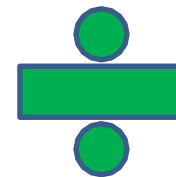
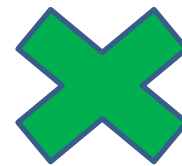


MATHS



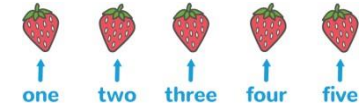
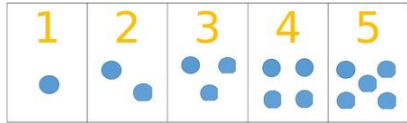
Calculation policy



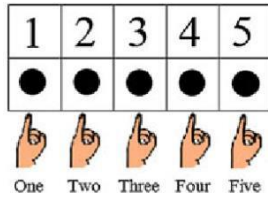
Early Years Foundation Stage: Counting

To count a group of objects children must be able to itemise them and tag each with a number name. There are different 'principles' by which children can learn to count which can help to build understanding and confidence.

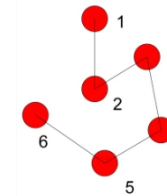
1 to 1 correspondence principle: The ability to match an object to the corresponding number and recognise that numbers are symbols to represent a quantity



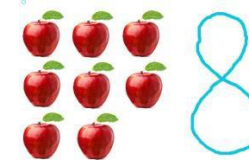
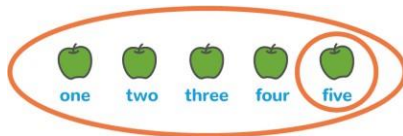
Stable order principle: Saying the number names in the same order every time.



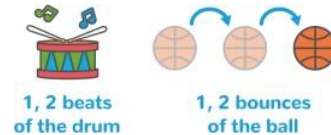
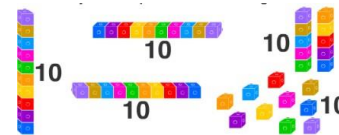
one, two, three, four, five,
six, seven, eight, nine ...



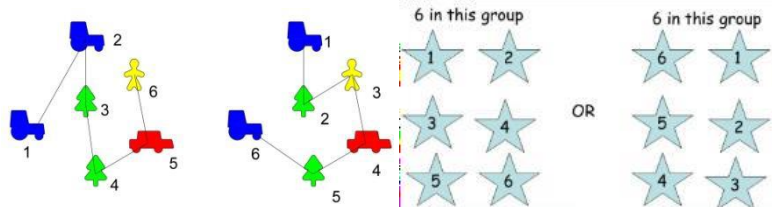
The cardinal principle: The final number represents the size of the set counted. This helps children when counting on.



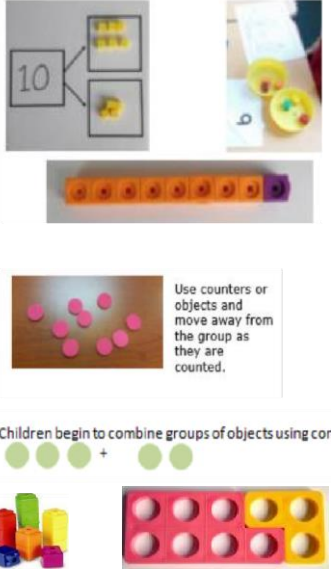
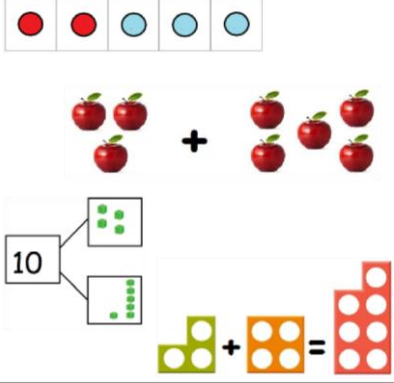
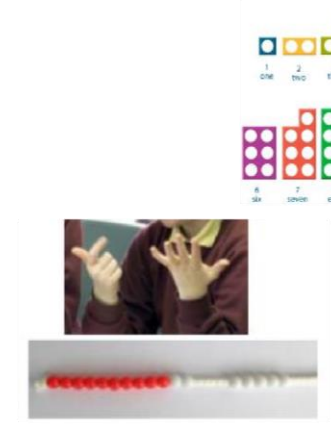
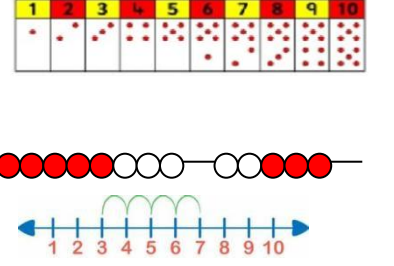
The abstraction principle: As counting develops, children need to know they can count physical things and non-physical, present and not present, similar and not similar.



