White Rose Maths

Autumn - Block 4

Multiplication & Division

Overview

Small Steps

1. Recognise equal groups
2. Make equal groups
3. Add equal groups
4. Multiplication sentences using the × symbol
5. Multiplication sentences from pictures
6. Use arrays
7. 2 times-table
8. 5 times-table
9. 10 times-table

NC Objectives

Recall and use multiplication and division facts for the 2, 5 and 10 times-tables, including recognising odd and even numbers.

Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) sign.

Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods and multiplication and division facts, including problems in contexts.

Show that the multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.

Recognise Equal Groups

Notes and Guidance

Children describe equal groups using stem sentences to support them. It is important that children know which groups are equal and unequal, and why they are equal or unequal. The addition and multiplication symbols are not used within this small step but use of the language of addition and multiplication will support them in understanding repeated addition and multiplication. The examples included refer to the times tables facts that Year 2 children need to know.

Mathematical Talk

What does the 2 represent? What does the 3 represent?

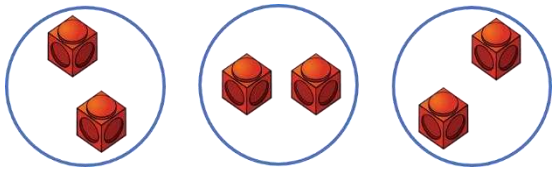
What does the 5 represent? What does the 2 represent?

I have ___ equal groups, with ___ in each group. Which image am I describing?

Why are these groups equal/unequal?

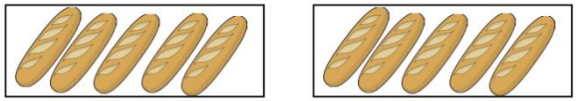
Varied Fluency

- Complete the stem sentences.



There are ____ equal groups with ____ in each group.

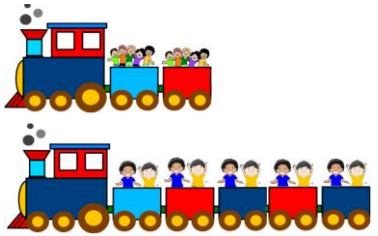
- Complete the sentences.



There are ____ equal groups with ____ in each group.

There are _____ baguettes altogether.

- Describe the equal groups.

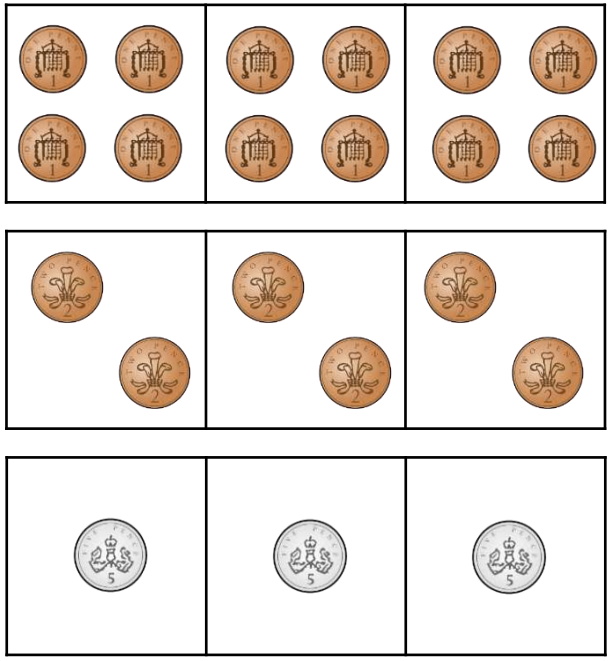


What is the same and what is different in each group?

Recognise Equal Groups

Reasoning and Problem Solving

Which group of money is the odd one out?

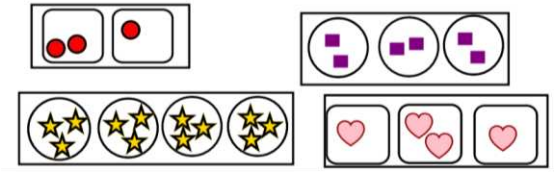


Explain why.

The bags with 5 p in each because the 2 ps and 1 ps have 4 p in each group.

Sort into equal and unequal groups.

Equal Groups	Unequal Groups

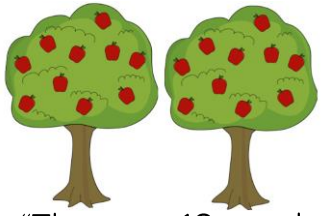


Create your own picture to go in each column.

