White Rose Maths

Autumn - Block 3

Multiplication & Division

Overview

Small Steps

Notes for 2020/21

Multiplication – equal groups

Multiplication using the symbol (R)

Using arrays (R)

2 times-table (R)

5 times-table (R)

Make equal groups - sharing (R)

Make equal groups - grouping (R)

Divide by 2 (R)

Divide by 5 (R)

Divide by 10 (R)

Multiply by 3

Divide by 3

The 3 times table

Children should have met the 2, 5 and 10 times table including being able to divide by 2, 5 and 10. However it may not be fully embedded.

These recap steps could be filtered in during starters or morning work to aim for fluency.

Overview

Small Steps

Notes for 2020/21

Multiply by 4

Divide by 4

The 4 times table

Multiply by 8

Divide by 8

The 8 times table

Understanding of the 4 and 8 times table relies on a deep knowledge of the 2s, therefore a recap would be useful.

Multiplication – Equal Groups

Notes and Guidance

Children recap their understanding of recognising, making and adding equal groups. This will allow them to build on prior learning and prepare them for the next small steps.

Mathematical Talk

What is the same and what is different between each of the groups?

What does the 3 represent?

What does the 8 represent?

How can we represent the groups?

Varied Fluency

Describe the equal groups.

_____ equal groups of _____

_____ equal groups of _____

How many different ways can you represent:
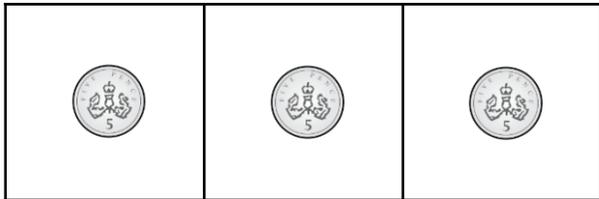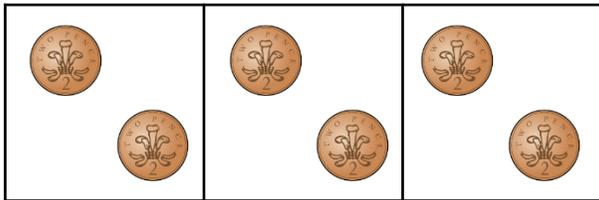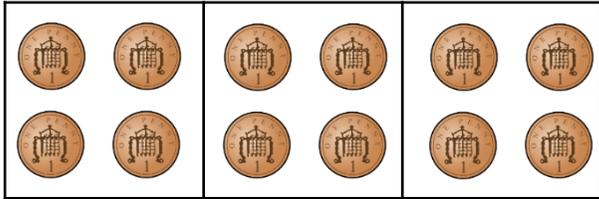Six equal groups with 4 in each group?
Six 4s?

Complete:

	Add It
Say it There are ___ equal groups with ___ in each group. There are ____ altogether.	Multiply it

4

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Multiplication – Equal Groups

Reasoning and Problem Solving
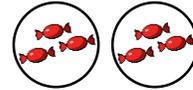
Which row of money is the odd one out?

Explain why.

The first two rows have 4p in each group, and 12p in total.

The third row has 5p in each group, so 15p in total.

The third group is therefore the odd one out.

Match the equal groups together.

Three 5s

Two 10s

Two 3s

Sweets, squares, two 3s

Dice, cubes, three 5s

Coins, number pieces, two 10s.

5

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	

6

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The Multiplication Symbol

Reasoning and Problem Solving

R

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

Is Mo correct? Explain why.

Draw an image to help you.

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

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

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

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

$2 \times 2 = 2 + 2$

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

Think of a multiplication to complete:

$$6 + 6 + 6 > \underline{\quad} \times \underline{\quad}$$

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

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

$6 + 6 = 2 \times 6$

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

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

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

$12 = 1 \times 12$

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

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?
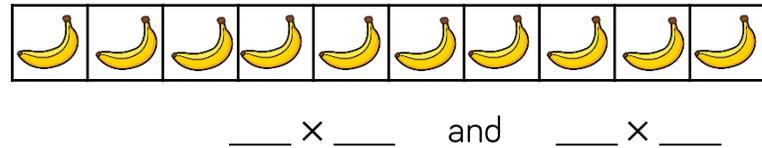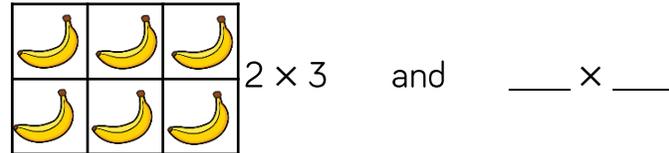
Can you draw an image?

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

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Use Arrays

Reasoning and Problem Solving

R

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

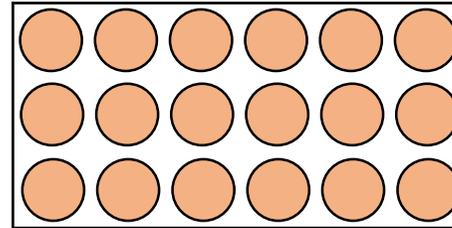Once you have created your array complete:
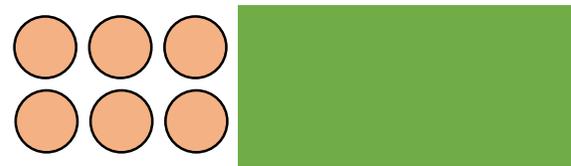
___ × ___ = ___ × ___

$1 \times 12 = 12 \times 1$

$2 \times 6 = 6 \times 2$

$3 \times 4 = 4 \times 3$

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?