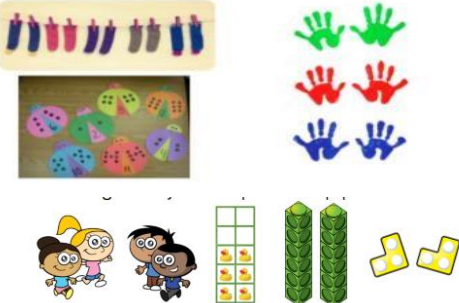
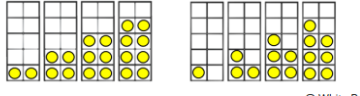
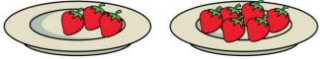
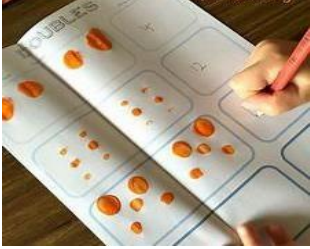

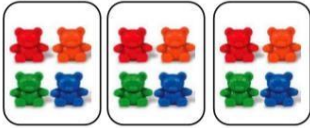
The order irrelevance principle: The order in which items are counted is irrelevant as the same cardinal value will be reached.

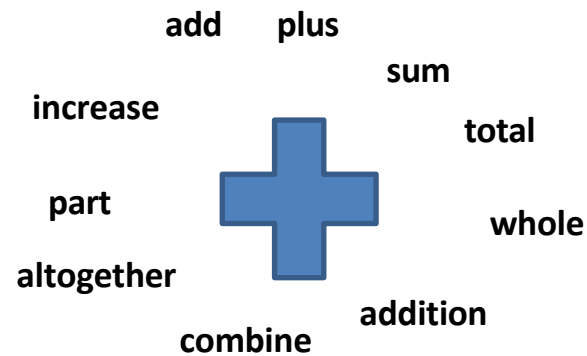


Addition and subtraction

Strategies	Concrete	Pictorial	Abstract
<p>Add and subtract using quantities and objects</p> <p>Say which number is more or less than a given number</p> <ul style="list-style-type: none"> - Add one on/take one away - Adding two to make a whole/ explore part, part, whole model - Recalling number facts within 5 and some within 10 	 <p>Use counters or objects and move away from the group as they are counted.</p> <p>Children begin to combine groups of objects using concrete apparatus</p> <ul style="list-style-type: none"> - Exploring number bonds including subtraction facts 		<p>I have 4 apples and I pick 3 more, how many have I got altogether?</p> <p>They begin to use +, - and = They are encouraged to develop a mental picture of the number system in their heads to use for calculations.</p> <p>Construct number sentences verbally or using cards. Read number sentences to find out the answer.</p> <p>2-1= 2+3= 5</p>
<p>Counting with numbers up to 20</p> <ul style="list-style-type: none"> - Add one on/take one away - Counting on / counting back - One more one less - Number bonds within 5 <p>Children should be taught to start at the biggest number and count on, using this as an opportunity to introduce commutativity of addition</p>			<p>Encourage recall of number facts to develop fluency in mental calculations</p> <p>4+1= 5 Reinforce starting from the largest number to count on.</p>

Multiplication and Division

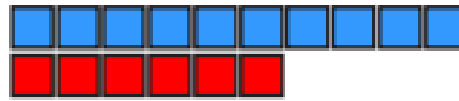
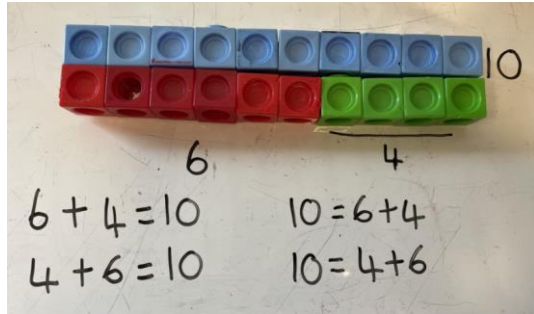
Strategies	Concrete	Pictorial	Abstract
<p>To explore and represent patterns within numbers up to 10 including evens and odds, doubling facts and how quantities can be disturbed evenly.</p> <ul style="list-style-type: none"> - Recalling doubles up ie. Double 2 is 4 - Sharing - Grouping - Noticing patterns within odd and even 	<p>Using a variety of objects to explore doubling.</p>  <p>Using 10s frames or multilink towers to notice the patterns with odd and even numbers.</p>   <p>Role play with food for sharing equally and grouping.</p>	  <p>Children might record ways of how groups can be shared equally or circling equal groups.</p> 	<p>Recalling doubling facts with numbers up to 10.</p> <p>Starting to talk about odd and even numbers and make links to being able to share those numbers equally.</p>



