

Welcome to the KS1 (class 1 and 2) Maths Workshop



What questions could you ask about this picture?




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Purpose of study

Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary in most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, and a sense of enjoyment and curiosity about the subject.

Aims

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 have conceptual understanding and are able to recall and apply their knowledge rapidly and accurately to problems
- **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.

Multi-representations and the Concrete, Pictorial, Abstract (CPA) Approach



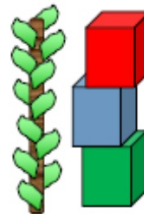
Multi-representations:

Using the resources can you show me as many different ways of showing the number 14.



ELG: Children count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and sharing.

Each day Jack's beanstalk doubled in height. It was twice as tall. Today it is 3 bricks tall. How tall will it be tomorrow?



ELG

They solve problems, including doubling, halving and sharing.



Cut the food in half to share with a friend.





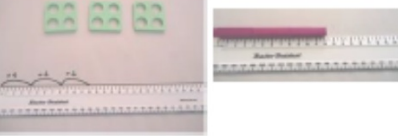

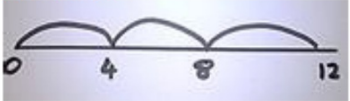

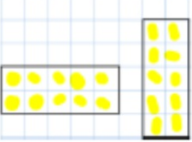
3 friends wanted to share the last 6 apples. To make it fair they need the same amount each.

Year 1 Multiply with concrete objects, arrays and pictorial representations in contexts of problems

Key vocabulary groups of, lots of, times, array, altogether, multiply, count, multiply by

Key Skills for multiplication at Year 1

- Count in multiples of 2, 5 and 10
- Recognise doubles to double 6
- Solve simple one-step problems involving multiplication and division, calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

Concrete	Pictorial	Abstract
<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>XX XX XX XX XX XX</p> <p>Use of a bar model for a more structured method</p> 	<p>3 x 4</p> <p>4 + 4 + 4</p>
<p>Use number lines to show repeated groups- 3 x 4</p> 	<p>Represent this pictorially alongside a number line e.g:</p> 	<p>Abstract number line 3 x 4 = 12</p> 
<p>Use arrays to illustrate commutativity (counters and other objects can also be used) 2 x 5 = 5 x 2</p> 	<p>Children to draw the arrays</p> 	<p>Children to be able to use an array to write a range of calculations e.g.</p> <p>2 x 5 = 10 5 x 2 = 10 2 + 2 + 2 + 2 + 2 = 10 5 + 5 = 10</p>

CARD 5

In her garden,
Anna plants some
daffodil bulbs. In each
row there are 2 bulbs.
There are 7 rows.
How many daffodil
bulbs does she plant
altogether?



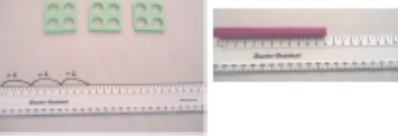



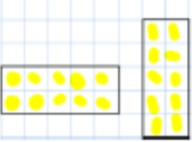
Use as many of the methods we
have just seen to solve this
problem.

Year 2 Multiplication using arrays and repeated addition.
(using at least 2s, 5s and 10s)

Key vocabulary groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, sets of, equal groups, times as big as, once, twice, three times...

Key Skills for multiplication at Year 2

- Count in steps of 2, 3 and 5 from zero and in 10s from any number
- Know the 2X, 5X and 10X tables and begin to say how many 10s are in 40 or how many 5s are in 30; recognise odd and even answers
- Write and calculate number statements using x and = signs
- Show that multiplication can be done in any order
- Solve a range of problems involving multiplication, using concrete objects, arrays, repeated addition, Numicon, mental methods and multiplication facts

