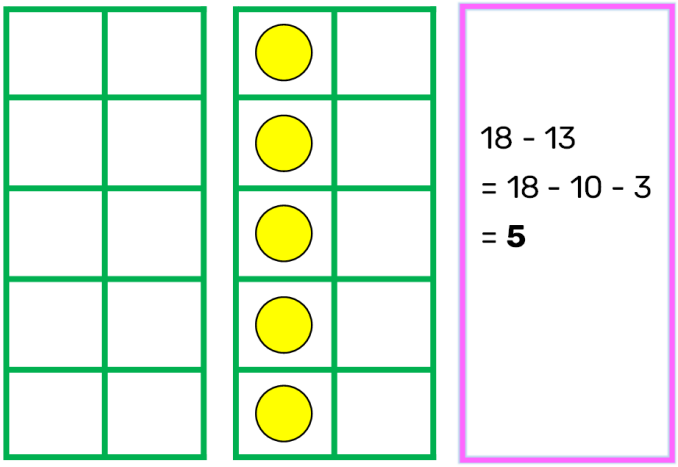
Example: *18 - 13*

Step 1: Place counters in the 10-Frame to show the minuend (18)

Step 2: Remove the counters shown by the subtrahend (13) by removing 10 then 3



Step 3: Write a number sentence in the purple box which describes the movement of counters

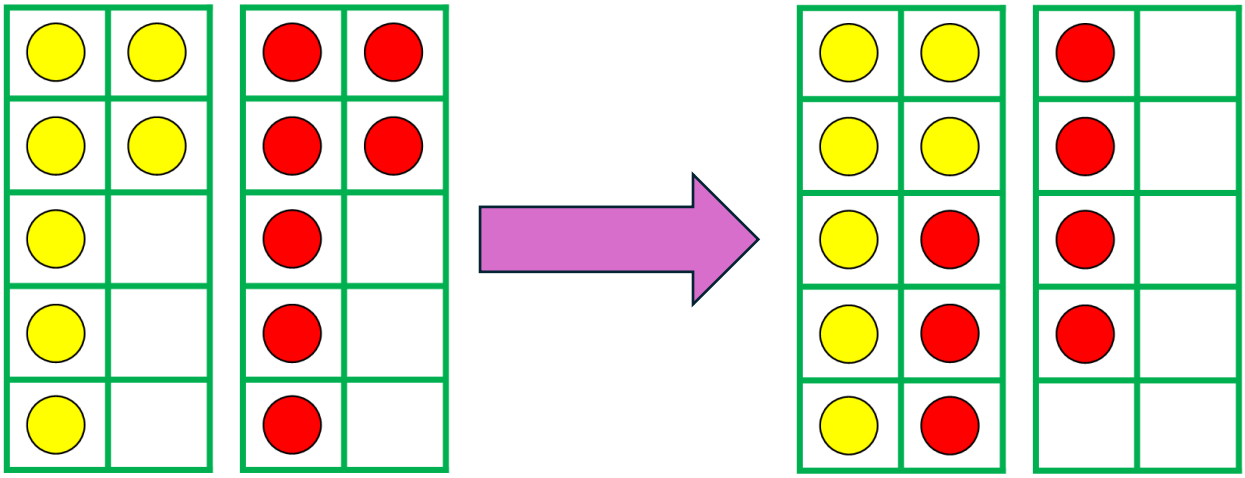


The 10-Frame: Doubling

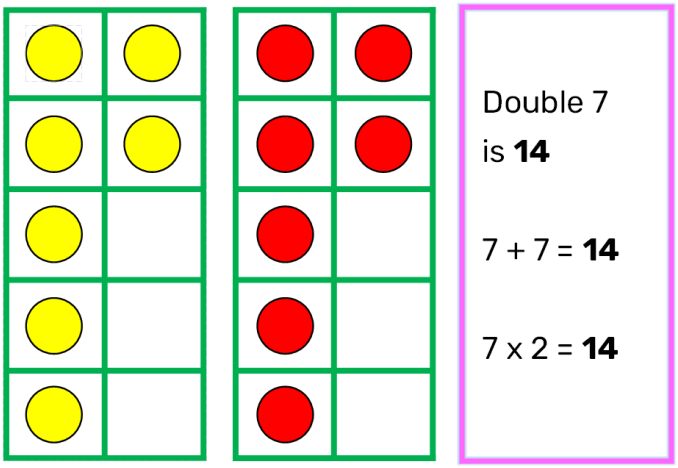
Example: *Double 7*

Step 1: Place counters in the 10-Frames to show the number (7) doubled

Step 2: Move counters from the second 10-Frame into gaps on the first 10-Frame



Step 3: Write number sentences in the purple box which describes the process of doubling (7 + 7 and 7 x 2)



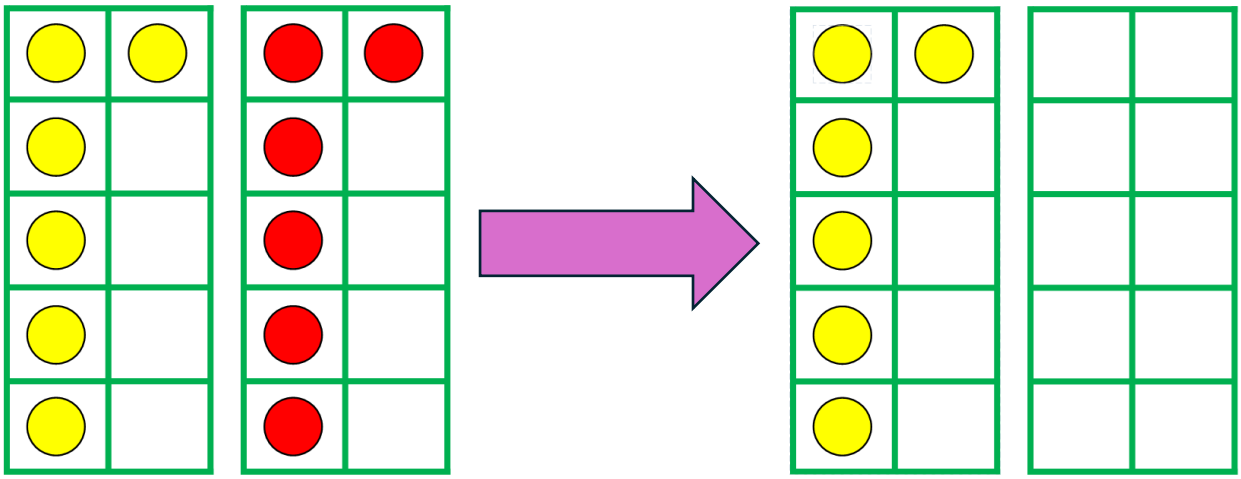
Step 4: Talk about how the number sentences relate to doubling

