How We Teach Multiplication, Division and Fractions

Wheatfields Infants' and
Nursery School

Multiplication

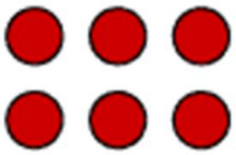
Vocabulary: Multiplied by, times, lots of, groups of. (twice, double, triple etc.)

We teach the children to think of the "x" symbol as 'lots of' or 'groups of'.
Therefore 2 x 6 means 2 lots of 6 or 2 groups of 6

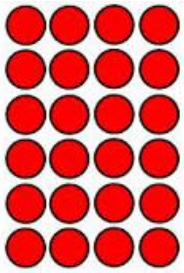
Arrays

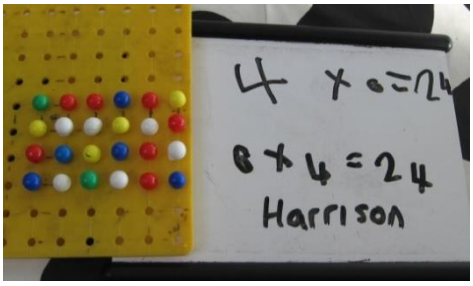
The children are taught to make and draw arrays to show what is happening to the numbers when they multiply. You can make these with cubes, Lego bricks or by drawing circles.

2 x 3



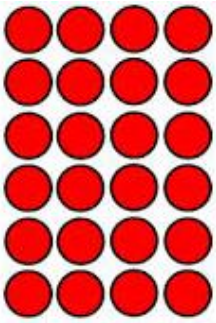
4 x 6



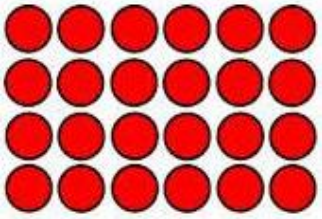


Arrays can also be rotated which helps the children to see that 6 x 4 is the same as 4 x 6.

4 x 6



6 x 4



Repeated Addition

The children can choose to solve multiplication problems by using repeated addition. For example to work out 4 x 6 they can add 4 'lots of' 6 by doing 6+6+6+6 and 6 x 4 they can add 6 lots of 4 as 4+4+4+4+4+4. They can also show this on a number line or with Numicon..

Times Tables

Once the children understand the concept of multiplication they can begin to learn times tables starting with 2's 10's and 5's. (Understand the effect of multiplying by 0 and 10).

Multiplication using the Bar Model

We also use the bar model to demonstrate and visualise multiplication and its link to repeated addition.

Bar Model

6	
3	3

2 x 3 = 6

3+ 3 = 6

20			
5	5	5	5

4 x 5 = 20

5 + 5 + 5 + 5 = 20

The bar models can also be used to show that 4 x 5 = 5 x 4.

20				
5	5	5	5	
4	4	4	4	4

5 + 5 + 5+ 5 = 20

4 + 4+ 4+ 4+ 4 = 20

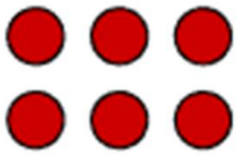
Division

Vocabulary: Divided by, grouped into, shared between, How many times does.. fit into…?

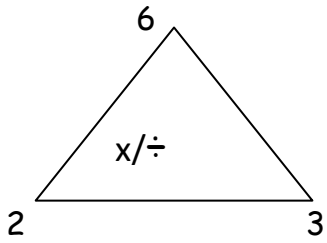
Arrays

Arrays are used to show that division is the inverse of multiplication.