Concrete	Pictorial	Abstract
<p>Repeated grouping/repeated addition (does not have to be restricted to cubes) 3×4 or 3 lots of 4</p> 	<p>Children to represent the practical resources in a picture e.g.</p> <p>XX XX XX XX XX XX</p> <p>Use of a bar model for a more structured method</p> 	<p>3×4</p> <p>$4 + 4 + 4$</p>
<p>Use number lines to show repeated groups- 3×4</p> 	<p>Represent this pictorially alongside a number line e.g:</p> 	<p>Abstract number line $3 \times 4 = 12$</p> 
<p>Use arrays to illustrate commutativity (counters and other objects can also be used) $2 \times 5 = 5 \times 2$</p> 	<p>Children to draw the arrays</p> 	<p>Children to be able to use an array to write a range of calculations e.g.</p> <p>$2 \times 5 = 10$ $5 \times 2 = 10$ $2 + 2 + 2 + 2 + 2 = 10$ $5 + 5 = 10$</p>

Jonathan has 4 boxes of marbles
with 5 in each box.
How many marbles are there altogether?
Richard has 10 fewer marbles than Jonathan.
How many marbles does Richard have?

Use as many of the methods we
have just seen to solve this
problem.

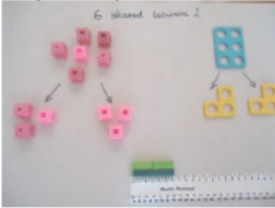


Year 1 Group and share small quantities

Using both objects diagrams and pictorial representations, to solve problems involving both **grouping** and **sharing**.

Key vocabulary share, share equally, one each, two each..., group, groups of, lots of, array

Key Skills for division at Year 1

- Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations arrays with the support of the teacher
- Through grouping and sharing small quantities, pupils begin to understand, division, and finding simple fractions of objects, numbers and quantities.
- They make connections between arrays, number patterns, and counting in twos, fives and tens.

Concrete	Pictorial	Abstract		
<p>6 shared between 2 (other concrete objects can also be used e.g. children and hoops, teddy bears, cakes and plates)</p> 	 <p>This can also be done in a bar so all 4 operations have a similar structure:</p> 	<p>$6 \div 2 = 3$</p> <p>What's the calculation?</p> <table border="1" data-bbox="1038 882 1358 931"> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">3</td> </tr> </table>	3	3
3	3			

Sarah has 12 beads.
She shares them equally
with her friend.

How many beads do
they each get?

Use the resources and an image to
answer this question.

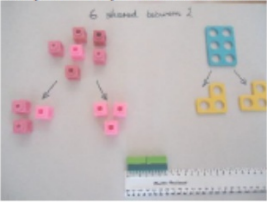



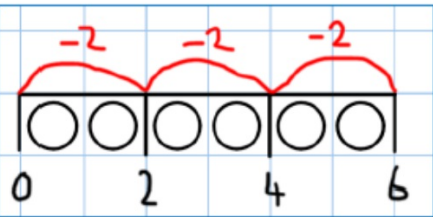
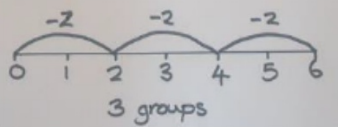
Year 2 Group and share using the \div and $=$ signs.

Use objects, arrays, pictorial representations and grouping on a number line in a variety of different contexts.

Key vocabulary share, share equally, one each, two each..., group, equal groups of, lots of, array, **divide, divided by, divided into, division, grouping, number line, left, left over**

Key Skills for division at Year 2

- Count in steps of 2, 3, and 5 from 0
- Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers.
- Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the \times , \div and $=$ signs.
- Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.
- Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

Concrete	Pictorial	Abstract		
<p>6 shared between 2 (other concrete objects can also be used e.g. children and hoops, teddy bears, cakes and plates)</p> 	 <p>This can also be done in a bar so all 4 operations have a similar structure:</p> 	<p>$6 \div 2 = 3$</p> <p>What's the calculation?</p> <table border="1" data-bbox="1031 864 1339 913"> <tr> <td style="width: 50px; text-align: center;">3</td> <td style="width: 50px; text-align: center;">3</td> </tr> </table>	3	3
3	3			
<p>Understand division as repeated grouping and subtracting</p> <p>$6 \div 2$</p> 		<p>Abstract number line</p> 		

There are 30 bananas
in a shop.

5 bananas are put in
each bag.

How many bags
can be filled?

1. Answer this question using repeated subtraction.

Please take a copy of the calculation booklet and the slides we used today.

