Maths At Battle Primary

The national curriculum for mathematics aims to ensure that all pupils:

•become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately

•reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language

•can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions

At Battle we follow a Mastery approach to help us to achieve these aims.

The key features of a mastery approach:

The class work together on the same topic

The emphasis is on keeping the class together until specific concepts or skills are mastered and then moving on together. This does **not** mean that some children will be left behind or others not challenged. Differentiation is now achieved through and deeper understanding, as explained below.

Speedy teacher intervention to prevent gaps

Those children that have not met the expected outcomes or have gaps in their understanding, will be helped by receiving short, immediate extra time on maths, during the lesson or later in the day. This is a positive opportunity to consolidate their understanding.

Challenge is provided by going deeper not accelerating

For those children that have mastered the skill, concept or procedure they will be presented with higher order thinking activities, rather than accelerating through the curriculum.

Focused, rigorous and thorough teaching

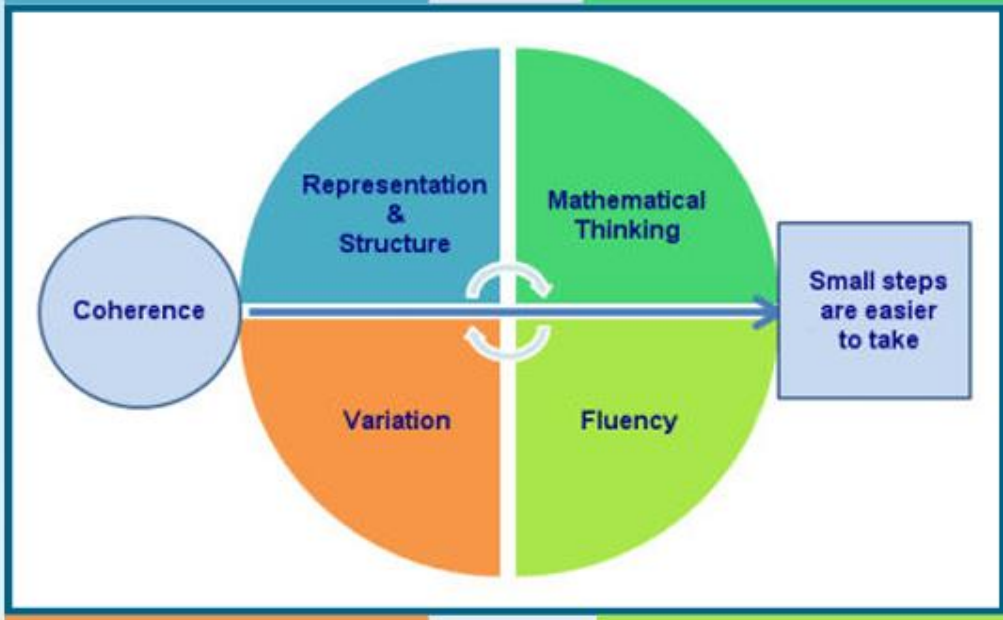
Within Mastery, the idea is to focus on one small step at a time in a lesson, with an emphasis on the mathematical structures involved and the best way to represent these through models and images. Each small step is important as it builds towards deep understanding of a concept.

More time on teaching topics – depth and practice

The same topic is likely to have the same focus until the class has mastered the concept, skill or procedure being taught. This is particularly the case for number and calculations. Focus areas are being taught over a longer time with smaller steps of progress and time is for practice and depth, making the learning effective.

Representation and Structure
Representations such as objects and pictures are used in lessons expose the mathematical concepts being taught.

Mathematical Thinking
If taught ideas are to be understood deeply, they must not merely be passively received but must be thought about, reasoned with and discussed with others.



Variation
Varying the way a concept is initially presented to students, by giving examples that display a concept as well as those that don't display it. Also, carefully varying practice questions so that mechanical repetition is avoided, and thinking is encouraged.

Fluency
Quick and efficient recall of facts and procedures and the flexibility to move between different contexts and representations of mathematics.

Coherence
Connecting new ideas to concepts that have already been understood, and ensuring that, once understood and mastered, new ideas are used again in next steps of learning, all steps being small steps.

You will see in our daily maths lessons:

Fluency, reasoning and problem solving.

In EYFS, KS1 and Year 4 and 5 the children are using the Mastering Number Program.

Learners are supported and challenged in lessons through questioning, resources and being challenged to think creatively about a problem.

Concrete manipulatives and pictorial representations are used to support conceptual understanding and to make links across topics.

Websites you can use to help your children at home:

https://www.bbc.co.uk/bitesize

https://www.primaryhomeworkhelp.co.uk/maths/index.html

https://www.cgpbooks.co.uk/resources/cgp-s-free-online-10-minute-tests

https://www.educationquizzes.com/in/primary/

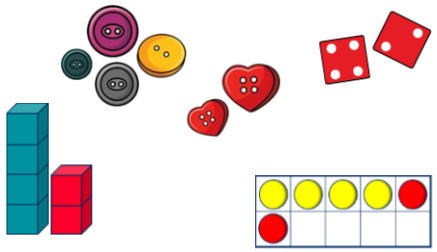
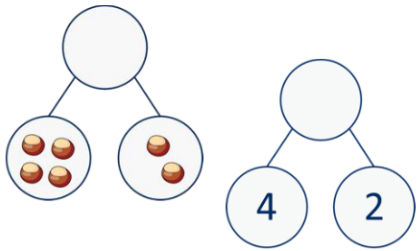
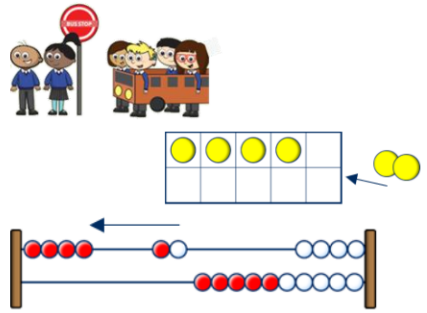
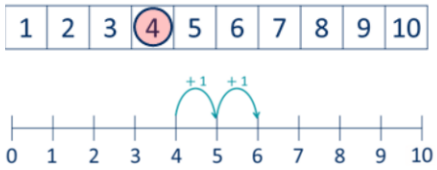
https://mathsbot.com/