The 10-Frame: Halving

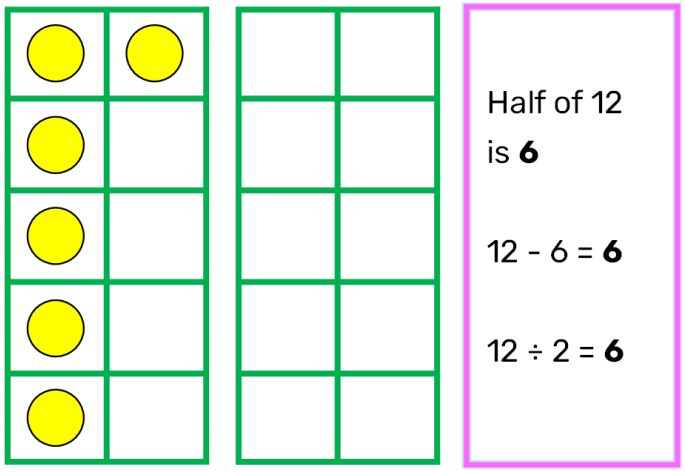
Example: Find half of *12*

Step 1: Share out the counters into both 10-Frames, using 2 different colours

Step 2: Remove counters from one of the 10-Frames

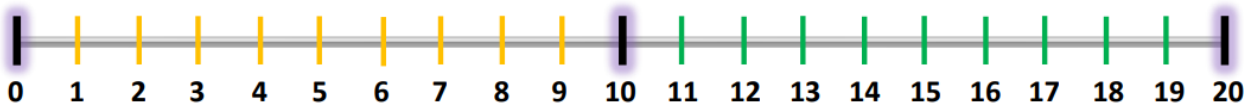


Step 3: Write number sentences in the purple box which describes the process of halving (12 - 6 and 12 ÷ 2)



Step 4: Talk about how the number sentences relate to halving

Number Lines



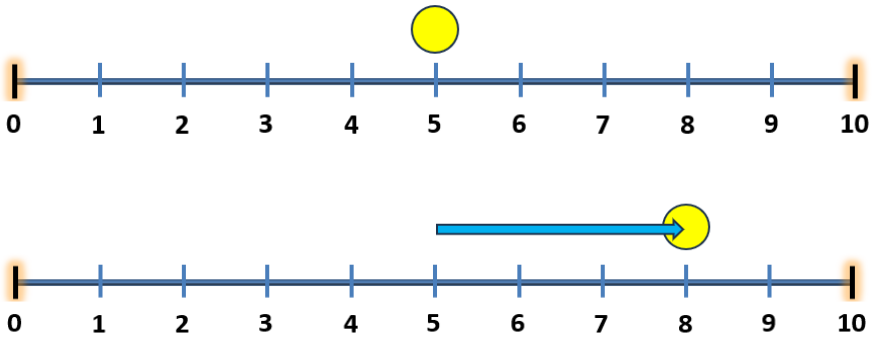
Stage:	Humans working with numbers to 20 who know what quantities the numerals represent
General skills:	• Seeing the relative nature of numbers • Visualising addition and subtraction
Specific skills:	• Adding and subtracting within 10 • Number bonds to and within 10 and 20 • Comparing numbers • Addition and subtraction by bridging 10 • Place Value for numbers to 20 • Subtracting 10s and 1s • Doubling and halving
Details:	• On the 0 to 20 number line a marker is placed at 10 to help with bridging 10 calculations • Empty number lines (no numerals marked) can also be used but they are more advanced

Number Line: Counting on

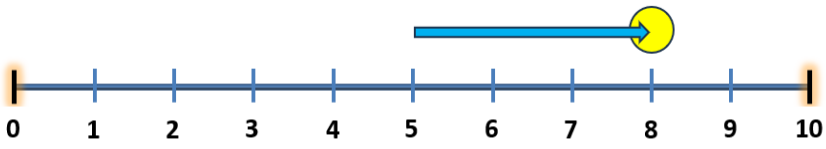
Example: *5 + 3 =*

Step 1: Place a finger (or a counter) on the augend (5)

Step 2: Move along the number of spaces that is being added (3) – initially you'll find most humans will jump one number at a time e.g. 6, 7, 8. This is fine but gradually encourage them to make one jump (3 in this case) when adding within 10



Step 3: Write a number sentence in the blue box which describes the movement of the finger / counter



$$5 + 3 = 8$$

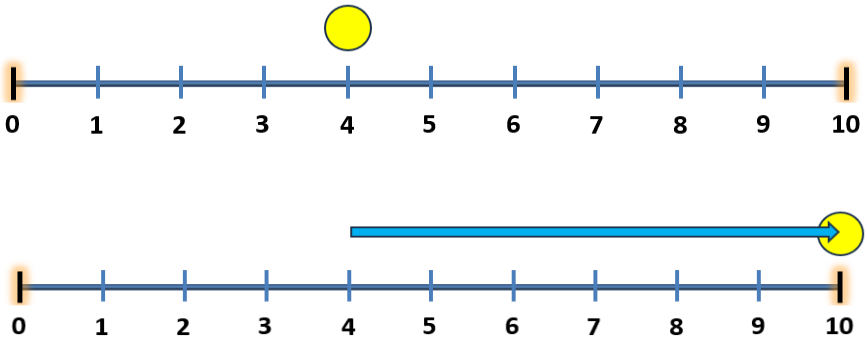
Step 4: Talk about how the calculation will give the same answer if reversed (3 + 5) and discuss whether it is easier to start with the bigger or smaller number.

Number Line: Number bonds to 10

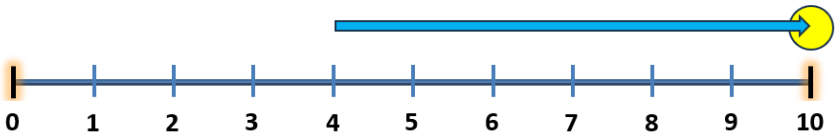
Example: *4 + ? = 10*

Step 1: Place a finger (or a counter) on the initial amount (4)

Step 2: Move along the number of spaces needed to reach 10



Step 3: Write a number sentence in the blue box which describes the movement of the finger / counter



$4 + \mathbf{6} = 10$

Step 4: Talk about how the calculation will give the same answer if you did 10 subtract the original amount

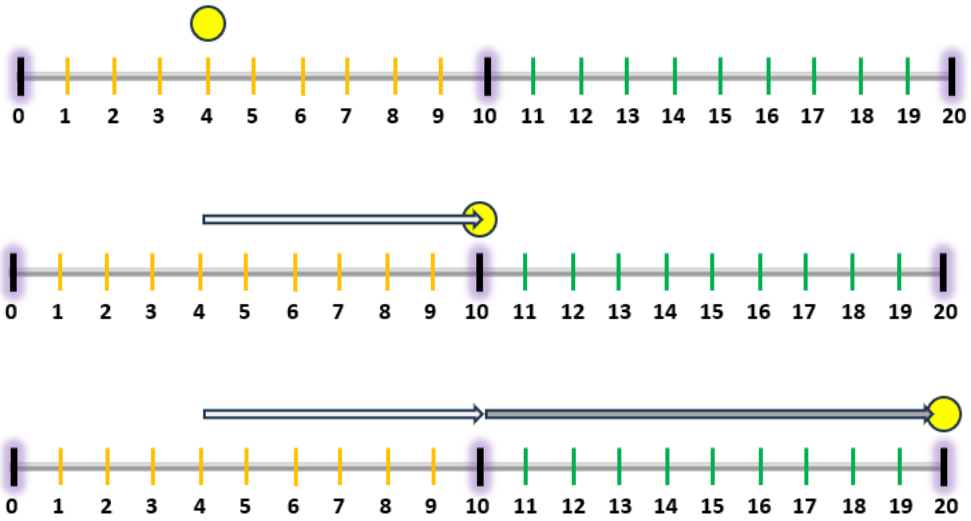
Number Line: Number bonds to 20

Example: *4 + ? = 20*

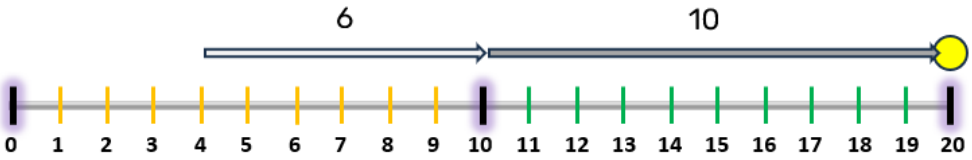
Step 1: Place a finger (or a counter) on the initial amount (4)