Hearts and dots in unequal groups.

Stars and squares in equal groups.

Spot the mistake.



Alex says, "There are 10 equal groups with 2 in each group. There are ten 2s."

There are 2 equal groups with 10 in each group

There are two 10s.

Make Equal Groups

Notes and Guidance

Children should be able to make equal groups to demonstrate their understanding of the word 'equal'.

With the examples provided to the children, it is important that they are exposed to numerals and words, as well as multiple representations.

Mathematical Talk

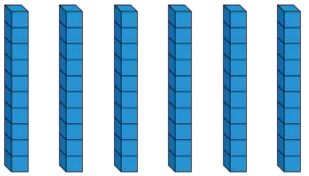
How else could you represent these in equal groups?

How many ways can you represent this?

How have you grouped your items?

Varied Fluency

- The Base 10 shows six equal groups with ten in each group.
  There are six tens.



How else can you represent these as equal groups?

- How many ways can you represent 'four equal groups with three in each group'?

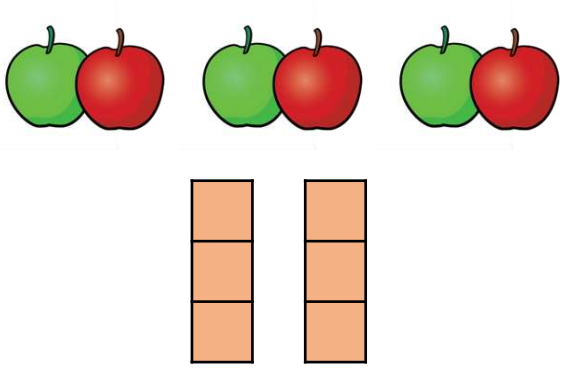
- What else do we need to show 'five 3s'?

How else can we show five equal groups with 3 in each group?
Compare your answer with a partner.

Make Equal Groups

Reasoning and Problem Solving

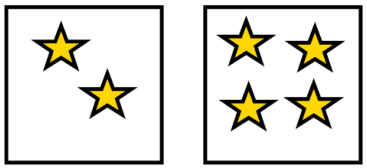
Has Eva shown the equal groups correctly?



Draw or use cubes to show what Eva should have done.

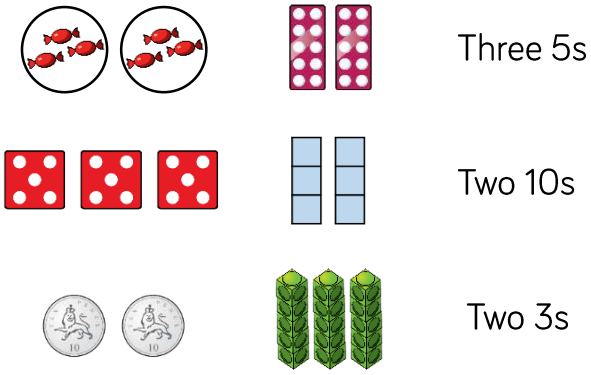
Children to draw or make 3 towers with 2 in each tower.

How can you make the groups equal?



Various answers e.g. move one star from right to left box. Any answer that makes them equal.

Match the equal groups.



Sweets, squares, two 3s.

Dice, cubes, three 5s.

Coins, number pieces, two 10s.

Add Equal Groups

Notes and Guidance

Children begin to connect equal groups to repeated addition.

At this point children have added 3 one digit numbers together, therefore they can add up to 3 equal groups when each group is any one digit number.

If there are more than 3 equal groups, the examples must be limited to 2s, 5s, 10s and 3s.

Mathematical Talk

What do the two 3s represent?

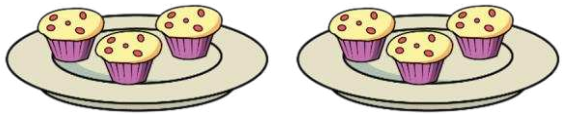
Why are we using the addition symbol?

How else can we show the equal groups?

What is the total?

Varied Fluency

Complete:



There are ____ equal groups with ____ in each group.
There are ____ 3s.
____ + ____ = 6

Complete:

There are ____ equal groups with ____ in each group.
There are three ____s.
____ + ____ + ____ = 12

Complete the table.

	Draw It	Say It	Add It
			

Add Equal Groups

Reasoning and Problem Solving

True or False?