https://www.ncetm.org.uk/classroom-resources/ey-numberblocks-at-home/

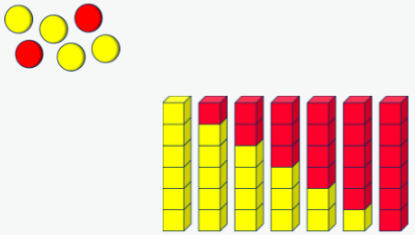
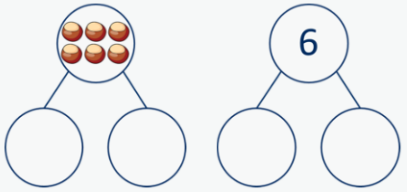
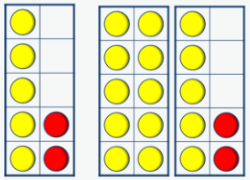
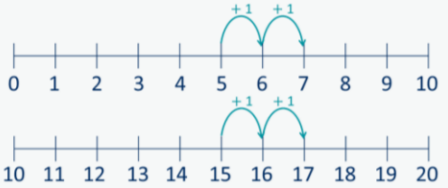
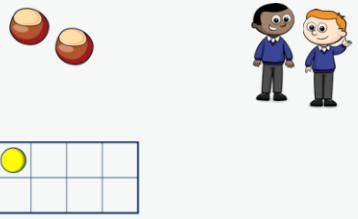
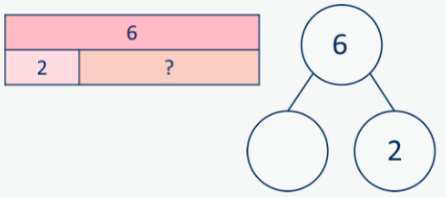
https://www.topmarks.co.uk/maths-games/5-7-years/counting

YEAR 1 and YEAR 2

Addition

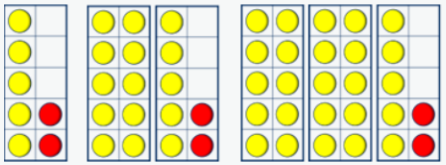
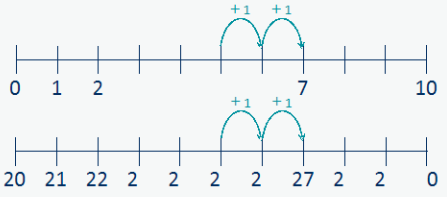
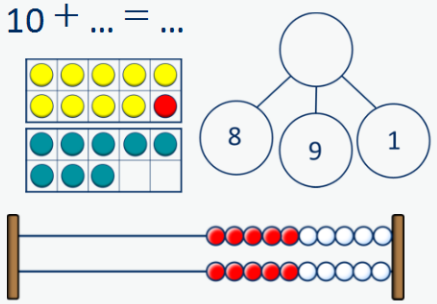
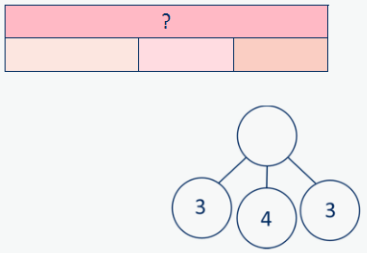
Year 1	• Read, write and interpret mathematical statements involving addition (+) and equals (=) signs. • Represent and use number bonds within 20 • Add 1-digit and 2-digit numbers to 20, including zero. • Solve one-step problems that involve addition, using concrete objects and pictorial representations, and missing number problems such as $7 = \square + 2$		
Progression of skills	**Key representations**		
Add together (aggregation) 2 quantities are combined to find the total.	There are ... There are ... There are ... altogether. 	... is a part. ... is a part. ... is the whole. 	... plus ... is equal to ... ... is equal to .... + ... $4 + 2 = 6$ $2 + 4 = 6$ $6 = 4 + 2$ $6 = 2 + 4$
Add more (augmentation) A quantity is increased.	First... Then... Now... 	I start at ... I jump on ... I land on ... 	... plus ... is equal to ... is equal to ... + ... $4 + 2 = 6$ $2 + 4 = 6$ $6 = 4 + 2$ $6 = 2 + 4$

Addition

Progression of skills	Key representations		
Bonds within 10 Include bonds for each number within 10 Encourage children to notice patterns.	… is made of … and … … and … make … 	… can be partitioned into … and … 	… plus … is equal to … $6 + 0 = 6$ $5 + 1 = 6$ $4 + 2 = 6$ $3 + 3 = 6$ $2 + 4 = 6$ $1 + 5 = 6$ $0 + 6 = 6$
Related facts within 20 Make links to known facts.	I know that … and … = … so … and … = … 	… more than … is … so … more than … is … 	What patterns do you notice? $5 + 2 = 7$ $15 + 2 = 17$ $7 = 5 + 2$ $17 = 15 + 2$
Missing numbers Make links to known facts.	How many more do you need to make …? 	If … is the whole and … is a part, the other part must be… 	… plus … is equal to … $2 + \square = 6$ $6 = 2 + \square$ 

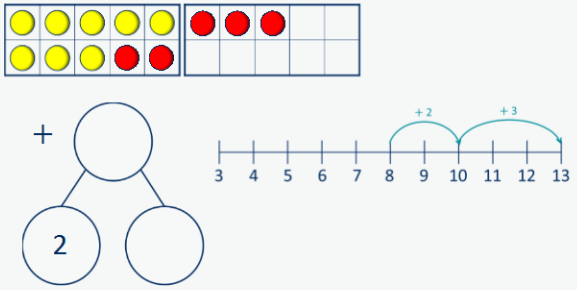
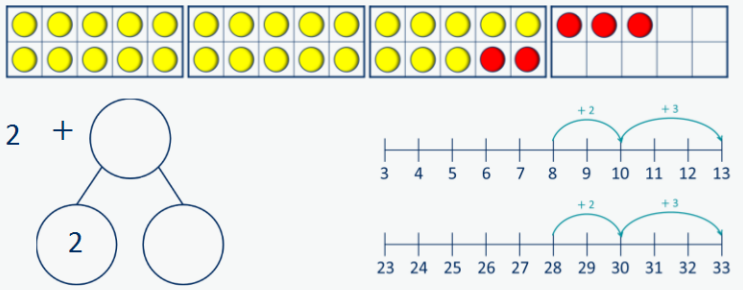
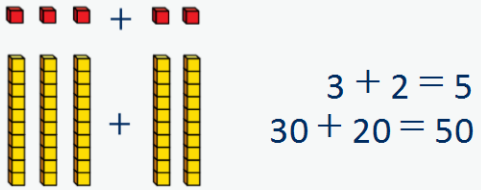
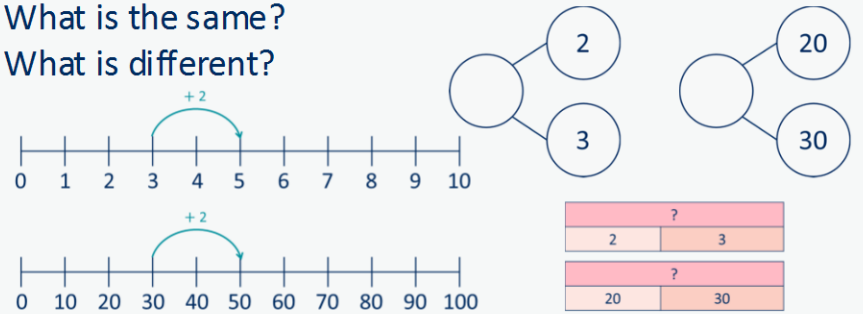
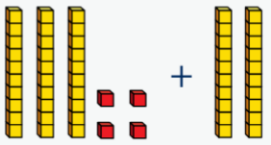
Addition

Year 2	• Recall and use addition facts to 20 fluently, and derive and use related facts up to 100
	• Add numbers using concrete objects, pictorial representations, and mentally, including:
	  • a two-digit number and 1s
	  • a two-digit number and 10s
	  • 2 two-digit numbers
	  • adding 3 one-digit numbers
	• Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.		

