Spring Scheme of Learning

Year 2

#MathsEveryoneCan

2020-21
Welcome

2020 will go down in history. The world has changed for all of us.

We want to do as much as we can to support children, teachers, parents and carers in these very uncertain times.

We have amended our schemes for 2020/21 to:

★ highlight key teaching points

★ recap essential content that children may have forgotten

★ flag any content that you might not have covered during the school closures period.

We hope these changes will add further value to the schemes and save you time.

New for 2020/21

Lesson-by-lesson overviews

We’ve always been reluctant to produce lesson-by-lesson overviews as every class is individual and has different needs. However, many of you have said that if blended learning becomes a key feature of school life next year, a weekly plan with linked content and videos could be really useful.

As always, we’ve listened! We’ve now produced a complete lesson-by-lesson overview for Y1 to Y9 that schools can use or adapt as they choose. Each lesson will be linked to a free-to-use home learning video, and for premium subscribers, a worksheet. This means that you can easily assign work to your class, whether they are working at home or in school.

Inevitably, this lesson-by-lesson structure won’t suit everyone, but if it works for you, then please do make use of this resource as much as you wish.
Teaching for Mastery

These overviews are designed to support a mastery approach to teaching and learning and have been designed to support the aims and objectives of the new National Curriculum.

The overviews:

• have number at their heart. A large proportion of time is spent reinforcing number to build competency
• ensure teachers stay in the required key stage and support the ideal of depth before breadth.
• ensure students have the opportunity to stay together as they work through the schemes as a whole group
• provide plenty of opportunities to build reasoning and problem solving elements into the curriculum.

For more guidance on teaching for mastery, visit the NCETM website:

https://www.ncetm.org.uk/resources/47230

Concrete - Pictorial - Abstract

We believe that all children, when introduced to a new concept, should have the opportunity to build competency by taking this approach.

Concrete – children should have the opportunity to use concrete objects and manipulatives to help them understand what they are doing.

Pictorial – alongside this children should use pictorial representations. These representations can then be used to help reason and solve problems.

Abstract – both concrete and pictorial representations should support children’s understanding of abstract methods.

Need some CPD to develop this approach? Visit www.whiterosemaths.com for find a course right for you.
Supporting resources

NEW for 2019-20!

We have produced supporting resources for every small step from Year 1 to Year 8.

The worksheets are provided in three different formats:

- **Write on worksheet** – ideal for children to use the ready made models, images and stem sentences.
- **Display version** – great for schools who want to cut down on photocopying.
- **PowerPoint version** – one question per slide. Perfect for whole class teaching or mixing questions to make your own bespoke lesson.

For more information visit our online training and resources centre [resources.whiterosemaths.com](http://resources.whiterosemaths.com) or email us directly at [support@whiterosemaths.com](mailto:support@whiterosemaths.com)
Meet the Characters

Children love to learn with characters and our team within the scheme will be sure to get them talking and reasoning about mathematical concepts and ideas. Who’s your favourite?

Teddy
Rosie
Mo
Eva
Alex
Jack
Whitney
Amir
Dora
Tommy
Dexter
Ron
Annie
<table>
<thead>
<tr>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
<th>Week 5</th>
<th>Week 6</th>
<th>Week 7</th>
<th>Week 8</th>
<th>Week 9</th>
<th>Week 10</th>
<th>Week 11</th>
<th>Week 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autumn</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number: Place Value</td>
<td>Number: Addition and Subtraction</td>
<td>Measurement: Money</td>
<td>Number: Multiplication and Division</td>
<td>Consolidation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number: Multiplication and Division</td>
<td>Statistics</td>
<td>Geometry: Properties of Shape</td>
<td>Number: Fractions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Multiplication & Division

Spring - Block 1

White Rose Maths
### Overview

#### Small Steps

- Recognise equal groups
- Make equal groups
- Add equal groups
- Multiplication sentences using the × symbol
- Multiplication sentences from pictures
- Use arrays
- Make doubles
- 2 times-table
- 5 times-table
- 10 times-table
- Make equal groups – sharing
- Make equal groups – sharing
- Make equal groups – grouping
- Make equal groups – grouping
- Divide by 2
- Odd & even numbers
- Divide by 5
- Divide by 10

---

#### Notes for 2020/21

Some of this content was previously in the Year 2 Autumn term. It has been moved over to Spring to allow more time on place value and addition and subtraction.