Year 1		
Concrete	Pictorial	Abstract
<p>Combining two parts to make a whole (You can use other practical resources too e.g. eggs, shells, teddy bears etc.)</p>		<p>$4 + 3 = 7$ (four is a part, 3 is a part and the whole is seven).</p>
<p>Counting on</p> <p>Counting on in ones</p> <p>Counting on in tens</p>		<p>Counting on mentally applying place value knowledge:</p> <p style="text-align: center;">What is two more than 11? $11 + 2 = ?$ (knowing 1 add 2 is 3) Add 20 to 5. $5 + 20 = ?$ (using counting in ten knowledge)</p>

Using number facts

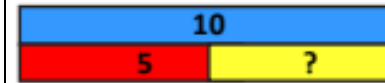
Exploring all the different ways to make numbers e.g $7 = 0+7$, $6+1$, $5+2$, $4+3$ etc
Number bonds 10 e.g $5+5$, $6+4$, $7+3$ etc



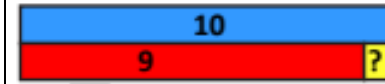
$$6 + \square = 10$$



$$7 + \square = 10$$



$$5 + \square = 10$$

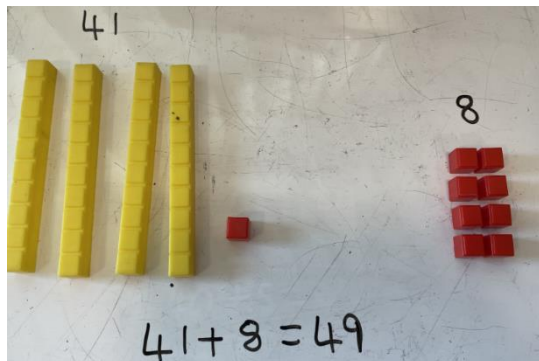


$$9 + \square = 10$$

Patterns using known facts, e.g. $4 + 3 = 7$ so we know $24 + 3$, $44 + 3$, $74 + 3$, etc.

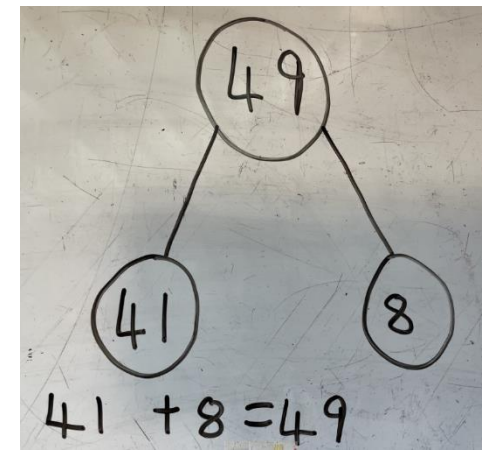
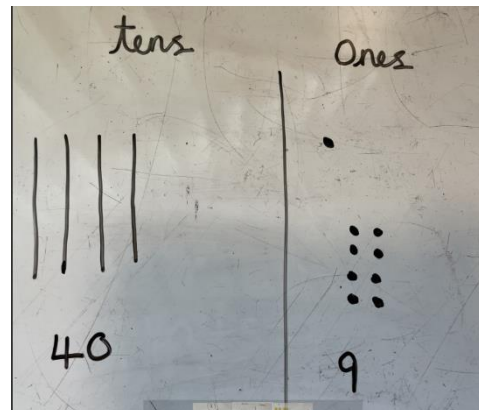
Year 2

Using place value



using dienes continue to develop understanding of partitioning and place value: $41 + 8$