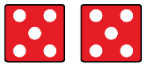
$5 + 5 = 2 + 2 + 2 + 2 + 2$

Draw an image or use cubes to help you explain your answer.

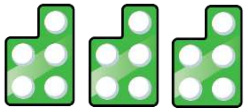
This is true because they are both equal to 10 but the groups look different.

To the left of the 'equal to' sign are 2 equal groups of 5, and to the right of the 'equal to' sign are 5 equal groups of 2.

Which one does not belong?



Two 5s



Ten

$5 + 5$

What do we need to change to make them all represent the same?

The three 5s do not belong. We would have to take away one five.

The Multiplication Symbol

Notes and Guidance

Children are introduced to the multiplication symbol for the first time. They should link repeated addition and multiplication together, using stem sentences to support their understanding.
They should also be able to interpret mathematical stories and create their own involving multiplication.
The use of concrete resources and pictorial representations is still vital for understanding.

Mathematical Talk

What does the 3 represent? What does the 6 represent?

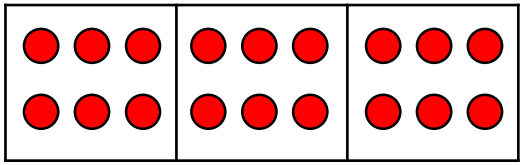
What does 'lots of' mean?

Does $18 = 3 \times 6$ mean the same?

How is $6 + 6 + 6$ the same as 3×6? How is it different?

Varied Fluency

Complete the sentences to describe the equal groups.



___ + ___ + ___ = 18

___ × ___ = 18

There are ___ equal groups with ____ in each group.
There are three ____.

Complete:

Three 2s	Draw It	Addition	Multiplication
There are 3 equal groups with 2 in each group.			

Complete:

Addition	Multiplication	Story
10 + 10 + 10		
	6 × 5	

The Multiplication Symbol

Reasoning and Problem Solving

$3 + 3 + 3 = 3 \times 3$

Is Mo correct? Explain why.

Draw an image to help you.

He is correct because
$3 + 3 + 3 = 9$
and $3 \times 3 = 9$

Use $<$, $>$ or $=$ to make the statements correct.

3×5	◯	$5 + 5 + 5 + 5$
2×2	◯	$2 + 2$
10×2	◯	$5 + 5 + 5$

$3 \times 5 < 5 + 5 + 5 + 5$

$2 \times 2 = 2 + 2$

$10 \times 2 > 5 + 5 + 5$

Think of a multiplication to complete:

$6 + 6 + 6 > \_\_ \times \_\_$

Any two numbers which multiply together to give an answer of less than 18

The total is 12, what could the addition and multiplication be?

$6 + 6 = 2 \times 6$

$2 + 2 + 2 + 2 + 2 + 2 = 6 \times 2$

$3 + 3 + 3 + 3 = 4 \times 3$

$4 + 4 + 4 = 3 \times 4$

$12 = 1 \times 12$

$1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 = 12 \times 1$

Multiplication from Pictures

Notes and Guidance

Children will use the multiplication symbol and work out the total from pictures.

They should also be able to interpret a multiplication word problem by drawing images to help them solve it.

Coins could be used within this small step too.

Mathematical Talk

What does the 4 represent?

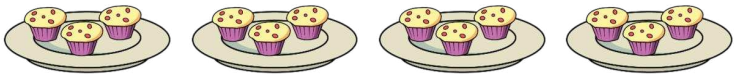
What does the 3 represent?

What does the 12 represent?

Can you think of your own story for $3 \times 4 = 12$?

Varied Fluency

Complete:



___ × ___ = ___

___ lots of 3 = ___

___ multiplied by ___ = 12

Complete:

4 lots of 3 ○

= 1 × ___

Complete the table.

Picture	Multiplication	Sentence
	4 × 10 = 40	4 lots of 10 is equal to 40
	35 = 7 × 5	
		6 lots of 3 is equal to 18

Multiplication from Pictures

Reasoning and Problem Solving

There are four baskets.

There are three dolls in each basket.

How many dolls are there altogether?

Draw an image and write a calculation to represent the problem.

The image could be 4 circles with 3 dots in each.