Prior to this block children had the opportunity to recap making equal groups, adding equal groups and making arrays from Year 1. Children can now build on this in the Spring term.

Concrete manipulatives are vital to introduce this topic and support children's conceptual understanding of the concept.
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?
Which group of money is the odd one out?

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.

<table>
<thead>
<tr>
<th>Equal Groups</th>
<th>Unequal Groups</th>
</tr>
</thead>
</table>

Hearts and dots in unequal groups.
Stars and squares in equal groups.

Create your own picture to go in each column.

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.
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.

How else could you represent these in equal groups?

How many ways can you represent this?

How have you grouped your items?

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.
Has Eva shown the equal groups correctly?

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

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.

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

Match the equal groups.

- Three 5s
- Two 10s
- Two 3s

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.

<table>
<thead>
<tr>
<th></th>
<th>Draw It</th>
<th>Say It</th>
<th>Add It</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><img src="image1.png" alt="Draw It" /></td>
<td><img src="image2.png" alt="Say It" /></td>
<td><img src="image3.png" alt="Add It" /></td>
</tr>
</tbody>
</table>
True or False?

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

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

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

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

5 + 5

Ten

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.
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 × 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:

<table>
<thead>
<tr>
<th>Three 2s</th>
<th>Draw It</th>
<th>Addition</th>
<th>Multiplication</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are 3 equal groups with 2 in each group.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Complete:

<table>
<thead>
<tr>
<th>Addition</th>
<th>Multiplication</th>
<th>Story</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 + 10 + 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 × 5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Reasoning and Problem Solving

**The Multiplication Symbol**

**Is Mo correct? Explain why.**

He is correct because

\[ 3 + 3 + 3 = 3 \times 3 \]

and \( 3 \times 3 = 9 \)

**Draw an image to help you.**

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

| 3 \times 5 | 5 + 5 + 5 + 5 |
| 2 \times 2 | 2 + 2 |
| 10 \times 2 | 5 + 5 + 5 |

\[ 3 \times 5 \leq 5 + 5 + 5 \]

\[ 2 \times 2 = 2 + 2 \]

\[ 10 \times 2 > 5 + 5 + 5 \]

**Think of a multiplication to complete:**

\[ 6 + 6 + 6 > \_ \times \_ \]

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

- \( 6 + 6 = 2 \times 6 \)
- \( 2 + 2 + 2 + 2 + 2 = 6 \times 2 \)
- \( 3 + 3 + 3 + 3 = 4 \times 3 \)
- \( 4 + 4 + 4 = 3 \times 4 \)
- \( 12 = 1 \times 12 \)
- \( 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 = 12 \times 1 \)
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:
  $$\_ \times \_ = \_$$
  $$\_ \text{ lots of } 3 = \_$$
  $$\_ \text{ multiplied by } \_ = 12$$

- Complete:
  $$\_ \times \_ = \_$$
  $$\_ \text{ lots of } 3 \text{ } = \_$$
  $$\_ \text{ multiplied by } \_ \text{ } = 12$$

- Complete the table.

<table>
<thead>
<tr>
<th>Picture</th>
<th>Multiplication</th>
<th>Sentence</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Image" /></td>
<td>$4 \times 10 = 40$</td>
<td>4 lots of 10 is equal to 40</td>
</tr>
<tr>
<td><img src="image2.png" alt="Image" /></td>
<td>$35 = 7 \times 5$</td>
<td>6 lots of 3 is equal to 18</td>
</tr>
</tbody>
</table>
### Reasoning and Problem Solving

<table>
<thead>
<tr>
<th>Problem</th>
<th>Image Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are four baskets. There are three dolls in each basket. How many dolls are there altogether?</td>
<td>The image could be 4 circles with 3 dots in each. The calculation: $4 \times 3 = 12$</td>
</tr>
<tr>
<td>Draw an image and write a calculation to represent the problem.</td>
<td></td>
</tr>
<tr>
<td>Write a story for the calculation $4 \times 10$</td>
<td>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.</td>
</tr>
<tr>
<td>Draw an image to illustrate your story.</td>
<td></td>
</tr>
</tbody>
</table>

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.