10

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The 2 Times-Table

Reasoning and Problem Solving

R

Fill in the blanks.

$$3 \times \underline{\quad} = 6$$

$$\underline{\quad} \times 2 = 20$$

$$\underline{\quad} = 8 \times 2$$

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.

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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?
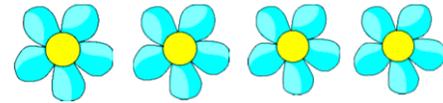
How many 5s go into 35?
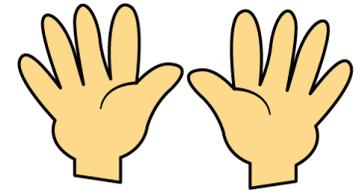
What does each symbol mean?

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

12

The 5 Times-Table

Reasoning and Problem Solving

Is Mo correct?

Every number in the 5 times table is odd.

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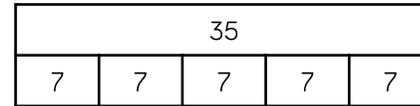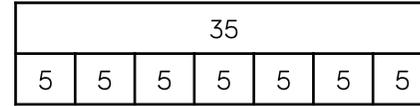
What's the same and what is different about their bar models?

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

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Make Equal Groups - Sharing

Notes and Guidance

Children divide by sharing objects into equal groups using one-to-one correspondence. They need to do this using concrete manipulatives in different contexts, then move on to pictorial representations.

Children will be introduced to the '÷' symbol. They will begin to see the link between division and multiplication.

Mathematical Talk

How many do you have to begin with?
How many equal groups are you sharing between?
How many are in each group?
How do you know that you have shared the objects equally?

___ has been shared equally into ___ equal groups.
I have ___ in each group.
___ groups of ___ make ___

Varied Fluency

Share the 12 cubes equally into the two boxes.

There are ___ cubes altogether.
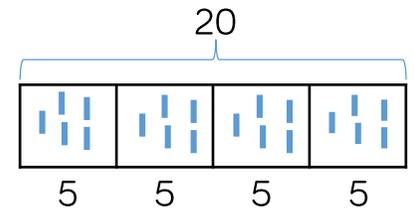There are ___ boxes.
There are ___ cubes in each box.

Can you share the 12 cubes equally into 3 boxes?

24 children are put into 4 equal teams.
How many children are in each team?

Can you use manipulatives to represent the children to show how you found your answer?

Ron draws this bar model to divide 20 into 4 equal groups.
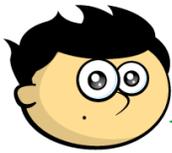How does his model represent this?
He writes $20 ÷ 4 = 5$

What other number sentences could Ron create using his model?

Make Equal Groups - Sharing
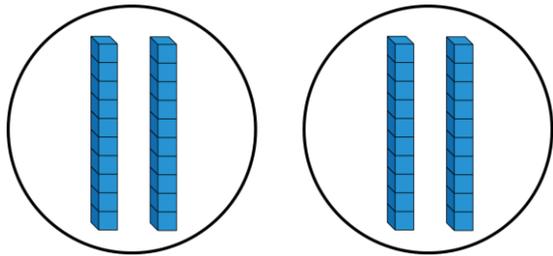
Reasoning and Problem Solving

Jack says,

I can work out 40 ÷ 2 easily because I know that 40 is the same as 4 tens.
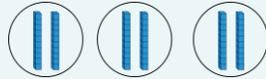
This is what he does:

40 ÷ 2 = 20

Is it possible to work out 60 ÷ 3 in the same way?
Prove it.

Is it possible to work out 60 ÷ 4?
What is different about this calculation?

Possible answer :

For 60 ÷ 4 the children will need to exchange 2 tens for 20 ones so they can put one 10 and 5 ones into each group.

Alex has 20 sweets and shares them between 5 friends.

Tommy has 20 sweets and shares them between 10 friends.

Whose friends will receive the most sweets?

How do you know?

Alex's friends get more because Tommy is sharing with more people so they will get fewer sweets each. Alex's friends will get 4 sweets each whereas Tommy's friends will only get 2 sweets each.

Make Equal Groups - Grouping

Notes and Guidance

Children divide by making equal groups. They then count on to find the total number of groups.

They need to do this using concrete manipulatives and pictorially in a variety of contexts.

They need to recognise the link between division, multiplication and repeated addition.

Mathematical Talk

How many do you have to begin with?
How many are in each group?
How many groups can you make?

How long should your number line be?
What will you count up in?

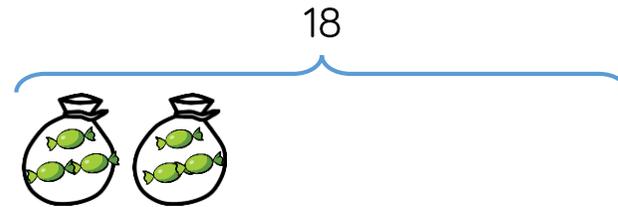____ groups of ____ make _____

Varied Fluency

R

☐ Pencils come in packs of 20
We need to put 5 in each pot.
How many pots will we need?