If you know that 2 x 3 =6 Then you also know that 6÷3=2 and 6÷2+3

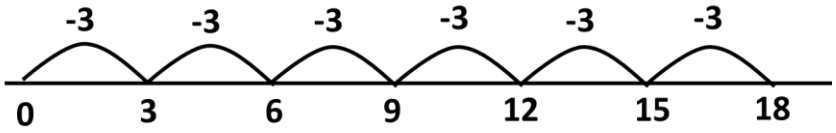


2x3=6
3x2=6
6÷2=3
6÷3=2



Repeated Subtraction

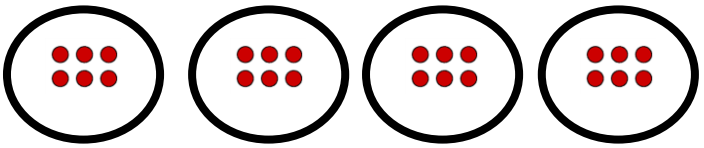
The children can choose to solve division problems by using repeated subtraction. For example to work out 18 ÷3 they can subtract 3 from 18 until they get to 0. They need to count how many times they subtracted 3.



Division by Sharing

For example: There are 24 sweets to share fairly between 4 people. How many sweets will each person have?

- 24 ÷ 4
- Get 24 cubes, sweets, beads, or dots
- Share them fairly between 4 people
- 1 for you , 1 for you etc.
- Count how many each person has
- Check it is fair



Division by Grouping

For example: At the fairground there are 6 seats in each carriage on the ghost train and there are 24 children that want to go on the ride. How many carriages will they fill?

- 24÷6
- How many groups of 6 in 24
- Get 24 cubes
- How many groups of 6 can you make?

Remainders

We work in whole numbers at this stage. If there are any left they are the remainder.

For example 7÷2=3 r1

Division using the Bar Model

We also use the bar model to demonstrate and visualise division and its link to fractions.

Bar Model

6	
3	3

$6 \div 2 = 3$

$\frac{1}{2} \times 6 = 3$

This bar model shows that half of 6 is 3 and that 6 divided by 2 (shared between 2) is 3.

20			
5	5	5	5

$20 \div 4 = 5$

$\frac{1}{4} \times 20 = 5$

The bar model shows that a quarter of 20 is 5 and that 20 divided by 4 (shared between 4) is 5.

The bar model is a useful tool to picture and represent worded problems.

For example: There are 24 apples in a bag. 6 children share them equally. How many would they have each.

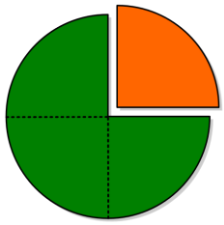
24					
4	4	4	4	4	4

$24 \div 6 = 4$

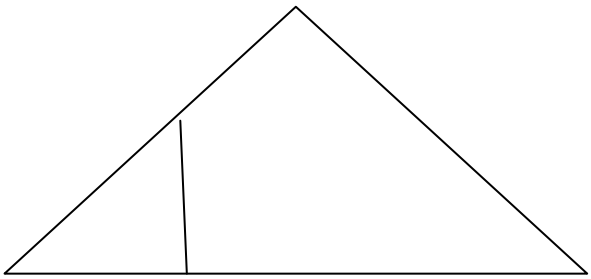
This is another way of solving division by sharing.

Fractions of Shapes

We introduce fractions by looking at fractions of shapes or objects. You can practise this at home by sharing food items equally. E.g. share the pizza equally between 4 by cutting it into quarters.



Is this half? Why/ Why not?

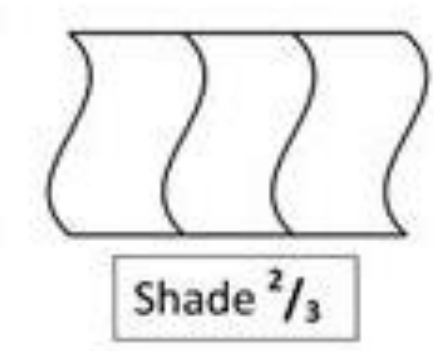


We teach the children to find halves and quarters of shapes by folding paper and ensuring the sections match exactly.

We use the vocabulary of half, one quarter, three quarters and then thirds.

Remember it has to be 'fair' or 'equal'.

They can practise by shading and labelling parts of shapes. In this example we would explain 2/3 as meaning two thirds or shade 2 'out of' 3 sections.