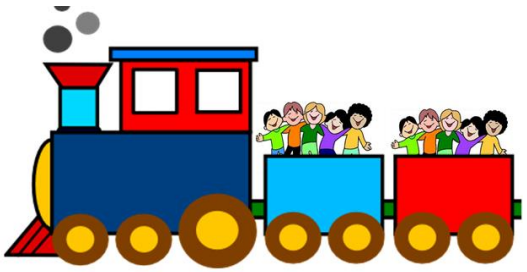
The calculation:

$4 \times 3 = 12$

Write a story for the calculation 4×10

Draw an image to illustrate your story.

Stories with 4 groups and 10 in each group, for example:
Four tables with ten children on each table.
Four purses with 10p in each purse.



2×5
$5 + 5$
5×2

Each calculation could explain the image.

Explain why.

There are 2 groups with 5 people in each group.

There are 5 people in one group and 5 in the other.

There are 5 lots of 2 people.

Use Arrays

Notes and Guidance

Children explore arrays to see the commutativity of multiplication facts e.g. $5 \times 2 = 2 \times 5$

The use of the array could be used to help children calculate multiplication statements.

The multiplication symbol and language of 'lots of' should be used interchangeably.

Mathematical Talk

Where are the 2 lots of 3?

Where are the 3 lots of 2?

What do you notice?

What can we use to represent the eggs?

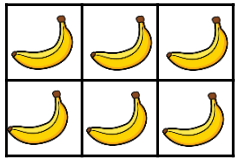
Can you draw an image?

Varied Fluency

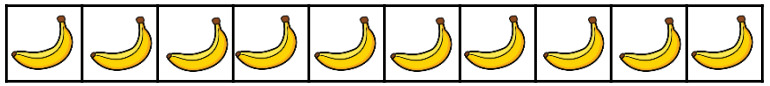
On the image, find 2×5 and 5×2

Can you represent this array using another object?

Complete the number sentences to describe the arrays.



2×3 and ___ × ___



___ × ___ and ___ × ___

Draw an array to show:

$4 \times 5 = 5 \times 4$

3 lots of 10 = 10 lots of 3

Use Arrays

Reasoning and Problem Solving

With 12 cubes, how many different arrays can you create?

Once you have created your array complete:

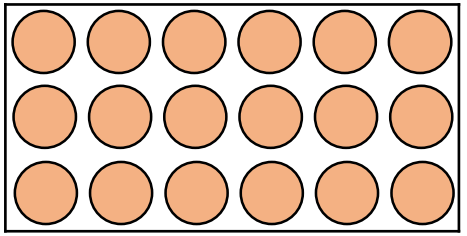
___ × ___ = ___ × ___

$1 \times 12 = 12 \times 1$

$2 \times 6 = 6 \times 2$

$3 \times 4 = 4 \times 3$

Find different ways to solve six lots of three.



Count in 3s
3 lots of 3 add 3 lots of 3
5 × 3 add 1 × 3
etc.

Part of this array is hidden.

The total is less than 16

What could the array be?

4 × 2
5 × 2
6 × 2
7 × 2

The 2 Times-Table

Notes and Guidance

Children should be comfortable with the concept of multiplication so they can apply this to multiplication tables.

Images, as well as number tracks, should be used to encourage children to count in twos.

Resources such as cubes and number pieces are important for children to explore equal groups within the 2 times-table.

Mathematical Talk

If 16 p is made using 2 p coins, how many coins would there be?

How many 2s go into 16?

How can the images of the 5 bicycles help you to solve the problems?

Varied Fluency

- Count in 2s to calculate how many eyes there are.

There are ____ eyes in total.

____ × ____ = ____

- Complete the number track.

2	4		8		12
14	16	18			24
	2	4	6	8	

- How many wheels are there on five bicycles?

If there are 14 wheels, how many bicycles are there?

The 2 Times-Table

Reasoning and Problem Solving

Fill in the blanks.

$3 \times \_\_\_ = 6$

$\_\_\_ \times 2 = 20$

$\_\_\_ = 8 \times 2$

2

10

16

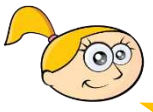
Tommy says that $10 \times 2 = 22$

Is he correct?

Explain how you know.

No Tommy is wrong because $10 \times 2 = 20$
Children could draw an array or a picture to explain their answer.

Eva says,



Every number in the 2 times-table is even.

Is she correct? Explain your answer.

Yes, because 2 is even, and the 2 times-table is going up in 2s. When you add two even numbers the answer is always even.

The 5 Times-Table

Notes and Guidance

Children can already count in 5s from any given number. They will also have developed understanding of the 2 times-table.