Step 2: Move along the number of spaces needed to reach 10

Step 3: Jump 10 to reach 20



Step 4: Write a number sentence in the blue box which describes the movement of the finger / counter



$4 + 6 + 10 = 20$

$4 + \mathbf{16} = 20$

Step 5: Talk about other ways in which this problem could have been solved e.g. add 10 first then see what else needs adding

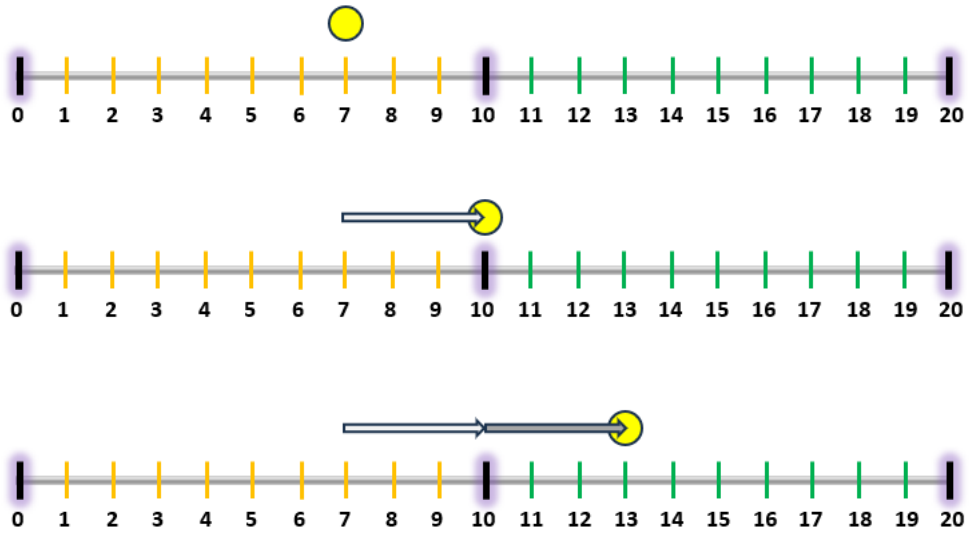
Number Line: Addition by bridging 10

Example: *7 + 6 =*

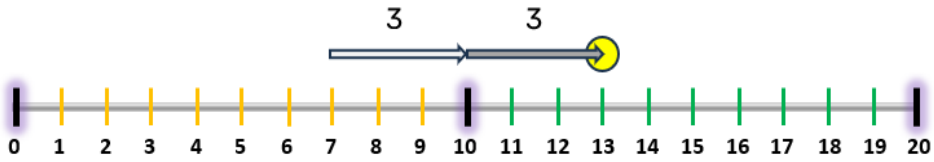
Step 1: Place a finger (or a counter) on the augend (7)

Step 2: Split the addend (6) so that you move forward the number of spaces needed to reach 10 first

Step 3: Complete the rest of the addend



Step 4: Write a number sentence in the blue box which describes the movement of the finger / counter



$$7 + 6$$
$$= 7 + 3 + 3$$
$$= 13$$

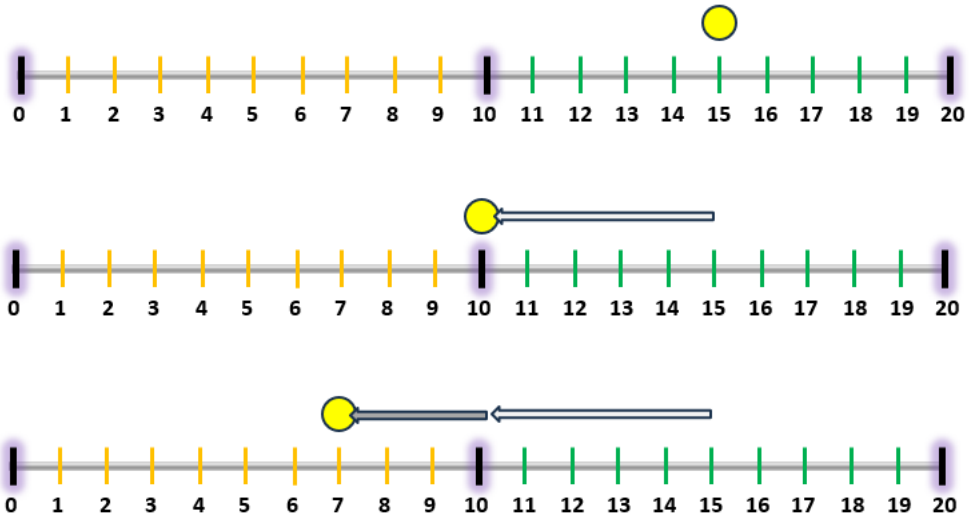
Number Line: Subtraction by bridging 10

Example: *15 - 8 =*

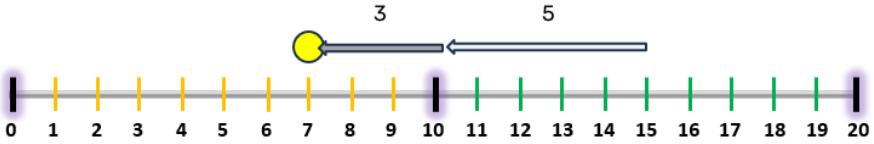
Step 1: Place a finger (or a counter) on the minuend (15)

Step 2: Split the subtrahend (8) so that you move back the number of spaces needed to reach 10 first (5)

Step 3: Complete the rest of the subtrahend (3)



Step 4: Write a number sentence in the blue box which describes the movement of the finger / counter