<u>Wholeness</u>

Children need to understand that 2 halves make a whole (1) and 4 quarters make a whole (1).

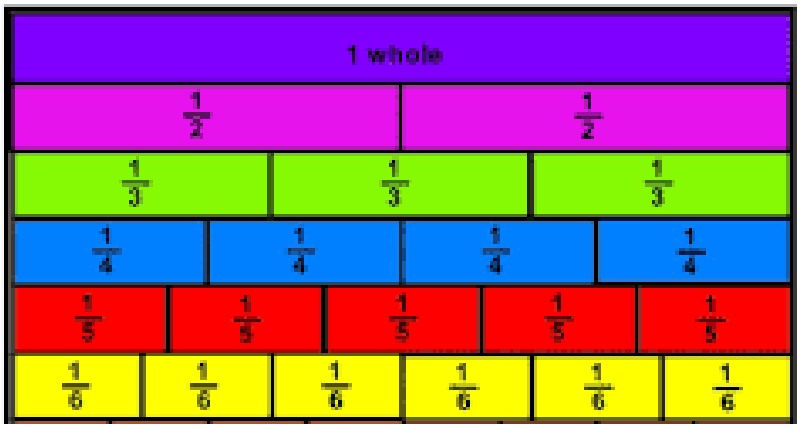
Fractions using the Bar Model

We also use the bar model to demonstrate and visualise fractions and their equivalence.

Bar Model

1 (whole)			
$\frac{1}{2}$ (half)		$\frac{1}{2}$ (half)	
$\frac{1}{4}$ (quarter)	$\frac{1}{4}$ (quarter)	$\frac{1}{4}$ (quarter)	$\frac{1}{4}$ (quarter)

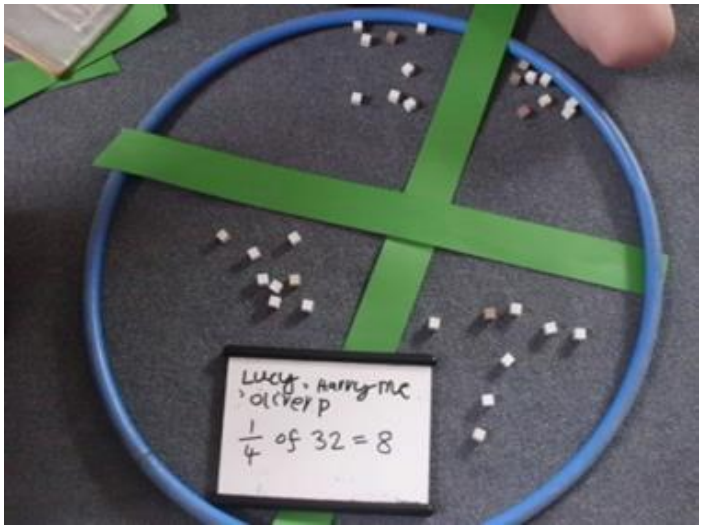
This model clearly shows that 2 halves make a whole, 4 quarters make a whole and that 2 quarters is the same as 1 half.



From this fraction wall you can see that 2/6 = 1/3. (2 sixths is the same as 1 third.)

Fractions of Number

Can you find a quarter of 32? This is how a group of Year 2 children did it.



They used the strategy they know for division by sharing and shared 32 equally into 4.

- Get 32 cubes, sweets, beads, or dots
- Share them fairly into 4 groups
- 1 for you , 1 for you etc
- Count how many each group has
- Check it is fair

Could you use the above to find $\frac{3}{4}$ of 32?
You could also use the **bar model**:

32			

We also teach the children that they can work out a quarter of a number by halving and then halving again.
For example; to work out $\frac{1}{4}$ of 20 I know that half of 20 is 10, and then half of 10 is 5 so $\frac{1}{4}$ of 20 is 5.

Once confident with the concept of fractions, children can solve worded problems that involve fractions.
E.g. Jack had 12 sweets. He gave half to Ella. How many sweets did he have left?