This small step is focused on the 5 times table and it is important to include the use of zero. Children should see the = sign at both ends of the calculation to understand that it means 'equals to'.

Mathematical Talk

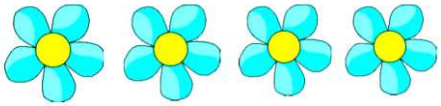
If there are 30 petals, how many flowers? Can you count in 5s to 30? How many 5s go into 30?

How many 5s go into 35?

What does each symbol mean?

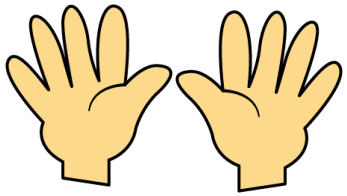
Varied Fluency

- How many petals altogether?



Write the calculation.

- There are 35 fingers.
How many hands?



___ × 5 = 35

- Use <, > or = to make the statements correct.

2 × 5 ◯ 5 × 2

3 × 2 ◯ 4 × 5

10 × 5 ◯ 5 × 5

The 5 Times-Table

Reasoning and Problem Solving

Is Mo correct?

Explain your answer.

Mo is incorrect because some of the multiples of the five times-table are even, e.g. 10, 20, 30

Tubes of tennis balls come in packs of 2 and 5

Whitney has 22 tubes of balls.

How many of each pack could she have?

How many ways can you do it?

Whitney could have:
4 packs of 5 and 1 pack of 2,
11 packs of 2 and 0 packs of 5,
2 packs of 5 and 6 packs of 2

Tommy and Rosie have both drawn bar models to show 7 × 5

35						
5	5	5	5	5	5	5

35				
7	7	7	7	7

What's the same and what is different about their bar models?

Draw your own bar model to represent 4 × 5

The total shown is the same.
Tommy's bar shows seven lots of 5 whereas Rosie's bar show five lots of 7

Children can choose either way to represent 4 × 5

The 10 Times-Table

Notes and Guidance

Children have counted in 10s from any given whole number. This small step is focused on the 10 times-table and it is important to include the use of zero.

Children should see the = sign at both ends of the calculation to understand what it means.

Mathematical Talk

What if there were 10 packs of crayons?

If there are 50 crayons altogether, how many packets are there? How do you know?

How many tens go into 30? Can you count in 10s to 30?

What does greater than mean? What does less than mean?

Varied Fluency

- How many crayons are there altogether?

There are ____ crayons altogether.

____ × 10 = ____

- Altogether there are 30 bottles, how many walls are there?

__ × 10 = 30

- Think of a multiplication fact for 10s to go in each box.

2 × 10		9 × 10	0 × 10		2 × 10
smallest		greatest	smallest		greatest
	1 × 10	6 × 10		5 × 10	
smallest		greatest	smallest		greatest

The 10 Times-Table

Reasoning and Problem Solving

On sports day, Jack runs 10 metres, 7 times.

Which of these calculations do **not** describe this word problem?

$10 + 7$

7×10

$7 + 7 + 7 + 7 + 7 + 7 + 7 + 7 + 7 + 7$

$10 + 10 + 10 + 10 + 10 + 10 + 10$

Explain why.

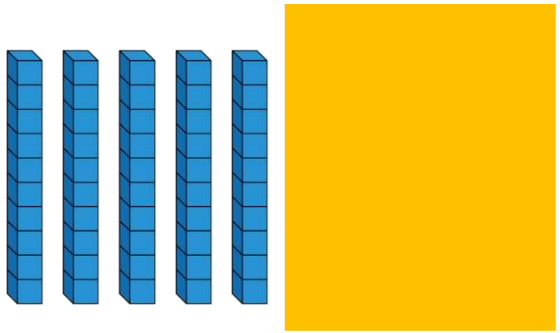
$10 + 7$ is incorrect because he has run 10 metres, 7 times, not 10 metres then 7 metres.

$7 + 7 + 7 + 7 + 7 + 7 + 7 + 7 + 7 + 7$ is incorrect because he does not run 7 metres each time but 10 metres.

Some Base 10 is hidden.

The total is less than 100

What could the calculation be?



$\_\_\_ \times 10 = \_\_\_$

Tim says it could be 10×10
Is he correct? Explain your answer.

It could be
$6 \times 10 = 60$
$7 \times 10 = 70$
$8 \times 10 = 80$
$9 \times 10 = 90$

It can't be 10×10 because 100 is not less than 100, it is equal to 100.