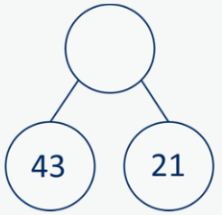
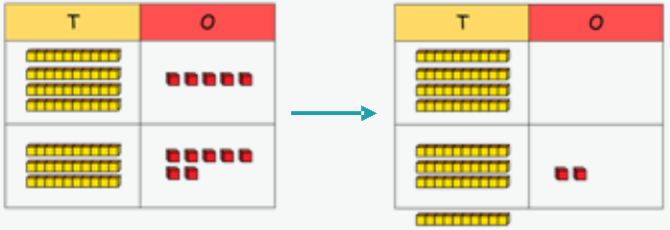
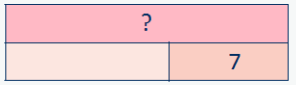
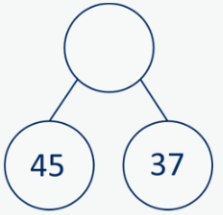
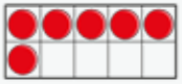
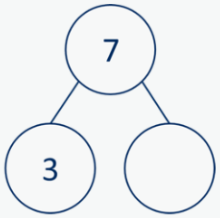
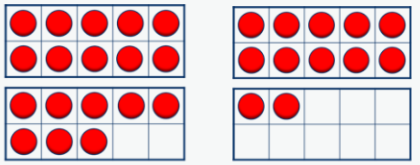
Progression of skills	**Key representations**		
Add ones to any number (related facts) Make links to known facts.	I know that … and … = … so … and … = … 	… more than … is … so … more than … is … 	What do you notice? Can you continue the pattern? 5 + 2 = 7 15 + 2 = 17 25 + 2 = 27…
Add three 1-digit numbers Prompt children to understand that addition can be done in any order and to make links to known facts.	… and … are a bond to 10 10 + … = … 	Double … + … = … 	What do you notice? Which addition is the easiest to calculate? 8 + 9 + 1 = 8 + 1 + 9 = 9 + 1 + 8 =

Addition

White Rose MATHS

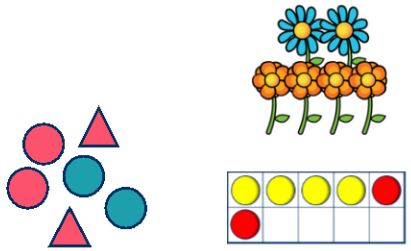
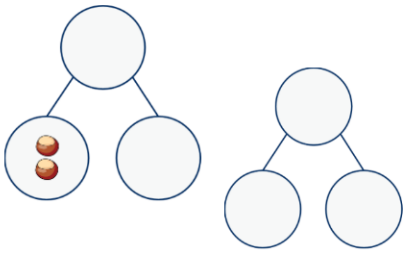
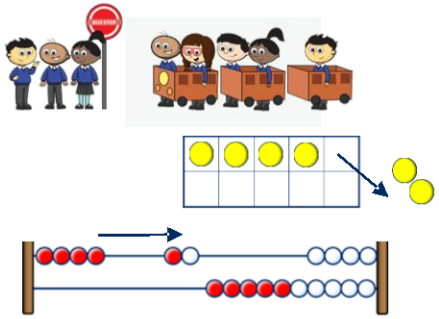
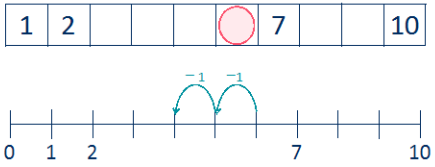
Progression of skills	Key representations		
Add across a 10 Partition the number being added to make a full ten.	… can be partitioned into … and …  	I add … to get to … then I add … $8 + 5 = 13$ $28 + 5 = 33$  	
Add multiples of 10 Make links to known facts within ten.	… ones + … ones = … ones so … tens + … tens = … tens  $3 + 2 = 5$ $30 + 20 = 50$	What is the same? What is different?  	
Add 10s to any number Make links to known facts.	… tens + … tens = … tens … tens and … ones = … 	To add … I need to add 10 … times.  	I know that … and … = … so … and … = … $30 + 20 = 50$ $34 + 20 = 54$

Addition

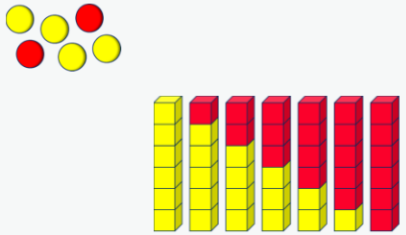
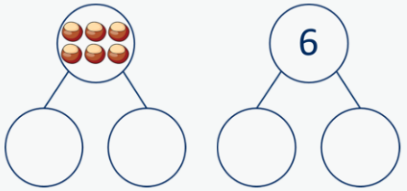
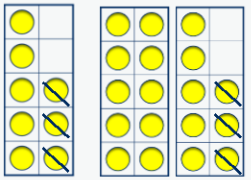
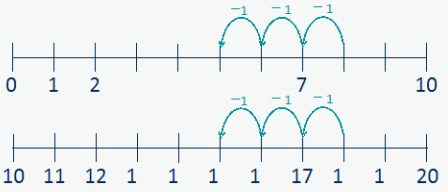
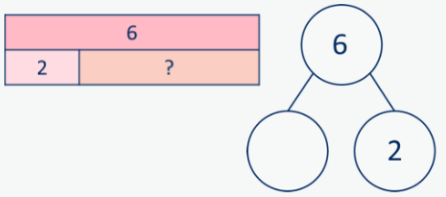
Progression of skills	Key representations
Add 2-digit numbers (not across a ten) Lining up ones and tens in columns will support with later written methods.	… ones + … ones = … ones … tens + … tens = … tens   3 ones + 1 one = 4 ones 4 tens + 2 tens = 6 tens 6 tens + 4 ones = 64 
Add 2-digit numbers (across a ten) Begin to exchange 10 ones for 1 ten.	There are …. ones, so I do/do not need to make an exchange. … ones = … ten and … ones    5 ones + 7 ones = 12 ones 12 ones = 1 ten and 2 ones 4 tens + 3 tens + 1 ten = 8 tens 8 tens and 2 ones = 82
Missing numbers Solve missing number problems and use the inverse to check.	How many more do you need to make …?  6 + □ = 10 10 − □ = 6	If … is a whole and … is a part, then … is the other part. □ + 3 = 7 7 − 3 = □ 	… can be partitioned into … and … 10 + 8 = 12 + □ 