- $2 \times 5$
- $5 + 5$
- $5 \times 2$

Each calculation could explain the image. Explain why.
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 $2 \times 5$ and $5 \times 2$.

Can you represent this array using another object?

Complete the number sentences to describe the arrays.

Draw an array to show:

$4 \times 5 = 5 \times 4$
$3 \text{ lots of } 10 = 10 \text{ lots of } 3$
With 12 cubes, how many different arrays can you create?

Once you have created your array complete:

\[
\begin{align*}
\quad \times \quad &= \quad \times \quad \\
1 \times 12 &= 12 \times 1 \\
2 \times 6 &= 6 \times 2 \\
3 \times 4 &= 4 \times 3
\end{align*}
\]

Find different ways to solve six lots of three.

<table>
<thead>
<tr>
<th>1 × 3 + 1 × 3</th>
<th>2 × 3 + 2 × 3</th>
<th>3 × 3 + 3 × 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 × 3 + 1 × 3</td>
<td>6 × 3 + 0 × 3</td>
<td>7 × 3 + 0 × 3</td>
</tr>
</tbody>
</table>

Part of this array is hidden.

The total is less than 16

What could the array be?

Count in 3s
3 lots of 3 add 3 lots of 3
5 × 3 add 1 × 3 etc.
Children explore doubling with numbers up to 20. Reinforce understanding that ‘double’ is two groups of a number or an amount. Children show and explain what doubling means using concrete and pictorial representations.

They record doubling using the sentence, ‘Double ___ is ____’ and use repeated addition to represent doubles in the abstract. They look at representations to decide whether that shows doubling or not.

Can you sort these representations in to doubles and not doubles? How do you know they’ve been doubled?

What comes next in my table, why?

How can we show the double differently?

If double 2 is 4, what is double 20?

What is the largest double we can roll on a normal dice?
Reasoning and Problem Solving

Louise doubles her donuts. The picture shows what she had after she doubled her donuts.

Whitney

Possible answer: Whitney is correct because the image shows what she was left with. She had 8 after she doubled and double 4 is 8

Eva

Louise started with 4 and ended with 8 donuts.

Mo

Louise started with 8 and ended with 16 donuts.

Who do you agree with? Explain why.

Complete the table by doubling each number.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

What patterns do you notice?

Possible answer:

- The doubles increase by 2 each time.
- The doubles are all even.
- The doubles end in 2, 4, 6, 8 or 0.
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.

<table>
<thead>
<tr>
<th>2</th>
<th>4</th>
<th>8</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>16</td>
<td>18</td>
<td>24</td>
</tr>
</tbody>
</table>

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 × ___ = 6 | 2 |
| ___ × 2 = 20 | 10 |
| ___ = 8 × 2 | 16 |

Tommy says that 10 × 2 = 22

Is he correct?

Explain how you know.

Eva says,

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.

Every number in the 2 times-table is 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

©White Rose Maths
### The 5 Times-Table

#### Reasoning and Problem Solving

<table>
<thead>
<tr>
<th>Is Mo correct?</th>
<th>Mo is incorrect because some of the multiples of the five times-table are even, e.g. 10, 20, 30</th>
<th>Tommy and Rosie have both drawn bar models to show $7 \times 5$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explain your answer.</td>
<td>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</td>
<td>The total shown is the same. Tommy’s bar shows seven lots of 5 whereas Rosie’s bar shows five lots of 7</td>
</tr>
</tbody>
</table>

#### 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?

<table>
<thead>
<tr>
<th>How many of each pack could she have?</th>
<th>How many ways can you do it?</th>
<th>What’s the same and what is different about their bar models?</th>
</tr>
</thead>
<tbody>
<tr>
<td>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</td>
<td></td>
<td>Draw your own bar model to represent $4 \times 5$</td>
</tr>
</tbody>
</table>

©White Rose Maths
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

1 × 10

6 × 10

5 × 10

©White Rose Maths
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

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 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?

___ × 10 = ___

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

It could be
6 × 10 = 60
7 × 10 = 70
8 × 10 = 80
9 × 10 = 90

It can’t be 10 × 10 because 100 is not less than 100, it is equal to 100.
Children explore sharing as a model of division. They use 1:1 correspondence to share concrete objects into equal groups.