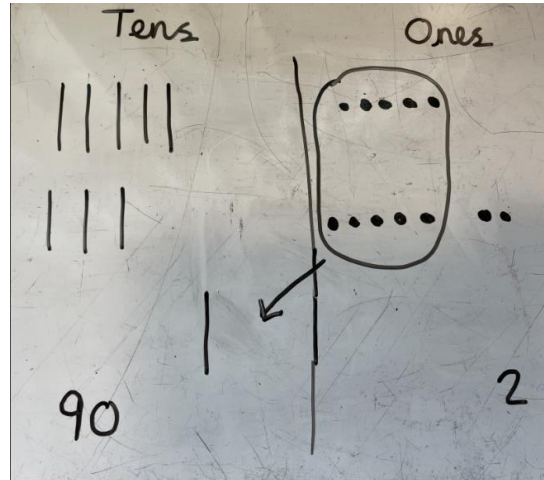
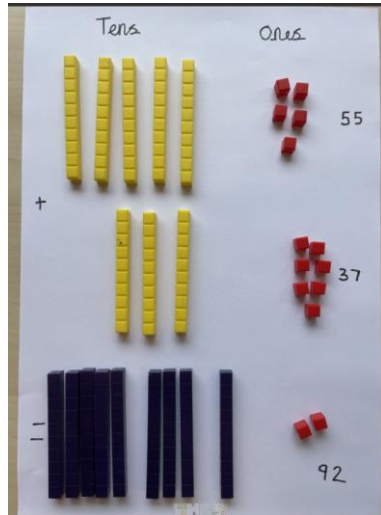
Children to represent the concrete using a particular symbol e.g. lines for tens and dot/crosses for ones.



Using place value

Continue to develop understanding of partitioning and place value and use this to support addition.

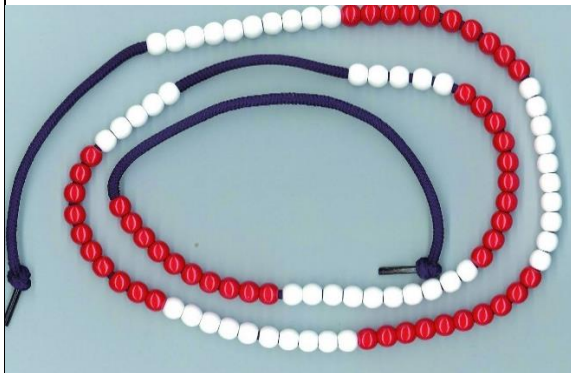
$55 + 37$



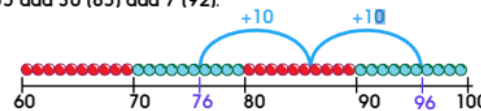
Partitioning, e.g. $55 + 37$
as $50 + 30$ and $5 + 7$
finally combining the two
totals: $80 + 12$.

$$\begin{array}{r} 50 + 30 = 80 \\ 5 + 7 = 12 \\ \hline 80 + 12 = 92 \end{array}$$

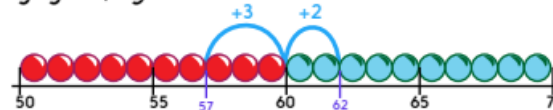
Counting on and using number facts using bead strings



Add ten and multiples of ten, e.g. $76 + 20$ as $76, 86, 96$ or in one hop $76 + 20$. Add two 2-digit numbers by counting on in tens and then in ones, e.g. $55 + 37$ as 55 add 30 (85) add 7 (92).



Bridging ten, e.g. $57 + 5$ as 57 add 3 then add 2 more.



$76 + 20 = ?$ (using counting in ten knowledge)

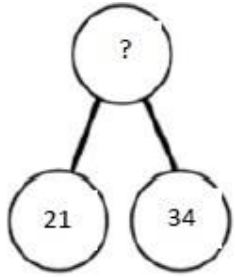
Applying number facts mentally to answer addition:

Bridging ten, e.g. $57 + 5$ as 57 add 3 then add 2 more.

Using number facts

Know pairs of numbers which make the numbers up to and including 10, e.g. $8 = 4 \& 4$, $3 \& 5$, $2 \& 6$, $1 \& 7$ and $10 = 5 \& 5$, $4 \& 6$, $3 \& 7$, $2 \& 8$, $1 \& 9$, $0 \& 10$.
Patterns of known facts, e.g. $6 + 3 = 9$, so we know $36 + 3 = 39$,
 $66 + 3 = 69$, $53 + 6 = 59$.