Subtraction

White Rose MATHS

Year 1	• Read, write and interpret mathematical statements involving subtraction (–) and equals (=) signs. • Represent and use number bonds and related subtraction facts within 20 • Subtract one-digit and two-digit numbers to 20, including zero. • Solve one-step problems that involve subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = \square - 9$		
Progression of skills	**Key representations**		
Find a part Link to number bonds and known facts. E.g. $2 + 4 = 6$ so if 6 is the whole and 4 is a part, the other part must be 2	There are ... in total. ... are ... How many are **not** ...? 	... is the whole. ... is a part. ... is a part. 	... subtract ... is equal to ... ... is equal to ... − ... $6 - 2 = 4$ $6 - 4 = 2$ $4 = 6 - 2$ $2 = 6 - 4$
Take away A quantity is decreased.	First... Then... Now... 	I start at ... I jump back ... I land on ... 	... minus ... is equal to ... ... is equal to ... − ... $6 - 2 = 4$ $6 - 4 = 2$ $4 = 6 - 2$ $2 = 6 - 4$

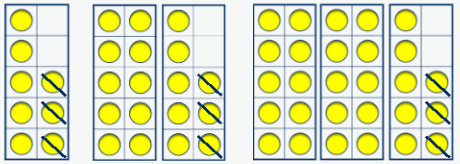
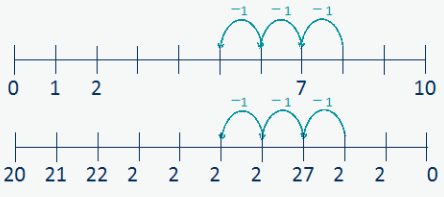
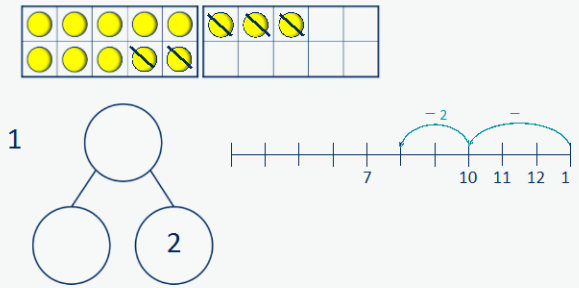
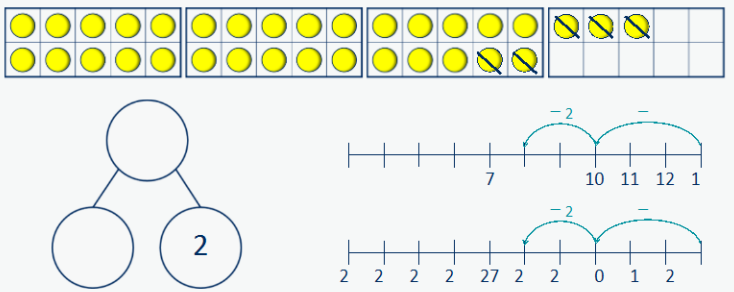
Subtraction

Progression of skills	Key representations		
Bonds within 10 Focus on subtraction facts. Encourage children to notice patterns.	… is made of … and … … and … make … 	… can be partitioned into … and … 	… minus … is equal to … $6 - 0 = 6$ $6 - 1 = 5$ $6 - 2 = 4$ $6 - 3 = 3$ $6 - 4 = 2$ $6 - 5 = 1$ $6 - 6 = 0$
Related facts within 20 Make links to known facts.	I know that … minus … = … so … minus … = … 	… less than … is … so … less than … is … 	What patterns do you notice? $8 - 3 = 5$ $18 - 3 = 15$ $5 = 8 - 3$ $15 = 18 - 3$
Missing numbers Make links to known facts.	How many do you need to subtract to make …?   	If … is the whole and … is a part, the other part must be… 	… minus … is equal to … $6 - \square = 2$ $2 = 6 - \square$ 

Subtraction

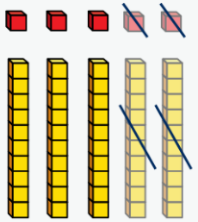
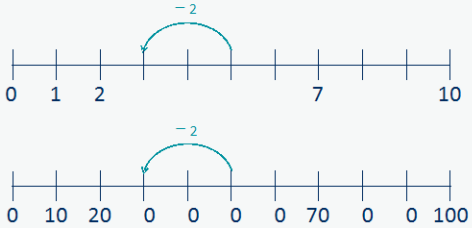
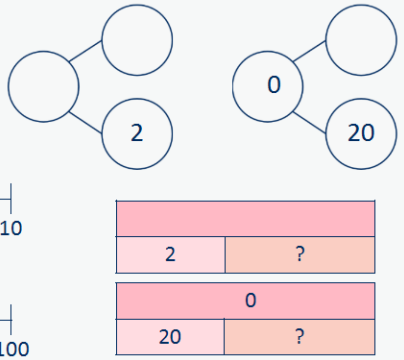
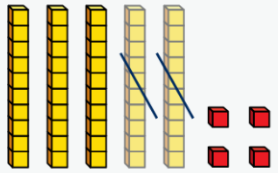
White Rose MATHS

	• Recall and use subtraction facts to 20 fluently, and derive and use related facts up to 100
	• Subtract numbers using concrete objects, pictorial representations, and mentally, including:
	  • a two-digit number and 1s
	  • a two-digit number and 10s
	  • 2 two-digit numbers
	• Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

Progression of skills	**Key representations**
Subtract ones from any number (related facts) Make links to known facts.	I know that … minus … = … so … minus … = …  … less than … is … so … less than … is …  What do you notice? Can you continue the pattern? 8 − 3 = 5 18 − 3 = 15 28 − 3 = 2 …
Subtract across a 10 Partition the number being subtracted to bridge through a ten.	… can be partitioned into … and …  Make links with related facts. 