15 - 8

= 15 - 5 - 3

= 7

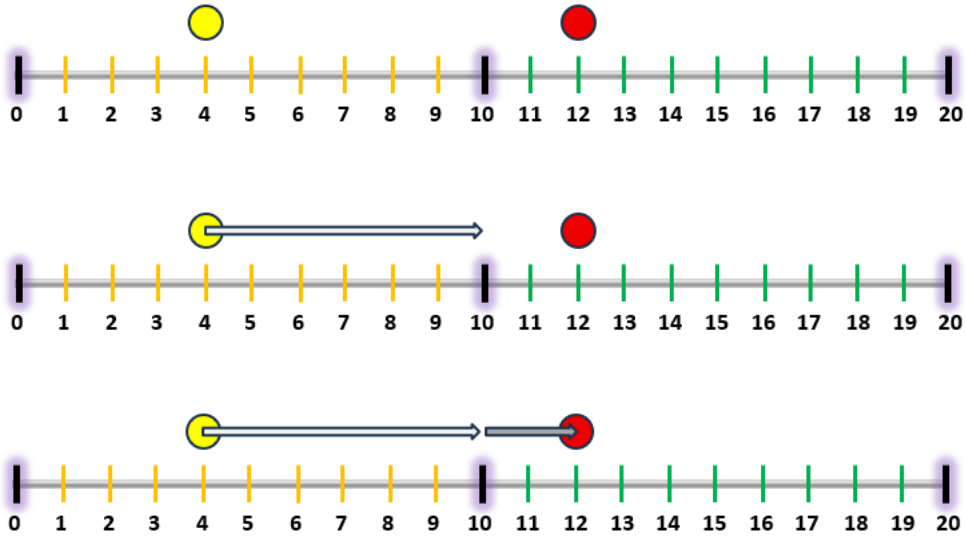
Number Line: Difference by bridging 10

Example: *Find the difference of 4 and 12*

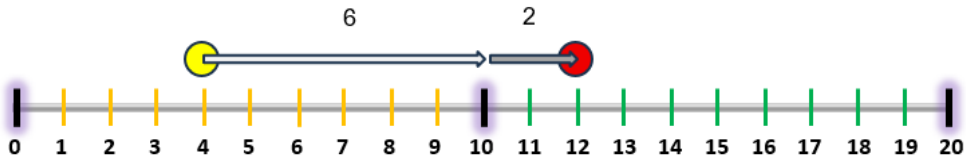
Step 1: Place a counter on each number (4 and 12)

Step 2: Starting with the lower number (4), jump to 10

Step 3: Jump from 10 to the number you want to reach (12)



Step 4: Write a number sentence in the blue box which describes the movement of the finger / counter and discuss links with subtraction (e.g. 12 -



$4 + \mathbf{6} + \mathbf{2} = 12$

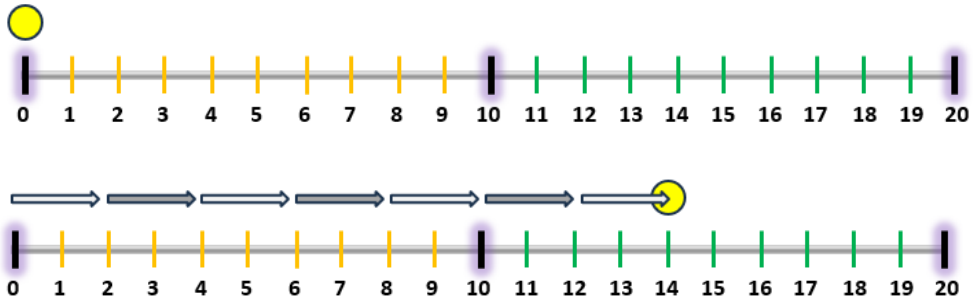
$4 + \mathbf{8} = 12$

Number Line: Multiplication (repeated addition)

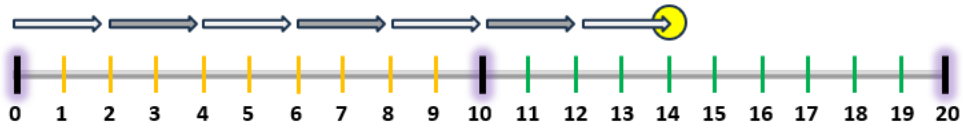
Example: *Show 7 lots of 2*

Step 1: Place a finger (or a counter) on the number you'll be repeating (2)

Step 2: Jump up in lots of that number until you have jumped the required number of times (in this example it is 7 times)



Step 3: Write addition and/or multiplication number sentences to describe the movement of the counter



$2 + 2 + 2 + 2 + 2 + 2 + 2 = \mathbf{14}$

$7 \times 2 = \mathbf{14}$

Step 4: Talk about what would happen if you reversed the numbers eg. 2 lots of 7 (commutative law)

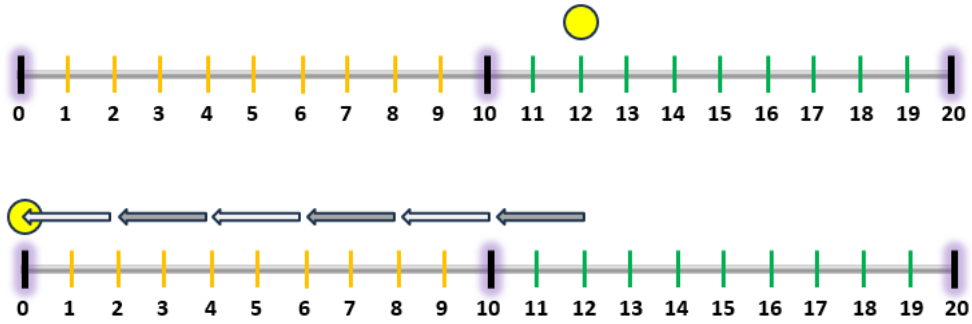
Number Line: Division

(repeated subtraction)

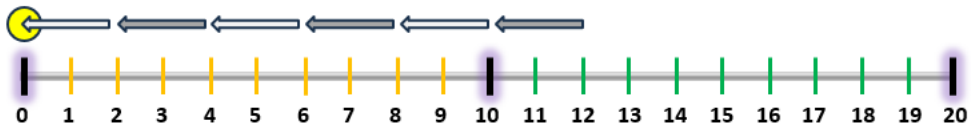
Example: *How many lots of 2 make 12?*

Step 1: Place a finger (or a counter) at the total (12)

Step 2: Jump backwards from that number until you reach 0



Step 3: Write subtraction and/or division number sentences to describe the movement of the counter



$12 - \mathbf{2} - \mathbf{2} - \mathbf{2} - \mathbf{2} - \mathbf{2} - \mathbf{2} = 0$

$12 \div 2 = \mathbf{6}$

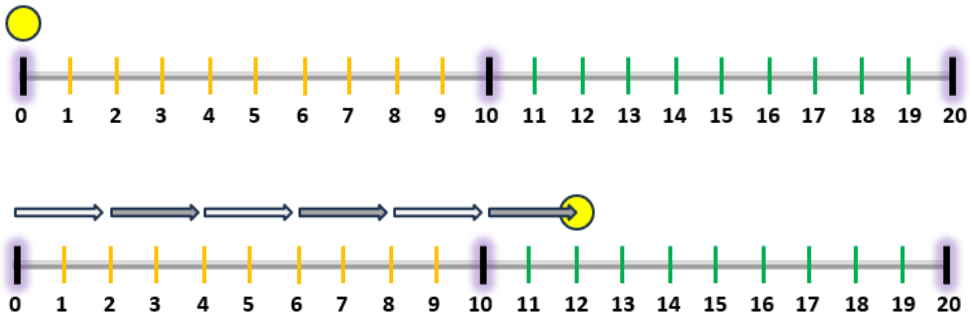
Step 4: Talk about what would happen if you started at 0 and jumped up to the number rather than starting at the number and jumping back

Number Line: Division (grouping)

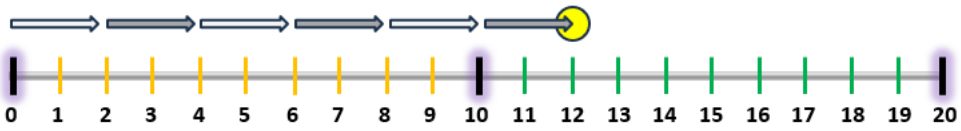
Example: *How many lots of 2 make 12?*

Step 1: Place a finger (or a counter) on 0

Step 2: Jump in groups (2) until you reach the target number (12)



Step 3: Write addition and/or division number sentences to describe the movement of the counter