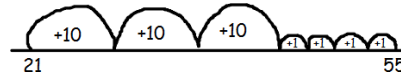
Fluency variation, different ways to ask children to solve $21 + 34 =$



Sam saved £21 one week and £34 another. How much did he save in total?

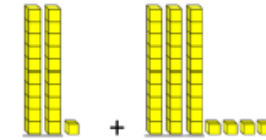
$21+34=55$. Prove it!
(reasoning but the

children need to be fluent in representing this)

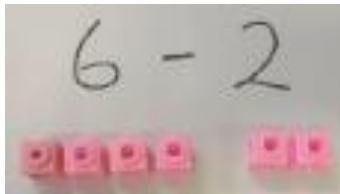


$$21 + 34 =$$

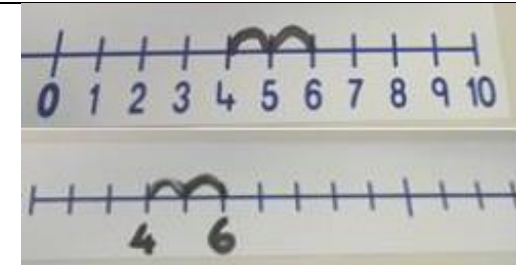
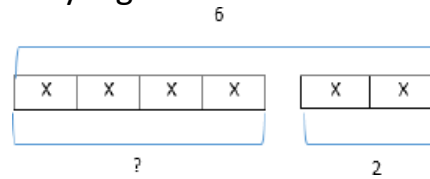
$$\square = 21 + 34$$



Counting back (using number lines/bead string).

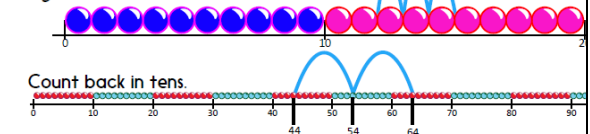


Children to represent what they see pictorially e.g.



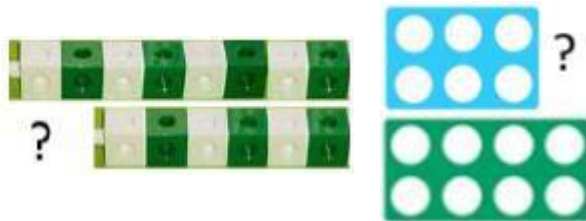
Subtracting by taking away

Count back in ones,
e.g. $15 - 3 =$ $25 - 3 =$



Count back in tens.

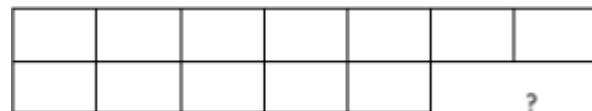
Finding the difference and using number facts (using cubes, numicon or other objects).



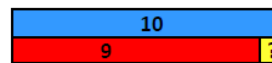
Children to draw the cubes/other concrete objects which they have used.

XXXXXXXXXX
XXXXXXX

Use of the bar model.



$10 - \square = 7$



$10 - \square = 9$

Find the difference between 8 and 6.

$8 - 6$, the difference is ___?

Children to also explore why $9 - 7 = 8 - 6$ (the difference, of each digit, has changed by 1 so the difference is the same.)

Patterns using known facts,
e.g. $10 - 7 = 3$ so we know $30 - 7 = ?$



Using place value

Using place value

Know 1 less or 10 less than any number, e.g. 1 less than 74 or 10 less than 82.

Partitioning, e.g. $55 - 32$ as $50 - 30$
and $5 - 2$ combining the
answers: $20 + 3$.

-100
counting

$$\begin{array}{r} 50 - 30 = 20 \\ 5 - 2 = 3 \\ \hline 55 - 32 = 23 \end{array}$$

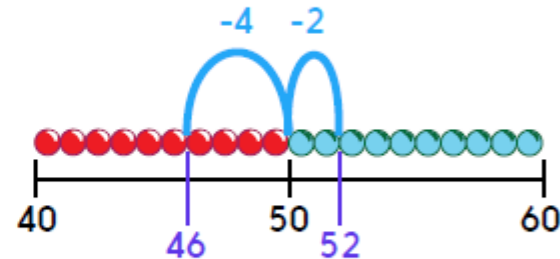
Using number facts

Know pairs of numbers which make the numbers up to and including 10,
e.g. $10 - 6 = 4$, $8 - 3 = 5$, $5 - 2 = 3$, etc.