There are ___ pencils altogether.
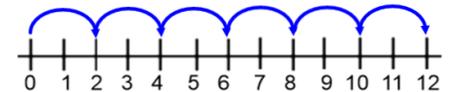There are ___ pencils in each pot.
There are ___ pots.

☐ Mrs Green has 18 sweets.
She puts 3 sweets in each bag.
How many bags can she fill?

$$18 \div 3 = \boxed{}$$

18

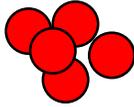☐ Mo uses a number line to work out how many equal groups of 2 he can make from 12

Use a number line to work out how many equal groups of 5 you can make from 30

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Make Equal Groups - Grouping

Reasoning and Problem Solving

R

You have 30 counters.

How many different ways can you put them into equal groups?

Write down all the possible ways.

10 groups of 3
3 groups of 10
6 groups of 5
5 groups of 6
2 groups of 15
15 groups of 2
1 group of 30
30 groups of 1

Amir has some counters. He makes 5 equal groups.

The amount he started with is greater than 10 but less than 35

How many counters could he have started with?

How many will be in each group?

He could have 30 counters in 5 groups of 6

25 counters in 5 groups of 5

20 counters in 5 groups of 4

15 counters in 5 groups of 3

Divide by 2

Notes and Guidance

Children should be secure with grouping and sharing. They will use this knowledge to help them divide by 2

They will be secure with representing division as an abstract number sentence using the division and equals symbol.

Children should be able to count in 2s and know their 2 times table.

Mathematical Talk

What do you notice when you group these objects into twos?

Is there a link between dividing by 2 and halving?

What is different about sharing into two groups and grouping in twos?

Can we write a multiplication sentence as well as a division sentence? What do you notice?

Varied Fluency

Complete the stem sentences.

I have ___ cubes altogether.
There are ___ in each group.
There are ___ groups.

$$\square \div \square = \square$$
$$\square \times \square = \square$$

Group the socks into pairs.

$$\square \div \square = \square$$
$$\square \times \square = \square$$

Complete the number sentences.

Mo and Tommy have 12 sweets between them. They share them equally. How many sweets does each child get?

There are ___ sweets altogether.
There are ___ groups.
There are ___ in each group.

12
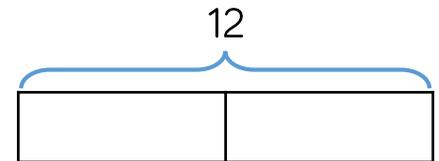
Complete the bar model and write a calculation to match.

18

Divide by 2

Reasoning and Problem Solving

R

I have 24p.
I divide it equally between 2 friends.
How much will they get each?

I have 24p in 2p coins.
How many 2p coins do I have?

Consider the two questions above.
What is the same and what is different?

The calculation is the same in both. In the first question we are sharing, whereas in the second question we are grouping.

Tommy and Annie have some counters.

Tommy shares his counters into 2 equal groups.
He has 15 in each group.

Annie groups her counters in twos.
She has 19 groups.

Who has more counters and by how many?
How did you work it out?

Tommy has 30 counters.
Annie has 38 counters.
Annie has 8 more.
Children could have compared 15 and 19 and realised they could have done 2 × 4

Ron has shared some grapes equally between two friends.
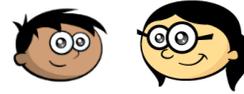
Ron's friends

Each friend receives fewer than 50 grapes.

Complete the sentences to describe the number of grapes Ron started with.

He must have started with…

He could have started with…

He can't have started with…

Possible answer:

He must have started with an even number of grapes.

He could have started with 40 grapes.

He can't have started with 100 grapes.

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Divide by 5

Notes and Guidance

During this step, children focus on efficient strategies and whether they should use grouping or sharing depending on the context of the question.

They use their knowledge of the five times table to help them divide by 5

They will continue to see the = sign both before and after the calculation.

Mathematical Talk

How can we represent the problem using objects/images?

How does knowing your 5 times table help when dividing by 5?

Circle all the multiples of 5 on a 100 square. What do you notice about the numbers? Can you explain the pattern? How does this help you to divide these numbers?

When would we count in 5s?

Varied Fluency

Take 30 cubes.
How many towers of 5 can you make?
You can make ___ towers of 5
___ towers of 5 is the same as 30
30 is the same as ___ towers of 5

40 pencils are shared between 5 children.

$\boxed{} \div \boxed{} = \boxed{}$

How many pencils does each child get?

Group the 1p coins into 5s.
How many 5p coins do we need to make the same amount of money?
Draw coins and complete the missing information.
- ___ lots of 5p = 20 one pence coins
- ___ lots of 5p = 20p
- 20p = ___ × 5p
- 20p ÷ 5 = ___

20

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Divide by 5

Reasoning and Problem Solving

R

A party bag contains 5 sweets.
A jar contains 5 party bags.
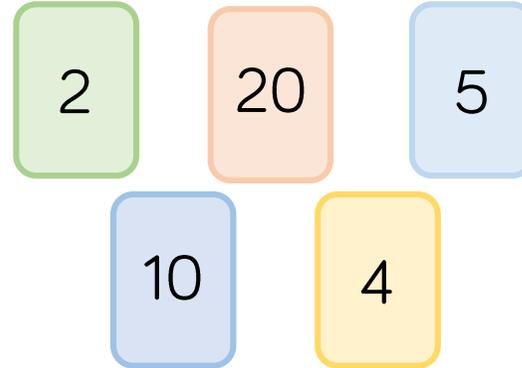
Sweets

Ron has 75 sweets.