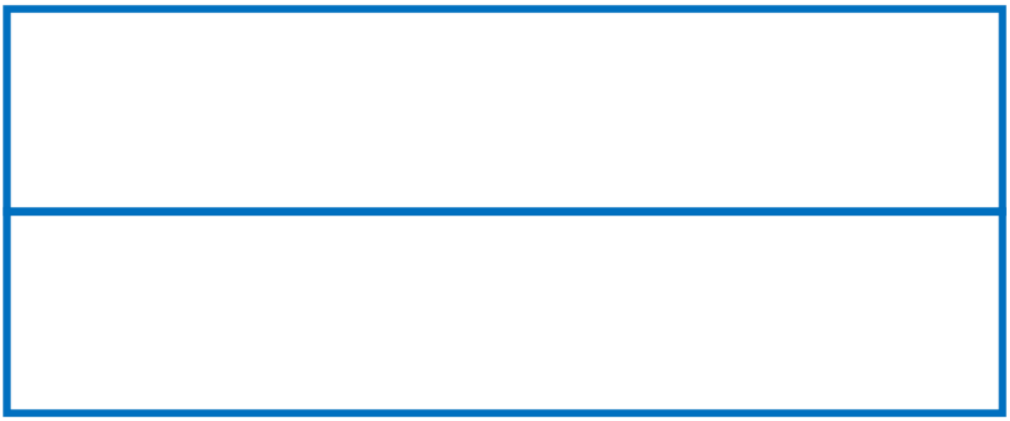


2 + 2 + 2 + 2 + 2 + 2 = 12

12 ÷ 2 = 6

Step 4: Talk about what would happen if you started at 0 and jumped up to the number rather than starting at the number and jumping back

Chapter 6: THE Bar



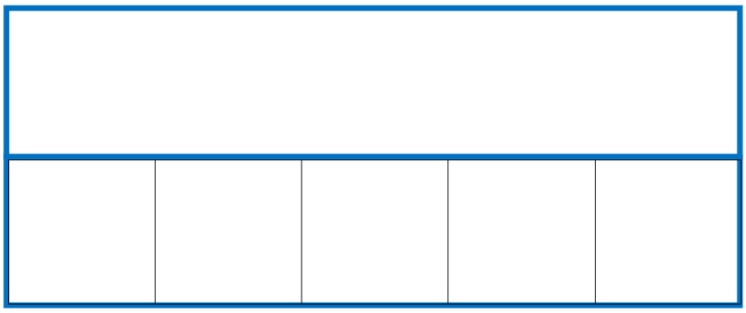
Stage:	Children confidently working with numbers to 20
General skills:	• Visualising concepts • Visualising worded problems
Specific skills:	• Problem solving with +, -, x, ÷ • Multiplying single digits • Dividing by grouping • Dividing by sharing • Finding a fraction of an amount
Details:	• The blue boxes are the ‘bars’ – the top bar acts as the ‘whole’ and the lower bar acts as the ‘parts’

Note. I am a HUGE fan of THE Bar! This guide will just touch on how it can be used for calculating but it is equally, if not more, powerful as a tool for interpreting worded problems.

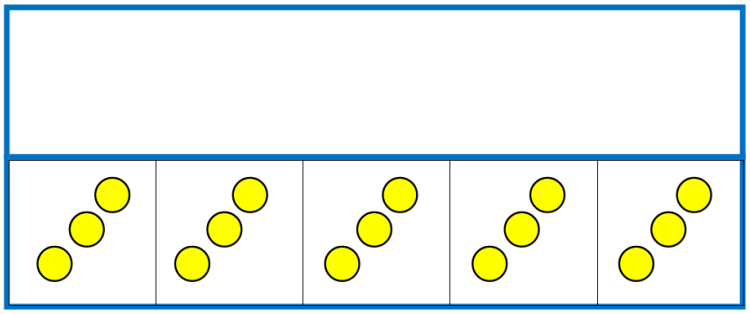
THE Bar: Multiplying

Example: *3 x 5* =

Step 1: Split the lower bar into the number of parts shown by the multiplier (5)

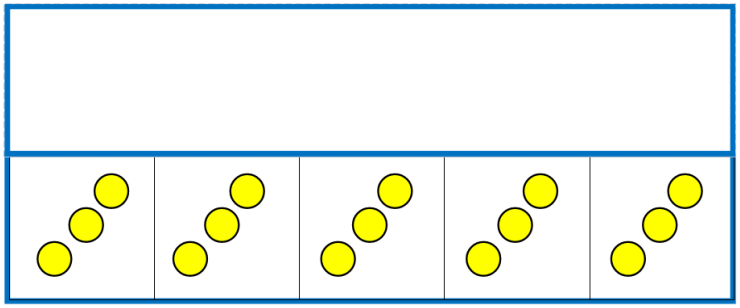


Step 2: Place the number of the multiplicand (3) in each of the boxes



Step 3: Count the total counters used

Step 4: Write the number sentence in the yellow box

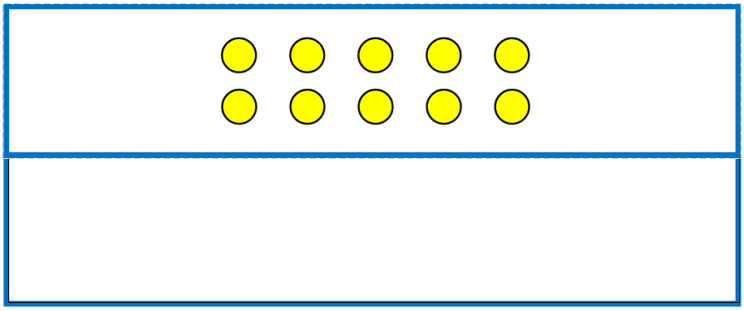


5 x 3 = **15**

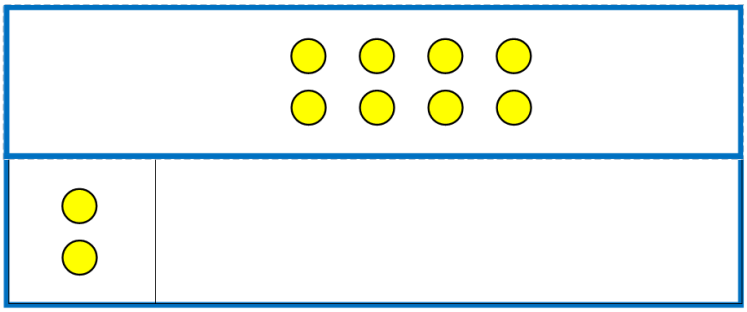
THE Bar: Dividing by grouping

Example: 10 ÷ 2

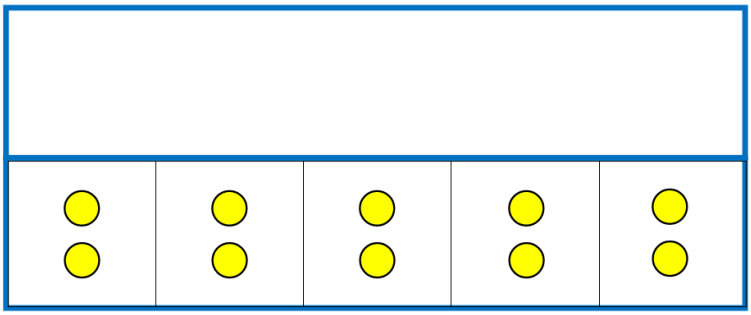
Step 1: Place counters in the top bar to show the dividend (10)