Patterns of known facts, e.g. $9 - 6 = 3$, so we know $39 - 6 = 33$, $69 - 6 = 63$,
 $89 - 6 = 83$.

ntences,
lition

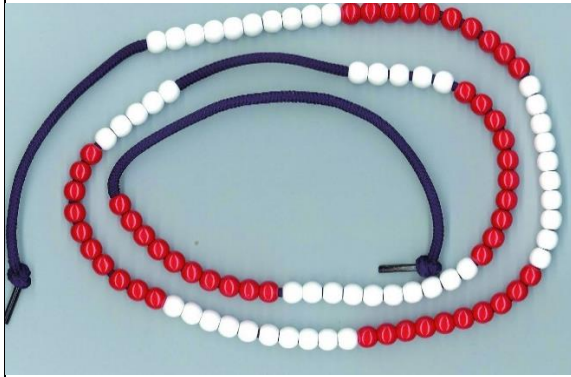
Bridge ten, e.g. $52 - 6$
as 52 subtract 2 then
subtract 4 more.

**Counting up**

Find a difference between two numbers on a line, e.g. $51 - 47$.

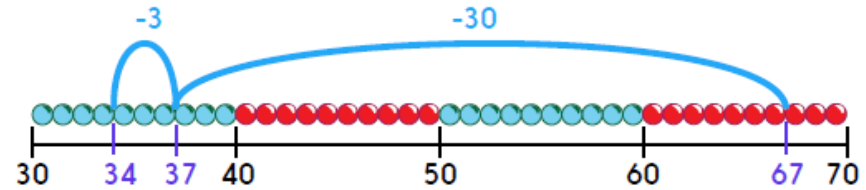
Taking away

Using beaded strings to physically move and subtract from a number



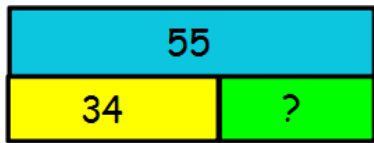
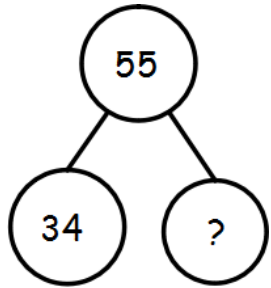
Taking away

Subtract ten and multiples of ten, e.g. $76 - 20$ as $76, 66, 56$ or in one hop $76 - 20 = 56$. Subtract two 2-digit numbers by counting back in tens then in ones, e.g. $67 - 33$ as 67 subtract 30 (37) then count back 3 (34).



Subtracting near multiples, e.g. $74 - 21$ or $57 - 19$.

Fluency variation, different ways to ask children to solve $55 - 34 =$



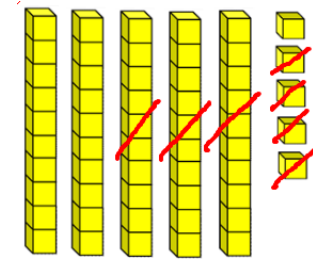
Gary had £55 and spent £34 on a new video game. How much change did he receive?

$55 - 34 = 21$. Prove it!
(reasoning but the children need to be fluent in representing this)

$$55 - 34 = \square$$

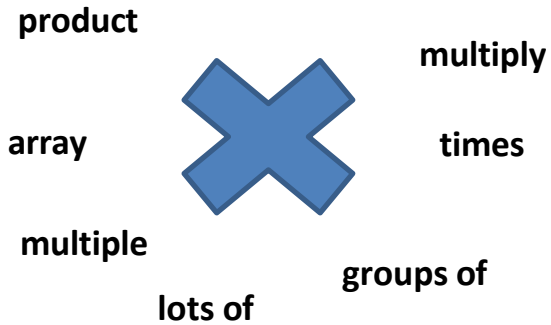
$$\square = 55 - 34$$




What's the difference between 55 and 34?