How many party bags will he need?

How many jars will he need?

15 party bags.
3 jars.

Use the number cards to make multiplication and division sentences.

How many can you make?

2   20   5

10   4

$4 \times 5 = 20$
$5 \times 4 = 20$
$20 \div 4 = 5$
$20 \div 5 = 4$
$5 \times 2 = 10$
$2 \times 5 = 10$
$10 \div 2 = 5$
$10 \div 5 = 2$
$20 \div 2 = 10$
$20 \div 10 = 2$
$2 \times 10 = 20$
$10 \times 2 = 20$

Divide by 10

Notes and Guidance

Children should already be able to multiply by 10 and recognise multiples of 10. They will need to use both grouping and sharing to divide by 10 depending on the context of the problem.

Children start to see that grouping and counting in 10s is more efficient than sharing into 10 equal groups.

Mathematical Talk
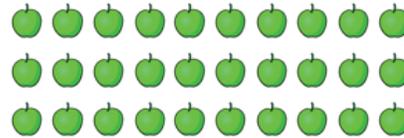
What can we use to represent the problem?

How does knowing your 10 times table help you to divide by 10?

Circle all the multiples of 10 on a hundred square.
What do you notice? Can you explain the pattern?
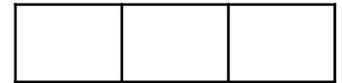
How many groups of 10 are there in ___ ?

Varied Fluency

Apples can be sold in packs of 10
How many packs can be made below?

$\square \div \square = \square$

When 30 apples are sold in packs of 10, ___ packs of apples can be made.
Can you show this in a bar model?
Label and explain what each part represents.

I have 70p in my pocket made up of 10p coins. How many coins do I have? Draw a picture to prove your answer.

Fill in the missing numbers.

- $70 \div 10 =$ ___
- 6 tens ÷ 1 ten = ___
- 5 = ___ ÷ 10
- There are ___ tens in 40

Divide by 10

Reasoning and Problem Solving

Mrs Owen has some sweets.

She shares them equally between 10 tables.

How many sweets could each table have?

Find as many ways as you can.

What do you notice about your answers?

They could have:

$10 \div 10 = 1$
$20 \div 10 = 2$
$30 \div 10 = 3$
$40 \div 10 = 4$
$50 \div 10 = 5$
etc

The tens digit is the same as the answer.

True or false?

Dividing by 10 is the same as dividing by 5 then dividing by 2

True

Cakes are sold in boxes of 10
Jack and Alex are trying to pack these cakes into boxes.

Jack says,

There are 5 groups of 10

Alex says,

There are 6 groups of 10

Who is correct? Explain how you know.

Alex is correct because there are 60 cakes and 60 divided by 10 is 6

Jack has incorrectly grouped the cakes, he might have counted the rows wrong. He hasn't put them in 10s. He incorrectly assumed there were 10 in each row.

Multiply by 3

Notes and Guidance

Children draw on their knowledge of counting in threes in order to start to multiply by 3

They use their knowledge of equal groups to use concrete and pictorial methods to solve questions and problems involving multiplying by 3

Mathematical Talk

How many equal groups do we have?

How many are in each group?

How many do we have altogether?

Can you write a number sentence to show this?

Can you represent the problem in a picture?

Can you use concrete apparatus to solve the problem?

How many lots of 3 do we have?

How many groups of 3 do we have?

Varied Fluency

There are five towers with 3 cubes in each tower.
How many cubes are there altogether?

___ + ___ + ___ + ___ + ___ = ___

___ × ___ = ___
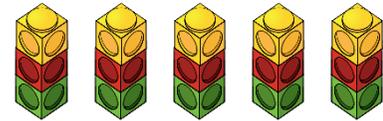
There are 7 tricycles in a playground.
How many wheels are there altogether?
Complete the bar model to find the answer.

?						
3	3	3				
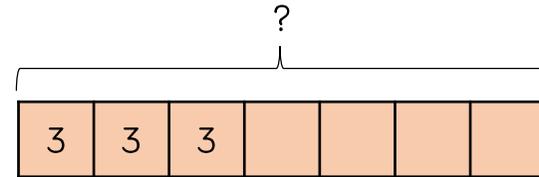
There are 3 tables with 6 children on each table.
How many children are there altogether?

___ lots of ___ = ___

___ × ___ = ___

24

Multiply by 3

Reasoning and Problem Solving

There are 8 children.
Each child has 3 sweets.
How many sweets altogether?

Use concrete or pictorial representations to show this problem.

Write another repeated addition and multiplication problem and ask a friend to represent it.

There are 24 sweets altogether.

Children may use items such as counters or cubes.

They could draw a bar model for a pictorial representation.

If $5 \times 3 = 15$, which number sentences would find the answer to 6×3?

- $5 \times 3 + 6$

- $5 \times 3 + 3$

- $15 + 3$

- $15 + 6$

- 3×6

Explain how you know.

$5 \times 3 + 3$ because one more lot of 3 will find the answer.

$15 + 3$ because adding one more lot of 3 to the answer to 5 lots will give me 6 lots.

3×6 because $3 \times 6 = 6 \times 3$ (because multiplication is commutative).

Divide by 3

Notes and Guidance

Children explore dividing by 3 through sharing into three equal groups and grouping in threes.