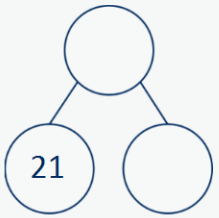
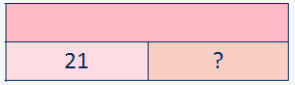
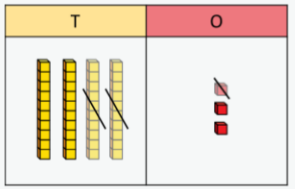
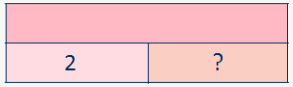
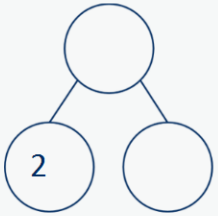
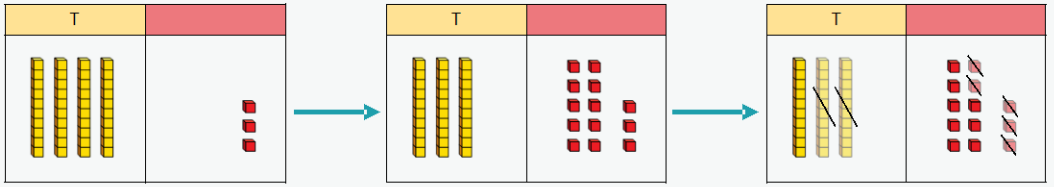
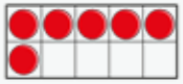
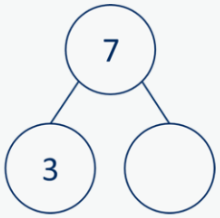
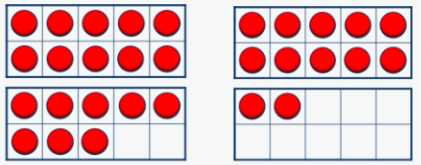
Subtraction

White Rose MATHS

Progression of skills	Key representations		
Subtract multiples of 10 Make links to known facts within ten.	… ones − … ones = … ones so … tens − … tens = … tens  5 − 2 = 3 50 − 20 = 30	What is the same? What is different? 	
Subtract 10s from any number Make links to known facts.	… tens − … tens = … tens … tens and … ones = … 	To subtract … I need to subtract 10 … times. 	I know that … minus … = … so … minus … = … 50 − 20 = 30 54 − 20 = 34

Subtraction

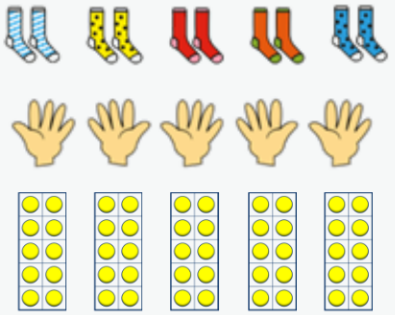
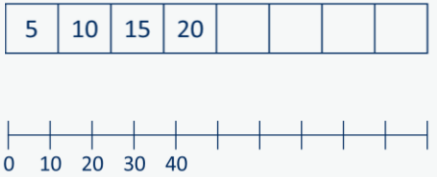
White Rose MATHS

Progression of skills	Key representations
Subtract two 2-digit numbers (not across a ten)	… ones − … ones = … ones … tens − … tens = … tens    3 ones − 1 one = 2 ones 4 tens − 2 tens = 2 tens 2 tens and 2 ones = 22
Subtract two 2-digit numbers (across a ten) Begin to exchange 1 ten for 10 ones.	I need to make an exchange because I do not have enough ones to subtract … ones.    3 ones − 5 ones (I need to exchange 1 ten for 10 ones) 13 ones − 5 ones = 8 ones 3 tens − 2 tens = 1 ten 1 ten and 8 ones = 18
Missing numbers Solve missing number problems and use the inverse to check.	How many do you need to subtract to make …?  10 − □ = 6 6 + □ = 10 If … is a whole and … is a part, then … is the other part. 7 − 3 = □ □ + 3 = 7  … can be partitioned into … and … 18 − □ = 12 + 2 

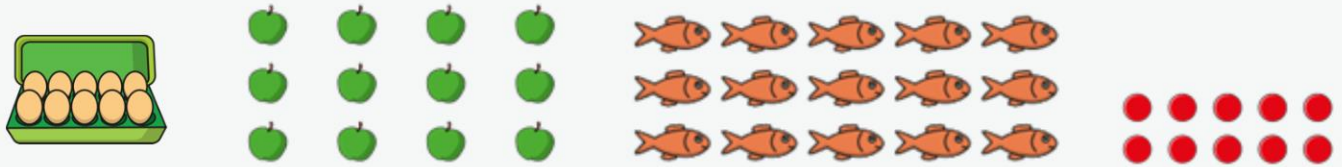
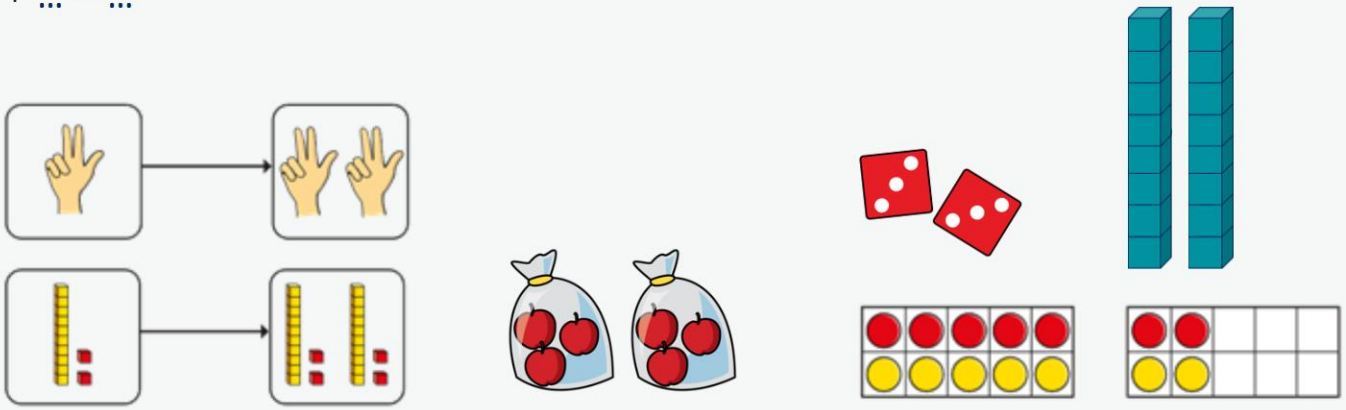
Multiplication

White Rose MATHS

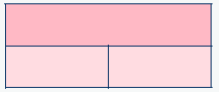
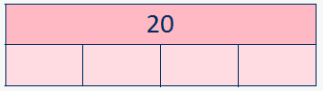
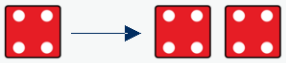
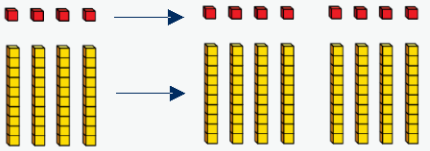
Year 1	• Count in multiples of twos, fives and tens. • Solve one-step problems involving multiplication, using concrete objects, pictorial representations and arrays with the support of the teacher.