Tens	Ones

multiplication

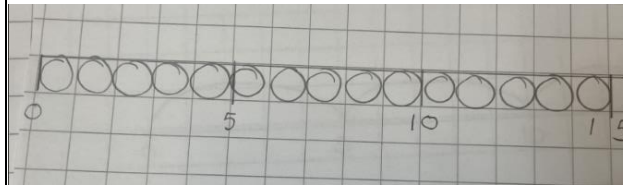


Concrete	Pictorial	Abstract
Year 1 & 2		
<p>Repeated grouping/repeated addition (does not have to be restricted to cubes) 3 x 4 or 3 lots of 4.</p> 	<p>Children to represent the practical resources in a picture e.g.</p>  <p>Use of a bar model for a more structured method</p> 	<p>$3 \times 4 = 12$</p> <p>$4 + 4 + 4 = 12$</p>

Use number lines to show repeated groups:

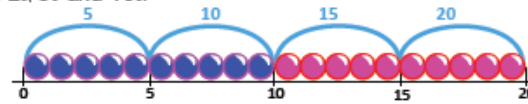


Represent this pictorially alongside a beaded number line e.g:



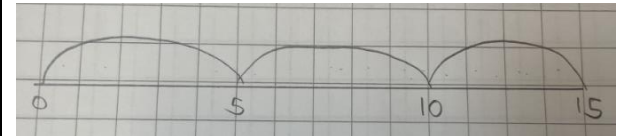
Counting in steps ('Clever' counting)

Count in 2s, 5s and 10s.



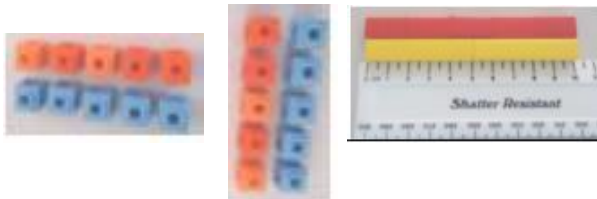
Abstract number line

$$5 \times 3 = 15$$

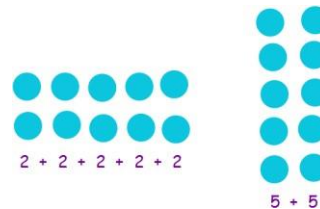


Use arrays to illustrate commutativity
(counters and other objects can also be used).

$$2 \times 5 = 5 \times 2$$



Children to draw the arrays



Children to be able to use an array to write a range of calculations e.g.

$$2 \times 5 = 10$$

$$5 \times 2 = 10$$

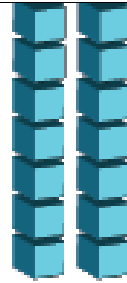
$$2 + 2 + 2 + 2 + 2 = 10$$

$$5 + 5 = 10$$

Use number facts

Know doubles to double 20

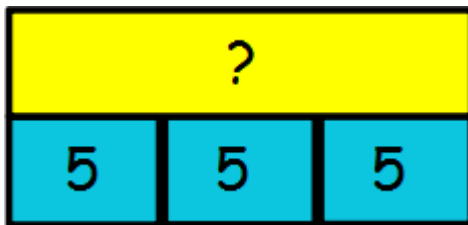
$$\text{Double } 7 = 14$$



Division, grouping, is the inverse of multiplication.

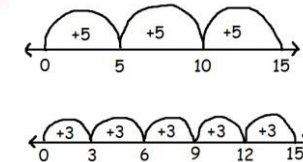
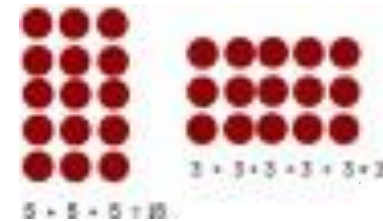
Start learning 2x, 5x, 10x tables, relating these to 'Clever counting' in 2s, 5s, and 10s, e.g. $5 \times 10 = 50$, and 10, 20, 30, 40, 50 is five steps in the tens count.

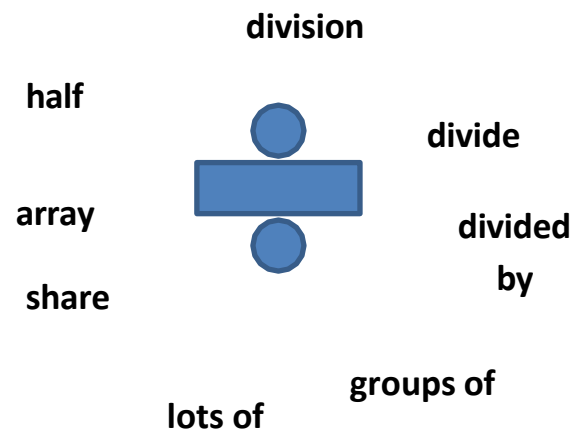
Fluency variation, different ways to ask children to solve $5 \times 3 =$



With counters, prove that $5 \times 3 = 15$
Why is $5 \times 3 = 3 \times 5$?