They use concrete and pictorial representations and use their knowledge of the inverse to check their answers.

Mathematical Talk

Can you put the counters into groups of three?

Can you share the number into three groups?

What is the difference between sharing and grouping?

Varied Fluency

Circle the counters in groups of 3 and complete the division.

___ ÷ 3 = ___

Circle the counters in 3 equal groups and complete the division.

___ ÷ 3 = ___

What's different about the ways you have circled the counters?

There are 12 pieces of fruit. They are shared equally between 3 bowls. How many pieces of fruit are in each bowl?
Use cubes/counters to represent fruit and share between 3 circles.

Bobbles come in packs of 3
If there are 21 bobbles altogether, how many packs are there?

Divide by 3

Reasoning and Problem Solving

Share 33 cubes between 3 groups.

Complete:
There are 3 groups with _____ cubes in each group.
33 ÷ 3 = _____

Put 33 cubes into groups of 3

Complete:
There are _____ groups with 3 cubes in each group.
33 ÷ 3 = _____

What is the same about these two divisions?
What is different?

The number sentences are both the same.
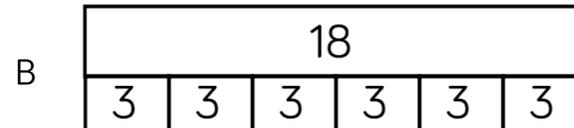The numbers in each number sentence mean different things.
In the first question, the '3' means the number of groups the cubes are shared into because the cubes are being shared.
In the second question, the '3' means the size of each group.

Jack has 18 seeds.

He plants 3 seeds in each pot.

Which bar model matches the problem?

A

	18	
6	6	6

B

18					
3	3	3	3	3	3
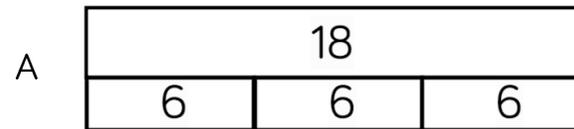
Explain your choice.

Bar model B matches the problem because Jack plants 3 seeds in each pot, therefore he will have 6 groups (pots), each with 3 seeds.

The 3 Times Table

Notes and Guidance

Children draw together their knowledge of multiplying and dividing by three in order to become more fluent in the three times table.

Children apply their knowledge to different contexts.

Mathematical Talk

Can you use concrete or pictorial representations to help you?

What other facts can you link to this one?

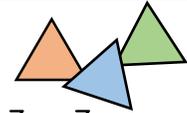What other times table will help us with this question?

Varied Fluency

■ Complete the number sentences.

1 triangle has 3 sides. $1 \times 3 = 3$
3 triangles have ___ sides in total. $3 \times \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$
___ triangles have 6 sides in total. $\underline{\hspace{1cm}} \times \underline{\hspace{1cm}} = 6$
5 triangles have ___ sides in total. $\underline{\hspace{1cm}} \times \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$

■ Tick the number sentences that the image shows.

$12 \div 3 = 4$ $3 = 12 \div 4$
$12 = 4 \times 3$ $3 \times 12 = 4$
$3 \div 4 = 12$ $3 \times 4 = 12$

■ Fill in the missing number facts.

$1 \times 3 = \underline{\hspace{1cm}}$ $\underline{\hspace{1cm}} \times 3 = 30$

$2 \times \underline{\hspace{1cm}} = 6$ $8 \times \underline{\hspace{1cm}} = 24$

$\underline{\hspace{1cm}} = 3 \times 3$ $6 \times 3 = \underline{\hspace{1cm}}$

$9 \times 3 = \underline{\hspace{1cm}}$ $21 = \underline{\hspace{1cm}} \times 3$

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The 3 Times Table

Reasoning and Problem Solving

Sort the cards below so they follow round in a loop.

Start at $18 - 3$
Calculate the answer to this calculation. The next card needs to be begin with this answer.

18	21	15	8
$- 3$	$\div 3$	$\div 3$	$- 5$

5	10	20	4
$\times 2$	$\times 2$	$+ 1$	$\times 2$

14	12	3	7
$- 2$	$\div 3$	$\times 6$	$\times 2$

Order:

$18 - 3$
$15 \div 3$
5×2
10×2
$20 + 1$
$21 \div 3$
7×2
$14 - 2$
$12 \div 3$
4×2
$8 - 5$
3×6

Start this rhythm:

Clap, clap, click, clap, clap, click.

Carry on the rhythm, what will you do on the 15th beat?

How do you know?

What will you be doing on the 20th beat?

Explain your answer.

Clicks are multiples of three.

On the 15th beat, I will be clicking because 15 is a multiple of 3

On the 20th beat, I will be clapping because 20 is not a multiple of 3

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Multiply by 4

Notes and Guidance

Building on their knowledge of the two times table, children multiply by 4
They link multiplying by 4 to doubling then doubling again.
Children connect multiplying by 4 to repeated addition and counting in 4s.
To show the multiplication of 4, children may use number pieces, cubes, counters, bar models etc.

Mathematical Talk

How many equal groups do we have?

How many are in each group?

How many do we have altogether?

Can you write a number sentence to show this?

Can you represent the problem in a picture?

Can you use concrete apparatus to solve the problem?