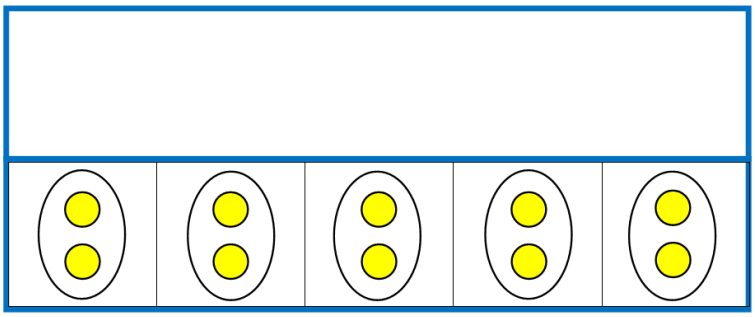
Step 2: Move the divisor (2) into the left side of the lower bar and draw a line



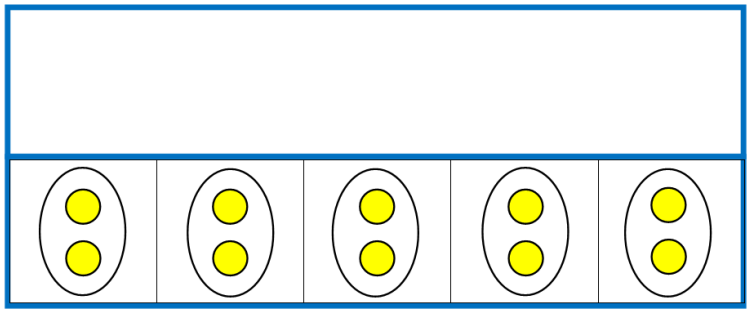
Step 3: Repeat until all the counters have been used



Step 4: Count the total number of groups



Step 5: Write a number sentence in the yellow box

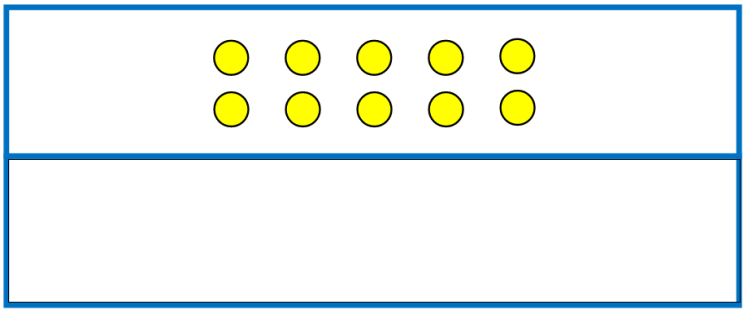


$10 \div 2 = \mathbf{5}$

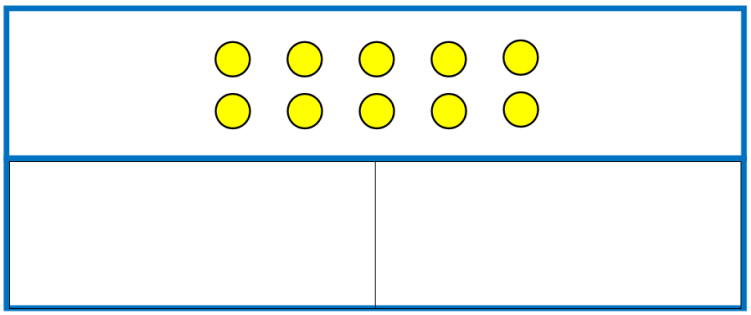
THE Bar: Dividing by sharing

Example: 10 ÷ 2 =

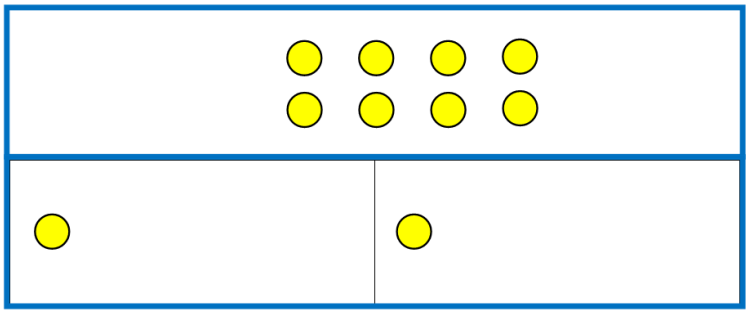
Step 1: Place counters in the top bar to show the dividend (10)

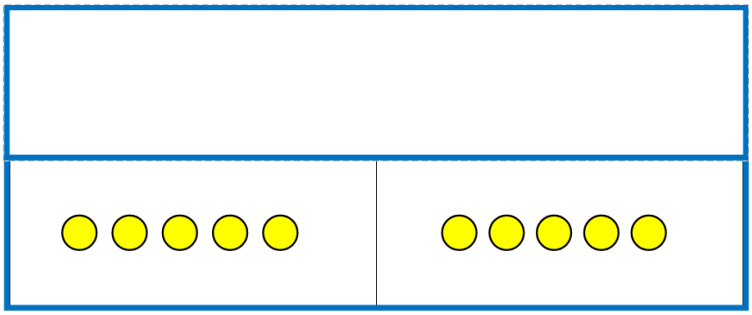


Step 2: Split the lower bar into the number of pieces shown by the divisor (2)