Progression of skills	Key representations		
Count in 2s, 5s and 10s Begin by counting objects that naturally come in 2s, 5s and 10s, for example pairs of socks or fingers.	There are ... equal groups of ... There are ... altogether. 	Continue to colour in ...s What do you notice?  1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50	Complete the number track/number line by counting in ...s.  5 10 15 20 0 10 20 30 40
Add equal groups (repeated addition) Children should be able to write a repeated addition to represent equal groups and to draw pictures or use objects to represent a repeated addition.	There are ... groups of ... There are ... altogether.  $10 + 10 + 10 = 30$  $5 + 5 + 5 + 5 = 20$		What is the same? What is different? $2 + 2 + 2 =$ $5 + 5 + 5 =$ $10 + 10 + 10 =$ Use objects or a drawing to represent the equal groups and find how many in total.

Multiplication

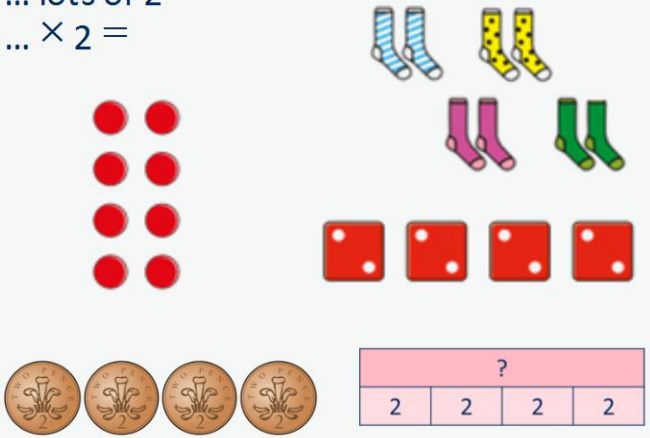
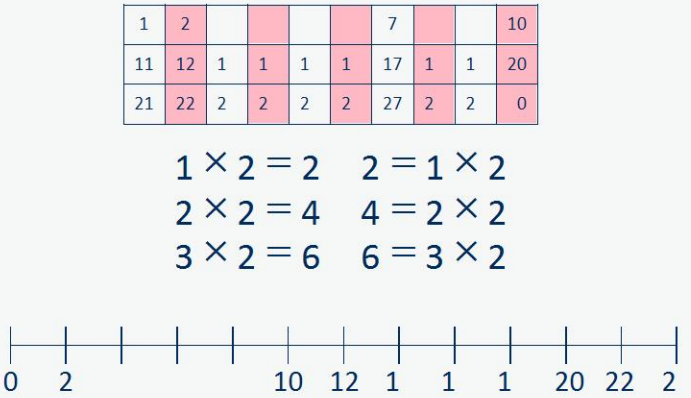
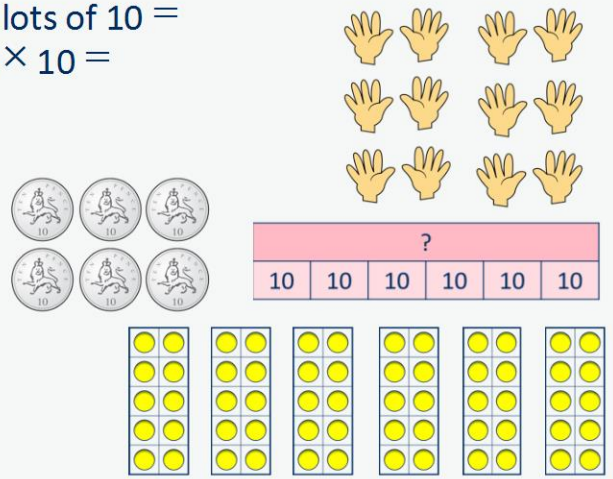
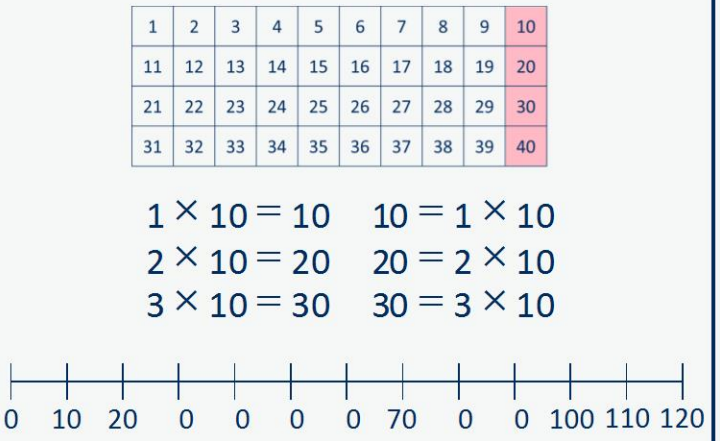
Progression of skills	Key representations
Make arrays Children use their knowledge of adding equal groups to arrange objects in columns and rows.	There are ... rows of ... There are ... altogether. There are ... columns of ... There are ... altogether. 
Make doubles Children understand that doubles are two equal groups. Children may begin to explore doubles beyond 20 using base 10	Double ... is ... ... + ... = ... 

Multiplication

Year 2	• Recall and use multiplication facts for the 2, 5 and 10 multiplication tables. • Calculate mathematical statements for multiplication within the multiplication tables and write them using the multiplication (×) and equals (=) signs. • Show that multiplication of two numbers can be done in any order (commutative).
Progression of skills	**Key representations**
Link repeated addition and multiplication Encourage children to make the link between repeated addition and multiplication.	There are … equal groups with … in each group. There are … altogether.   3 + 3 = 6 2 × 3 = 6   5 + 5 + 5 + = 20 4 × 5 = 20
Use arrays Encourage children to see that multiplication is commutative.	There are … rows with … in each row. There are … columns with … in each column.  3 lots of 5 = 15 5 + 5 + 5 = 15 5 lots of 3 = 15 3 + 3 + 3 + 3 + 3 = 15
	I can see … × … and … × … 3 × 5 = 15 5 × 3 = 15 3 × 5 = 5 × 3
Double Encourage children to make links with related facts.	Double … is …  Double 4 = 4 + 4 Double 4 is 8
	Double … is … so double … is …  Double 4 is 8 Double 40 is 80

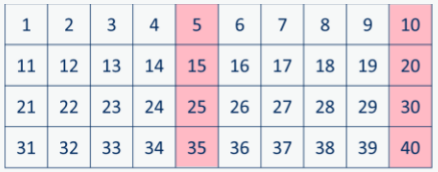
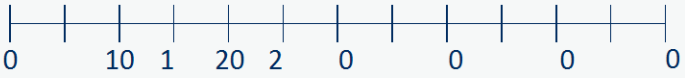
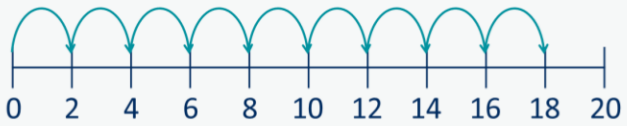
Multiplication