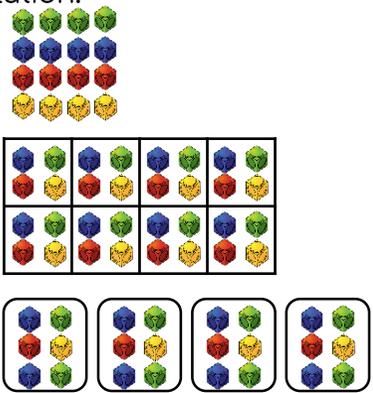How many lots of 4 do we have?

How many groups of 4 do we have?

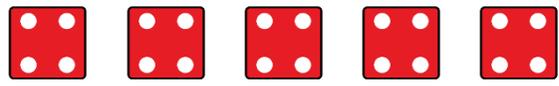## Varied Fluency

Match the multiplication to the representation.

4 × 4

4 × 6

8 × 4

How many dots are there altogether?

There are ____ dice with ____ dots on each.

There ____ fours.

____ × ____ = ____ dots.

There are 4 pens in a pack.
How many pens are there in 7 packs?

Multiply by 4

Reasoning and Problem Solving

Tommy has four bags with five sweets in each bag.

Annie has six bags with four sweets in each bag.

Who has more sweets?

How many more sweets do they have?

Draw a picture to show this problem.

Annie has more sweets.

She has four more sweets than Tommy.

Here is a blue strip of paper.

An orange strip is four times as long.

The strips are joined end to end.

20 cm

How long is the blue strip?

How long is the orange strip?

Explain how you know.

The blue strip is 4 cm long.

The orange strip is 16 cm long.

The orange strip is 4 times as long as the blue strip, so there are 5 equal parts in total, and the length of each part is:

$20 \div 5 = 4$ cm long.

To find the length of the orange part:

$4 \times 4 = 16$ cm.

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Divide by 4

Notes and Guidance

Children explore dividing by 4 through sharing into four equal groups and grouping in fours.

They use concrete and pictorial representations and their knowledge of the inverse to check their answers.

Mathematical Talk

Can you put the buttons into groups of fours?

Can you share the number into four groups?

What is the difference between sharing and grouping?

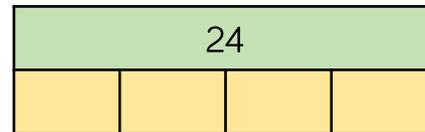## Varied Fluency

Circle the buttons in groups of 4.

Can you also split the buttons into 4 equal groups?
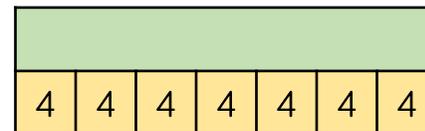How is this the same? How is it different?

There are some cars in a car park.
Each car has 4 wheels.
In the car park there are 32 wheels altogether.
How many cars are there?

___ ÷ ___ = ___

Complete the bar models and the calculations.

24

$24 \div 4 = $ ___

4	4	4	4	4	4	4

___ $\div 4 = $ ___

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Divide by 4

Reasoning and Problem Solving

Which of the word problems can be solved using $12 \div 4$?

There are 12 bags of sweets with 4 sweets in each bag.
How many sweets are there altogether?

A rollercoaster carriage holds 4 people.
How many carriages are needed for 12 people?

I have 12 crayons and share them equally between 4 people.
How many crayons does each person receive?

I have 12 buns and I give 4 to my brother.
How many do I have left?

Explain your reasoning for each.

No, the calculation is $12 \times 4 = 48$ sweets

Yes, 12 is being grouped into 4s.

Yes, 12 is being shared equally into 4 groups.

No, the calculation is $12 - 4 = 8$ buns

Five children are playing a game.

They score 4 points for every bucket they knock down.

Mo	16
Eva	28
Tommy	12
Amir	32
Dora	8

How many buckets did they knock down each?
How many buckets did they knock down altogether?
How many more buckets did Eva knock down than Mo?

Mo = 4 buckets.

Eva = 7 buckets.

Tommy = 3 buckets.

Amir = 8 buckets.

Dora = 2 buckets.

They knocked down 24 buckets altogether.

Eva knocked 3 more buckets down than Mo.

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The 4 Times Table

Notes and Guidance

Children use knowledge of known multiplication tables (2, 3, 5 and 10 times tables) and understanding of key concepts of multiplication to develop knowledge of the 4 times table.

Children who have learnt $3 \times 4 = 12$ can use understanding of commutativity to know that $4 \times 3 = 12$

Mathematical Talk

What do you notice about the pattern?

Can you use concrete or pictorial representations to help you?

What other facts can you link to this one?

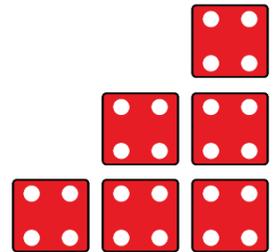What other times tables will help you with this times table?

Varied Fluency

Use the pictorial representations to complete the calculations.

$1 \times 4 =$ ___

$2 \times 4 =$ ___

$3 \times 4 =$ ___

Continue the pattern.

2 cars have eight wheels. How many wheels do four cars have?

$2 \times 4 = 8$ $4 \times 4 =$ ___

Three cows have 12 legs. How many legs do six cows have?

$3 \times$ ___ $= 12$ $6 \times$ ___ $=$ ___

Colour in the multiples of 4
What pattern 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

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The 4 Times Table

Reasoning and Problem Solving

I have forgotten what 4 × 4 is.