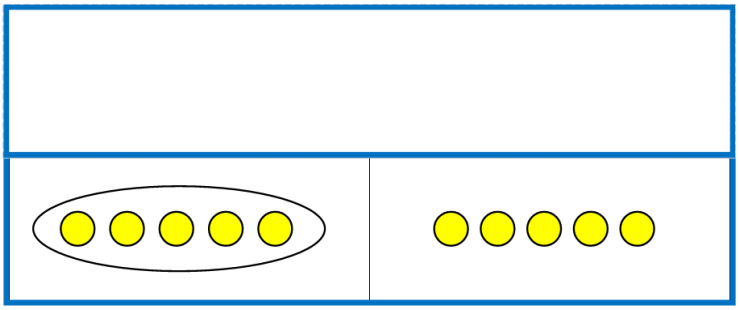


Step 3: Share the counters equally into both boxes

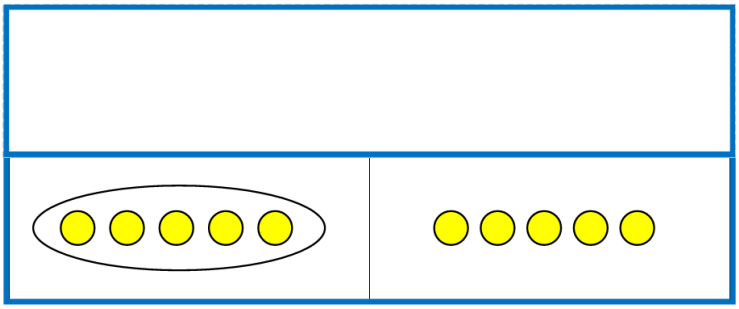




Step 4: Count the total number of counters in one box



Step 5: Write a number sentence in the yellow box

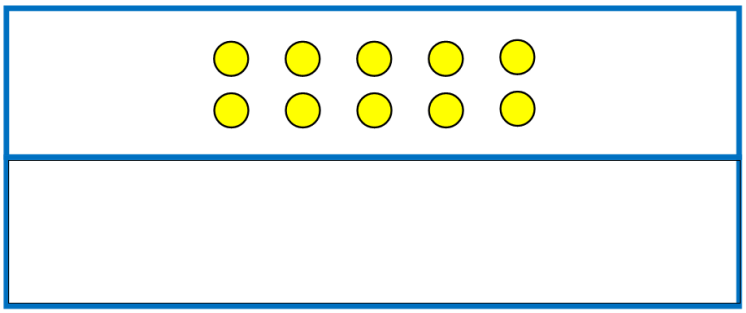


$10 \div 2 = \mathbf{5}$

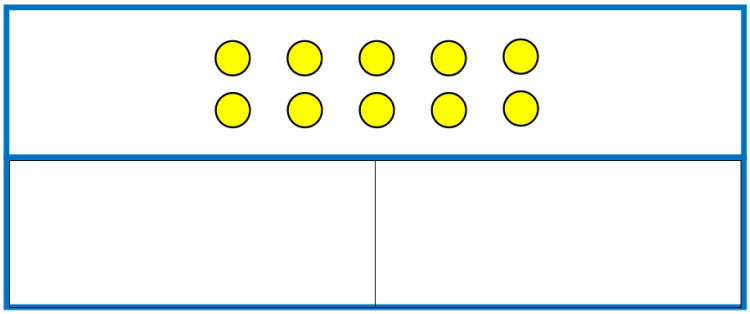
THE Bar: Finding ½ of an amount

Example: Find ½ of 10

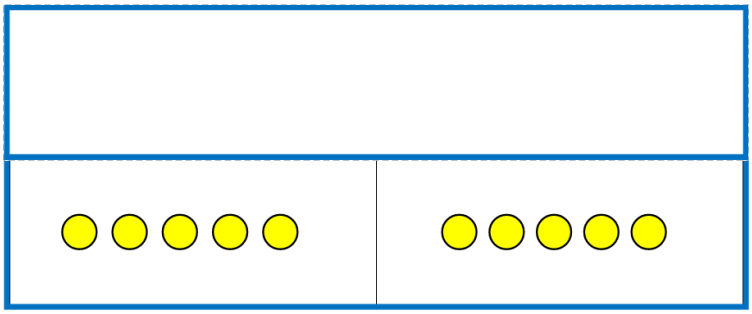
Step 1: Fill the top ‘bar’ with counters showing the whole amount



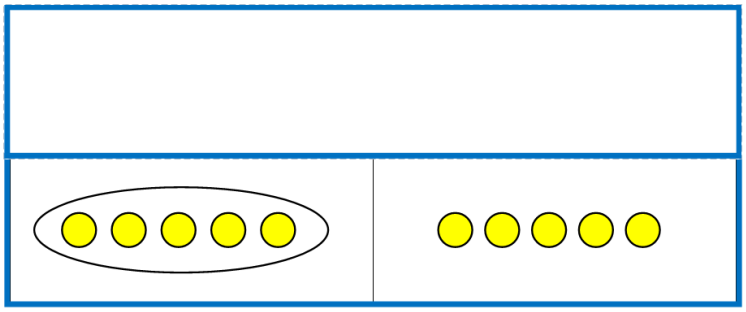
Step 2: Split the lower ‘bar’ into 2 halves



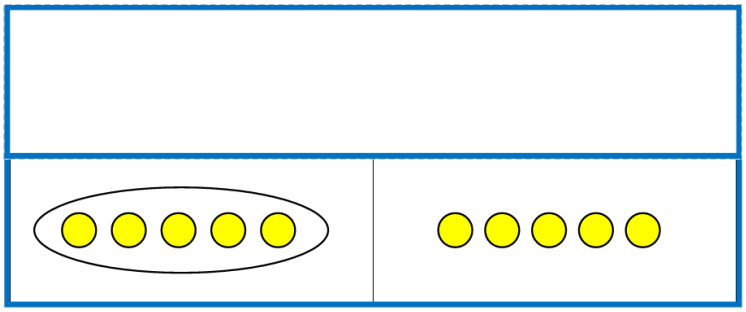
Step 3: Share the counters equally between the 2 halves



Step 4: Count the total number of counters in one box



Step 5: Write a number sentence in the yellow box – it is good practice to also write the division number sentence so that humans see the connection between fractions and division



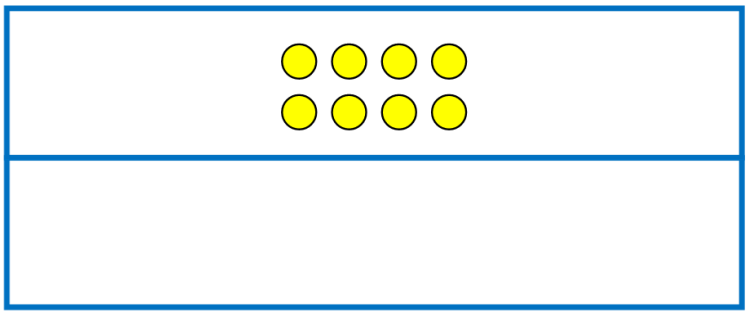
Half of 10 is **5**

10 ÷ 2 = **5**

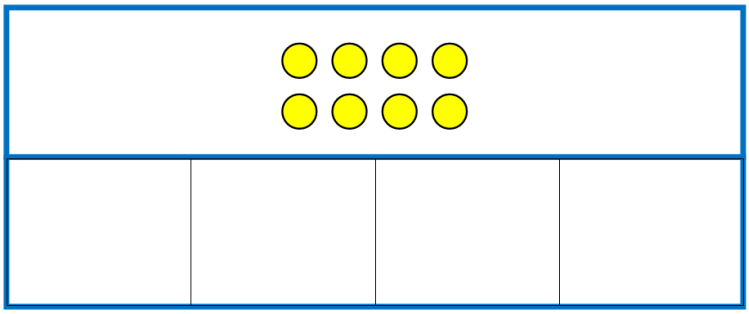
THE Bar: Finding ¼ of an amount

Example: Find ¼ of 8

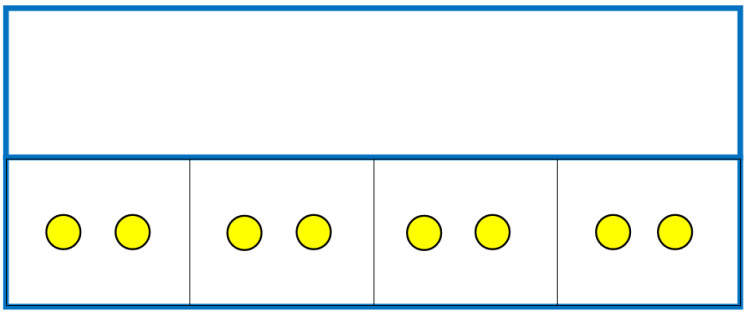
Step 1: Fill the top ‘bar’ with counters showing the whole amount



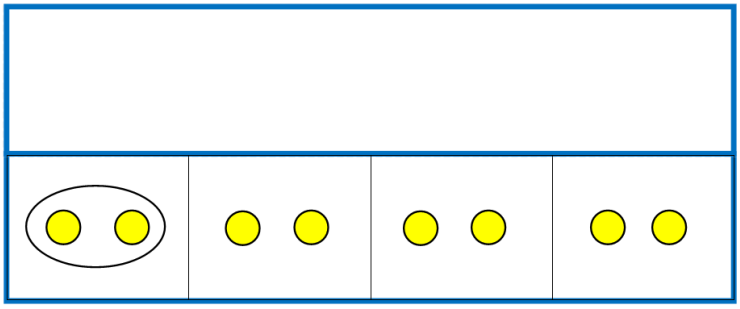
Step 2: Split the lower ‘bar’ into 4 quarters