White Rose MATHS

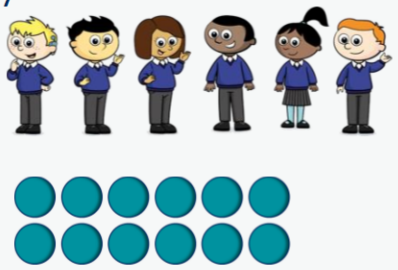
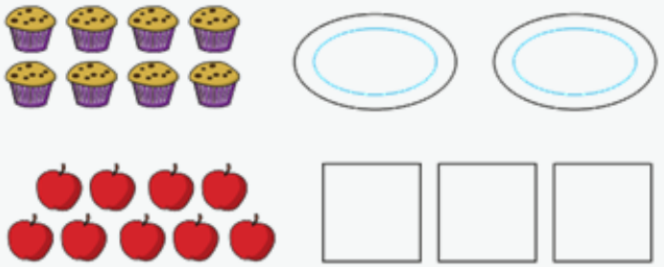
Progression of skills	Key representations	
The 2 times-table Encourage daily counting in multiples both forwards and back. Notice that all multiples of 2 are even numbers.	… lots of 2 = … × 2 = 	… times 2 is equal to … 
The 10 times-table Encourage daily counting in multiples both forwards and back. Notice the pattern in the numbers.	… lots of 10 = … × 10 = 	… times 10 is equal to … 

Multiplication

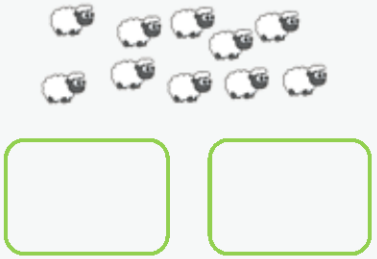
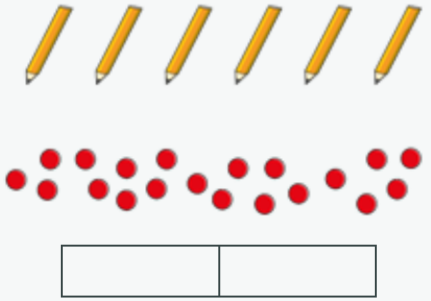
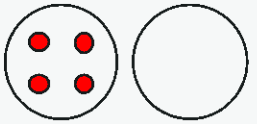
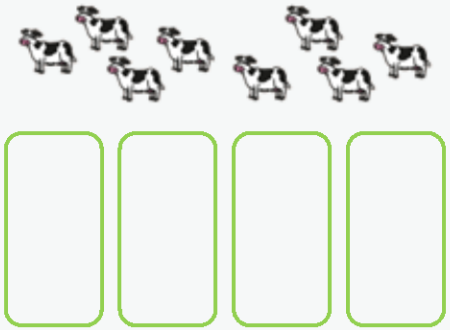
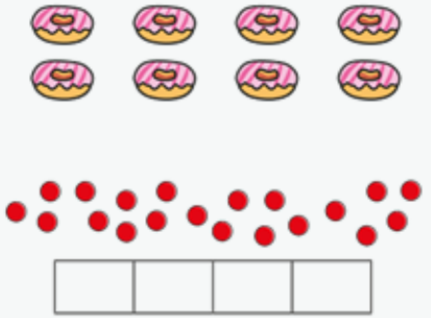
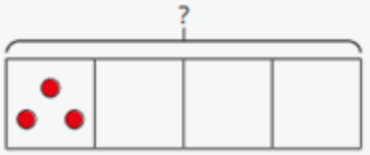
White Rose MATHS

Progression of skills	Key representations	
The 5 times-table Encourage daily counting in multiples both forwards and back. Notice the pattern in the numbers.	… lots of … = … × 5 =    	… times … is equal to …  $1 \times 5 = 5$ $5 = 1 \times 5$ $2 \times 5 = 10$ $10 = 2 \times 5$ $3 \times 5 = 15$ $15 = 3 \times 5$ 
Missing numbers Make links to known facts.	… is equal to … groups of … 18 socks, how many pairs?  	… times … is equal to … $\square \times 2 = 18$ $18 = 2 \times \square$

Division

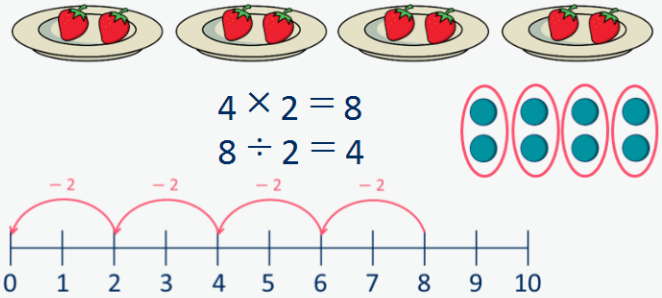
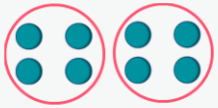
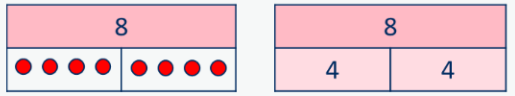
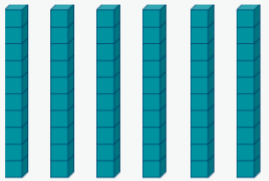
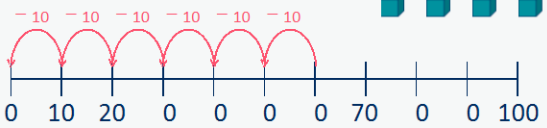
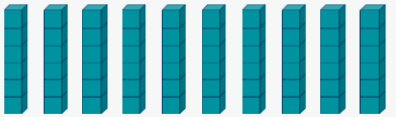
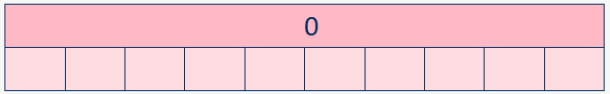
Year 1	• Solve simple one-step problems involving division, using concrete objects, pictorial representations and arrays with the support of the teacher. • Recognise, find and name a half as one of two equal parts of a quantity. • Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.		
Progression of skills	**Key representations**		
Make equal groups - grouping Encourage children to physically move objects into equal groups. They can also circle equal groups when using pictures.	There are ... altogether. How many groups of ... can you make? 	Circle groups of 2 There are ... groups of 2 	Take ... cubes. Make equal groups.  There are ... groups of ...
Make equal groups – sharing Encourage children to check that the objects have been shared fairly and each group is the same.	... have been shared equally between... There are ... on/in each ... 		Take ... cubes. Share them between ...  12 shared between ... is ...