Jack says,
"The answer is more than 3 × 4"

Complete the calculation to prove this.
4 × 4 = 3 × 4 + __

Mo says,
"The answer is 4 less than 5 × 4"

Complete the calculation to prove this.
4 × 4 = __ × 4 − __

Teddy says,
"The answer is double 2 × 4"

Complete the calculation to prove this.
4 × 4 = __ × 4 × __

Whose idea do you prefer? Why?

4×4
$= 3 \times 4 + 4$
$= 12 + 4$
$= 16$

4×4
$= 5 \times 4 - 4$
$= 20 - 4$
$= 16$

4×4
$= 2 \times 4 \times 2$
$= 16$

Which part below does not show counting in fours?

$4 + 4 + 4 + 4$

4	4	4

Explain why.

The place value counters do not show counting in fours because each part has 3 in so it is counting in threes.

Multiply by 8

Notes and Guidance

Building on their knowledge of the 4 times table, children start to multiply by 8, understanding that each multiple of 8 is double its equivalent multiple of 4

They link multiplying by eight to previous knowledge of equal groups and repeated addition. Children explore the concept of multiplying by 8 in different ways, when 8 is the multiplier (first number in the multiplication calculation) and where 8 is the multiplicand (second number).

Mathematical Talk

How many equal groups do we have?

How many are in each group?

How many do we have altogether?

Can you write a number sentence to show this?

Can you represent the problem in a picture?

Can you use concrete apparatus to solve the problem?

How many lots of 8 do we have?

How many groups of 8 do we have?

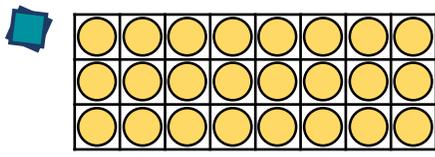We have 8 groups, how many are in each group?

Varied Fluency

How many legs altogether do four spiders have?

There are ____ legs on each spider.

___ + ___ + ___ + ___ = ___

___ × 8 = ___

If there are ____ spiders, there will be ____ legs altogether.

Arrange 24 counters in an array as shown and complete the calculations.

___ + ___ + ___ = ___ × ___

___ + ___ + ___ + ___ + ___ + ___ + ___ + ___ = ___ × ___

Fill in the table to show that multiplying by 8 is the same as double, double and double again.

6	6	6	6	6	6	6	6
6 × 2 = ___		6 × 2 = ___		6 × 2 = ___		6 × 2 = ___	
___ × 2 = ___				___ × 2 = ___			
___ × 2 = ___							

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Multiply by 8

Reasoning and Problem Solving

$8 \times 3 =$ ___
$2 \times 4 \times 3 =$ ___
$2 \times 2 \times 2 \times 3 =$ ___
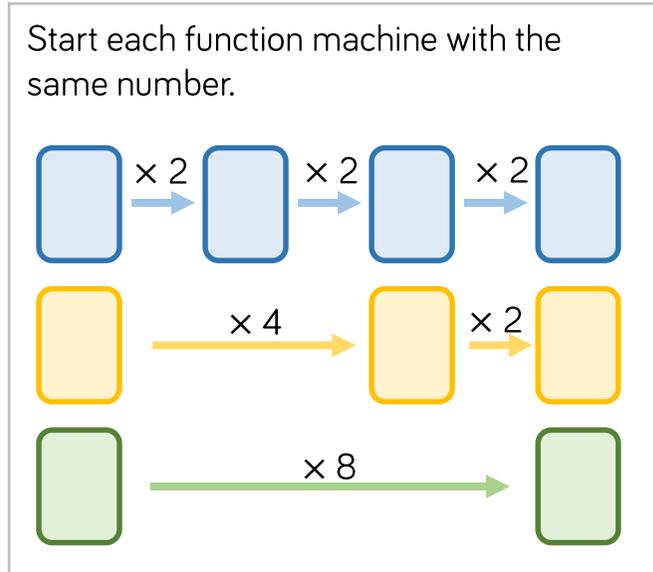
What do you notice?
Why do you think this has happened?

All of the answers are equal.
8 has been split (factorised) into 2 and 4 in the second question and 2, 2 and 2 in the third.

Jack calculates 8×6 by doing 5×6 and 3×6 and adding them.

___ + ___ = ___

Ron calculates 8×6 by doing $4 \times 6 \times 2$

___ $\times 2 =$ ___

Whose method do you prefer? Explain why.

Possible answers:
I prefer Jack's method because I know my 5 and 3 times tables.
I prefer Ron's method because I know my 4 times table and can double numbers.

Start each function machine with the same number.

What do you notice about each final answer?

Tommy knows the 4 times table table, but is still learning the 8 times table table.

Which colour row should he use? Why?

Each time the final number is 8 times greater than the starting number.

Tommy should use the yellow row because he can double each multiple of 4 to calculate a number multiplied by 8 e.g. $4 \times 6 = 24$ so 8×6 is double that (48).

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Divide by 8

Notes and Guidance

Children explore dividing by 8 through sharing into eight equal groups and grouping in eights.

They use concrete and pictorial representations and their knowledge of inverse operations to check their answers.

Mathematical Talk

What concrete/pictorial representations might help you?

Can you group the numbers in eights?

Can you share the number into eights groups?

Can you use any prior knowledge to check your answer?

Varied Fluency

There are 32 children in a PE lesson.
They are split into 8 equal teams for a relay race.
How many children are in each team?
Use counters or multi-link to represent each child.