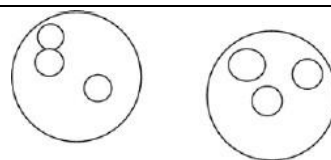
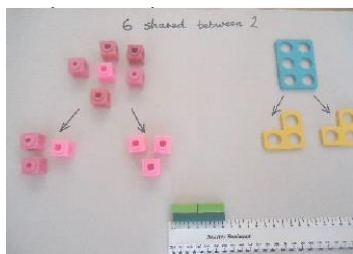
Terry had to swim 5 lengths, 3 times a week. How many lengths did he swim in one week?
Tammy saved 3p, 5 days a week. How much did he save in 2 weeks?



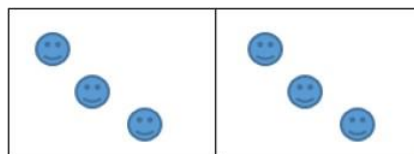


Year 1 & 2

Sharing (other concrete objects can also be used e.g. children and hoops, teddy bears, cakes and plates). This can be linked to finding $\frac{1}{4}$ or $\frac{1}{2}$ of a number.



This can also be done in a bar so all 4 operations have a similar structure:



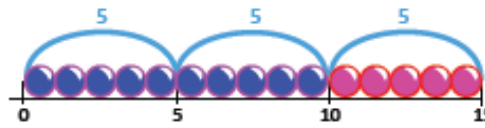
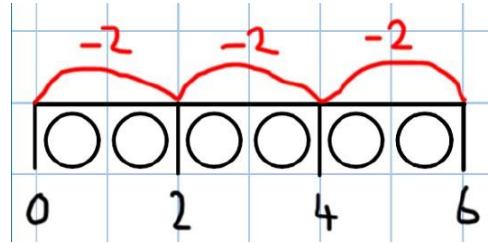
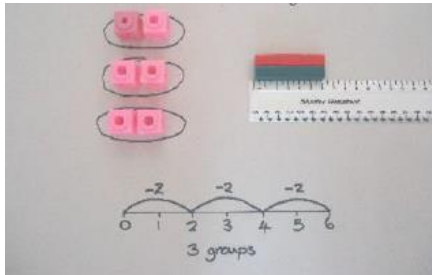
$$6 \div 2 = 3$$

What's the calculation?

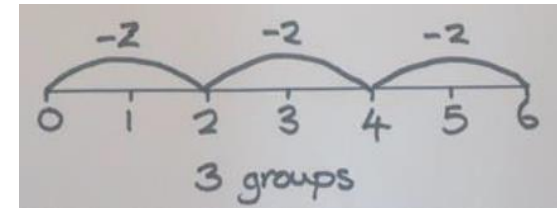
3	3
---	---

Understand division as subtracting

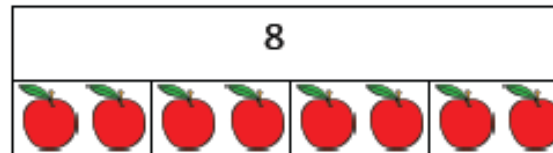
$$6 \div 2$$



Abstract number line



Understanding division as grouping



How many groups of 2 can you make from 8?

$$? \times 2 = 8 \text{ and } 8 \div 2 = ?$$

8			
2	2	2	2

Find half of numbers up to 40, including realising that half of an odd number gives a remainder of 1 or an answer containing a $\frac{1}{2}$.

Begin to know half of multiples of 10 to 100, e.g. *half of 70 is 35*.

Using number facts

Know halves of even numbers to 24.

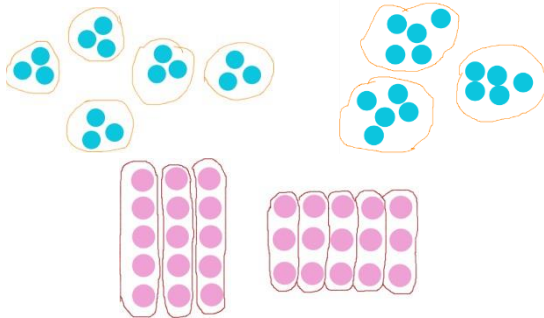
Know 2x, 5x and 10x division facts.

Begin to know 3x division facts.

half of 20 is...

20	
?	?

Fluency variation, different ways to ask children to solve $15 \div 5 =$



I have £15 and share it equally between 5 bank accounts. How much will be in each account?

15 children need to be put into 5 groups. How many will be in each group?