Division

Progression of skills	Key representations		
Find a half Start with practical opportunities to share a quantity into 2 groups. Progress to circling half of the objects in a picture and then to finding the whole from a given half.	To find half, I need to share into 2 equal groups.  There are ... in each group.	Half of ... is ... 	If ... is half, what is the whole?  is half of ...
Find a quarter Start with practical opportunities to share a quantity into 4 groups. Progress to using pictures or bar models to find a quarter and then to finding the whole from a given quarter.	To find a quarter, I need to share into 4 equal groups.  There are ... in each group.	A quarter of ... is ... 	If ... is one quarter, what is the whole?  is one quarter of ...

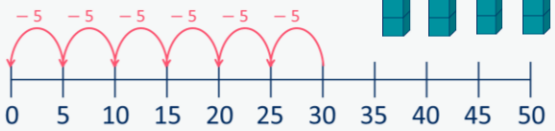
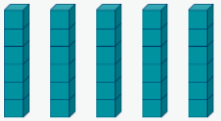
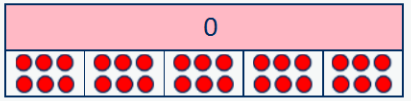
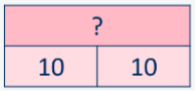
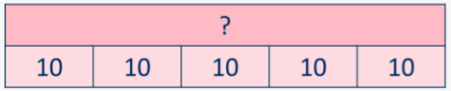
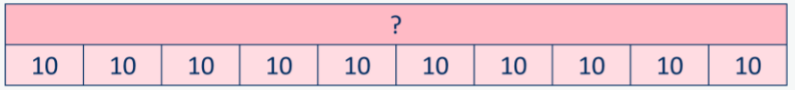
Division

Year 2	• Recall and use division facts for the 2, 5 and 10 multiplication tables. • Calculate mathematical statements for division within the multiplication tables and write them using the division (÷) and equals (=) signs. • Recognise, find, name and write fractions $\frac{1}{2}, \frac{1}{4}, \frac{2}{4}$ and $\frac{3}{4}$ of a quantity.

Progression of skills	Key representations	
Divide by 2 Encourage children to compare the grouping and sharing structures of division and to make links with times-table facts and halving.	There are … equal groups of 2 … ÷ 2 = …  4 × 2 = 8 8 ÷ 2 = 4 	… shared equally between 2 is … Half of … is … … ÷ 2 = …  4 × 2 = 8 8 ÷ 2 = 4  
Divide by 10 Encourage children to compare the grouping and sharing structures of division and to make links with times-table facts.	There are … equal groups of 10 … ÷ 10 = … 6 × 10 = 60 60 ÷ 10 = 6  	… shared equally between 10 is … … ÷ 10 = … 6 × 10 = 60 60 ÷ 10 = 6  

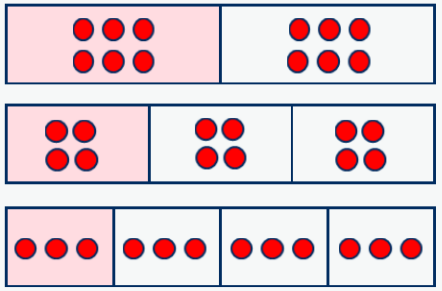
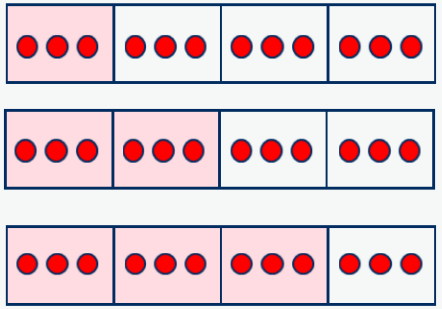
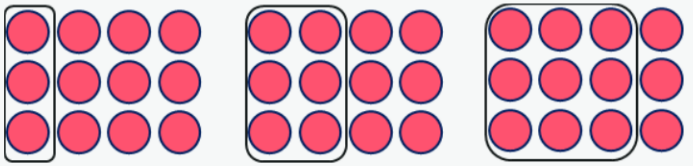
Division

White Rose MATHS

Progression of skills	Key representations	
Divide by 5 Encourage children to compare the grouping and sharing structures of division and to make links with times-table facts.	There are … equal groups of … ÷ 5 = …  6 × 5 = 30 30 ÷ 5 = 6   	… shared equally between is … … ÷ 5 = …  6 × 5 = 30 30 ÷ 5 = 6  
Missing numbers Bar models are useful to show the link between multiplication and division.	… divided by 2/ /10 is equal to …  □ ÷ 2 = 10  □ ÷ 5 = 10  □ ÷ 10 = 10	

Division

White Rose MATHS

Progression of skills	Key representations	
Unit fractions In Y2 the focus is on finding $\frac{1}{2}$, $\frac{1}{\square}$ and $\frac{1}{\square}$ Bar models are useful to show the link between division and finding a fraction.	The objects have been shared fairly into … groups. $\frac{1}{\square}$ of … is … 	There are … equal parts. There is … part circled. $\frac{1}{\square}$ is circled. 
Non-unit fractions In Y2 the focus is on finding $\frac{2}{\square}$ and $\frac{\square}{\square}$ Prompt children to notice that $\frac{2}{\square}$ is equivalent to $\frac{1}{2}$	The objects have been shared fairly into … groups. $\frac{\square}{\square}$ of … is … 	There are … equal parts. There are … parts circled. $\frac{\square}{\square}$ is circled. 

Glossary

Addend - A number to be added to another.

Aggregation - combining two or more quantities or measures to find a total.

Augmentation - increasing a quantity or measure by another quantity.

Commutative – numbers can be added in any order.

Complement – in addition, a number and its complement make a total e.g. 300 is the complement to 700 to make 1,000

Difference – the numerical difference between two numbers is found by comparing the quantity in each group.

Exchange – Change a number or expression for another of an equal value.

Minuend – A quantity or number from which another is subtracted.

Partitioning – Splitting a number into its component parts.

Reduction – Subtraction as take away.

Subitise – Instantly recognise the number of objects in a small group without needing to count.

Subtrahend - A number to be subtracted from another.

Sum - The result of an addition.

Total – The aggregate or the sum found by addition.

Glossary

Array – An ordered collection of counters, cubes or other item in rows and columns.

Commutative – Numbers can be multiplied in any order.

Dividend – In division, the number that is divided.

Divisor – In division, the number by which another is divided.

Exchange – Change a number or expression for another of an equal value.

Factor – A number that multiplies with another to make a product.

Multiplicand – In multiplication, a number to be multiplied by another.

Partitioning – Splitting a number into its component parts.

Product – The result of multiplying one number by another.

Quotient – The result of a division

Remainder – The amount left over after a division when the divisor is not a factor of the dividend.

Scaling – Enlarging or reducing a number by a given amount, called the scale factor