There are ____ teams with ____ children in each team.

Crayons are sold in packs of 8.
Year 3 need 48 crayons.
How many packs should be ordered?

They should order ____ packs of crayons.

Complete:

$$80 \div 8 = \text{\_\_\_}$$ $$8 = 72 \div \text{\_\_\_}$$

$$64 \div 8 = \text{\_\_\_}$$ $$8 \times \text{\_\_\_} = 40$$

$$\text{\_\_\_} \times 8 = 24$$ $$\text{\_\_\_} \div 8 = 7$$

Divide by 8

Reasoning and Problem Solving

$48 \div 2 =$ ___

$48 \div 4 =$ ___

$48 \div 8 =$ ___

What do you notice about the answers to these questions?

Can you predict what $48 \div 16$ would be?

The answers (quotients) halve and the divisors double.

3

Which numbers can be divided by 8 without a remainder?

64, 32, 800, 200

| 64 | 32 | 800 |

| 18 | 200 | 42 |

Amir shares 24 sweets equally between 8 friends.
How many do they get each?
Which bar model would you use to represent this problem? Why?

24

24
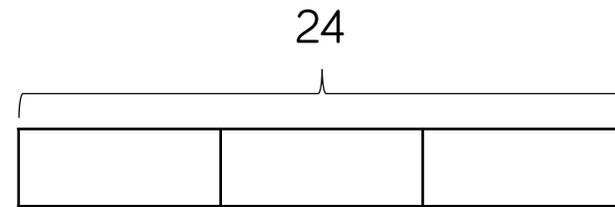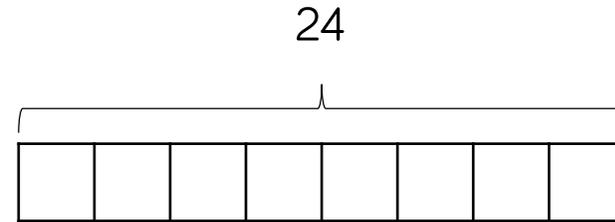
Although both can represent
$24 \div 8 = 3$, the first bar model fits this word problem best, because 24 has been split into 8 parts, 1 part shows 1 friend.

The 8 Times Table

Notes and Guidance

Children use prior knowledge of multiplication facts for 2, 3, 4 and 5 times tables along with the distributive law in order to calculate unknown multiplication facts.

Mathematical Talk

Why is it helpful to partition the number you are multiplying by?

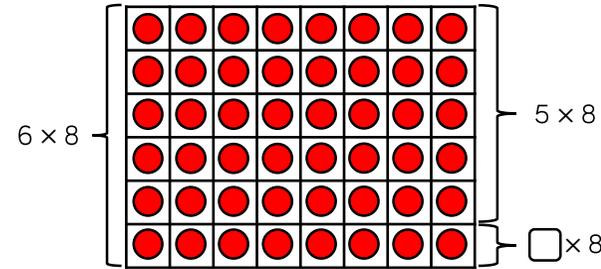Can you use concrete or pictorial representations to help you?

What other facts can you link to this one?

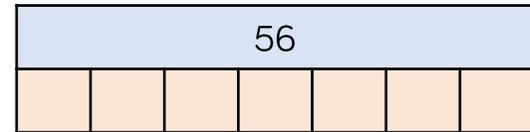What other times tables will help you with this times table?

Varied Fluency

◼ Complete the diagram using known facts.

6×8
$5 \times 8 = \square$
$\square \times 8 = \square$
altogether $\square$

6×8 — 5×8 — $\square \times 8$

◼ Complete the bar model.

56

◼ Complete the table.

×	2	4	8
3	6		
	10	20	
			72

Can you spot a pattern in the numbers?

The 8 Times Table

Reasoning and Problem Solving

.

All the numbers in the 8 times table are even.

Explain why

When you add an even number to an even number you always make an even number.
The 8 times table is repeated addition so keeps adding an even number each time.

On a blank hundred square, colour multiples of 8 red and multiples of 4 blue.

Always, Sometimes, Never

• Multiples of 4 are also multiples of 8

• Multiples of 8 are also multiples of 4

1) Sometimes, every other multiple of 4 is also a multiple of 8 The ones in between aren't because the jumps are smaller than 8
2) Always – 8 is a multiple of 4 therefore all multiples of 8 will be multiples of 4

Rosie has some packs of cola which are in a box.

Some packs have 4 cans in them, and some packs have 8 cans in them.
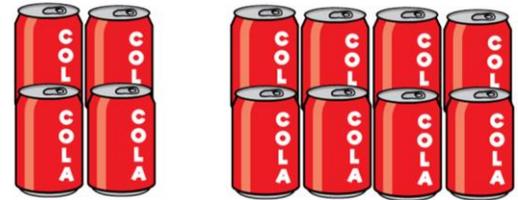
Rosie's box contains 64 cans of pop.

How many packs of 4 cans and how many packs of 8 cans could there be?

Find all the possibilities.

Possible answers:
• 2 packs of 4, 7 packs of 8
• 4 packs of 4, 6 packs of 8
• 6 packs of 4, 5 packs of 8
• 8 packs of 4, 4 packs of 8
• 10 packs of 4, 3 packs of 8
• 12 packs of 4, 2 packs of 8
• 14 packs of 4, 1 pack of 8

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