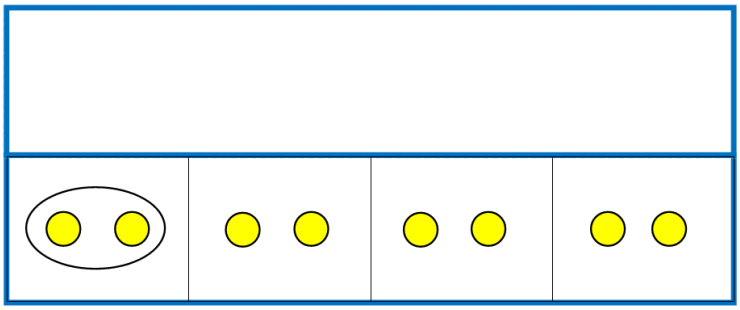
Step 3: Share the counters equally between the 4 quarters



Step 4: Count the total number of counters in one box



Step 5: Write a number sentence in the yellow box



A quarter of 8 is **2**

8 ÷ 4 = **2**

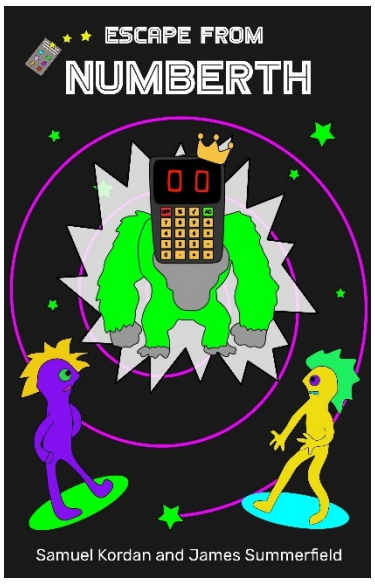
Final Thought

And that's it! There is so much I want to say about these models but if I did then this guide would become longer than 'War and Peace'!

However, there is one thought I will leave you with:

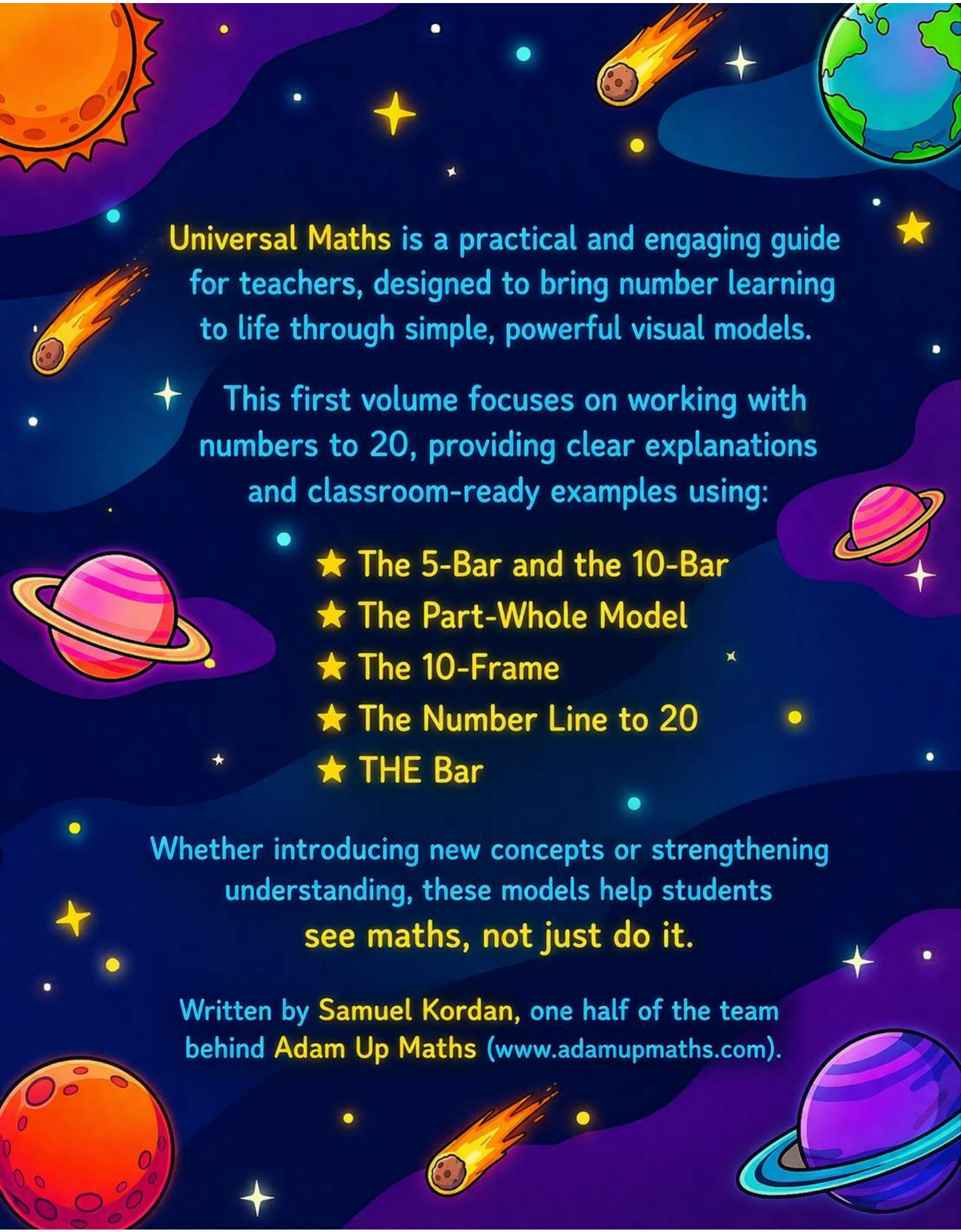
I meet too many children at secondary school who have given up on maths. I believe that we can reduce this number by making maths as visual as possible (this includes secondary school, which will be covered in future books). By being able to 'see' the maths and by removing the abstract nature of numbers, humans generally have more 'I get it' moments which leads to a greater engagement with the subject as well as improved confidence. So, if you are a fan of this approach to mathematics teaching then please share it with others and spread the word of Universal Maths!

As mentioned earlier, please feel free to contact me at sam@adamupmaths.com if you have any questions about the content of this book and I will do my best to respond as soon as possible.



Finally, thank you for reading this book, I hope it has been helpful. If you are looking for a very different maths book then please check out 'Escape from Numberth' – a mathematical adventure story with challenges, songs and mystery. You can find it at https://www.adamupmaths.com/books

Samuel Kordan


Universal Maths is a practical and engaging guide for teachers, designed to bring number learning to life through simple, powerful visual models.
This first volume focuses on working with numbers to 20, providing clear explanations and classroom-ready examples using:
★ The 5-Bar and the 10-Bar
★ The Part-Whole Model
★ The 10-Frame
★ The Number Line to 20
★ THE Bar
Whether introducing new concepts or strengthening understanding, these models help students
see maths, not just do it.
Written by Samuel Kordan, one half of the team behind Adam Up Maths (www.adamupmaths.com).