Children also need to be given the opportunity to see when a number of objects cannot be shared equally into equal groups.

How can I share the muffins equally? How many muffins on this plate? How many on this plate? Are they equal? If I had 9 muffins what would happen?

How can I share the objects equally? How many equal groups am I sharing the objects into? Are the groups equal? Are there any left over?

Share the muffins equally between the two plates. Complete the sentence. ___ cakes shared equally between 2 is ___

Collect 20 cubes. Use hoops to represent your friends. Can you share the cubes between 5 friends? 20 shared between 5 equals ____ Can you share the cubes between 2 friends? 20 shared between 2 equals ____ Can you share the cubes between 10 friends? 20 shared between 10 equals ____

Tim has 16 bananas. He shares them equally between two boxes. How many bananas are in each box? Represent and solve the problem.
Dora has 10 biscuits.

She wants to share them equally at her party.

How many people could be at the party?

Possible answers:

- 10 people
- 5 people
- 2 people
- 1 person (Dora)

There are 10 cakes and 2 boxes.

An equal amount needs to be put into each box.

Eva is correct. She has shared the cakes equally and put 5 into each box.

Put them into groups of 2

Share them into 2 groups.

Who is correct? Explain your answer.
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?
Jack says,

This is what he does:

40 \div 2 = 20

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

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

Possible answer:

\[
\begin{array}{c}
40 \\
40 \div 2 \\
\end{array}
\]

For 60 \div 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.
Children start with a given total and make groups of an equal amount. They record their understanding in sentences, not through formal division at this stage.

Children can develop their understanding of equal groups by also being exposed to numbers which do not group equally.

How can you tell if the groups are equal? How can you represent the equal groups? Do all numbers divide into equal groups of 2?

How do you sort the cubes into equal groups?

What would happen if there were 21 cubes?

Have I got equal groups?

How do you know?

Does each group need to be arranged in the same way for it to be equal?

How many equal groups of 2 can you make with the mittens?

There are ____ groups of 2 mittens.

If you had 10 mittens, how many equal groups of 2 mittens could you make?

Take 20 cubes. Complete the sentences.

I can make ____ equal groups of 2
I can make ____ equal groups of 5
I can make ____ equal groups of 10

Complete the table. Use equipment to help you.

<table>
<thead>
<tr>
<th>Representation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Triangles" /></td>
<td>There are ____ altogether. There are ____ equal groups of ____</td>
</tr>
<tr>
<td><img src="image2" alt="Circles" /></td>
<td>There are ____ altogether. There are ____ equal groups of ____</td>
</tr>
<tr>
<td><img src="image3" alt="Circles" /></td>
<td>15 has been sorted into 3 equal groups of 5</td>
</tr>
<tr>
<td><img src="image4" alt="Triangles" /></td>
<td>____ has been sorted into ____ equal groups of ____</td>
</tr>
</tbody>
</table>

©White Rose Maths
<table>
<thead>
<tr>
<th>Reasoning and Problem Solving</th>
</tr>
</thead>
</table>

| Tommy and Jack each have the same number of sweets. |
| Tommy has 5 equal groups of 2 |
| Jack has 1 equal group. |
| How many sweets are in Jack’s group? |

| Jack has 10 sweets in his group. |

| I am thinking of a number between 20 and 30 |
| I can only make equal groups of 5 |
| What must my number be? |
| What happens when I try to make groups of 2 with it? |
| What happens when I try to make groups of 10 with it? |

| Answer: 25 |
| Children can use practical equipment to solve this and discover what happens. |
| If you make equal groups of 2 with it there will be 1 left over. |
| If you make equal groups of 10 with it there will be 5 left over. |

©White Rose Maths
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.

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 _____
Reasoning and Problem Solving

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
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.

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?

---

Complete the stem sentences.

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

Group the socks into pairs.

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.

Complete the bar model and write a calculation to match.
### Divide by 2

#### Reasoning and Problem Solving

<table>
<thead>
<tr>
<th>I have 24p.</th>
<th>The calculation is the same in both.</th>
<th>Ron has shared some grapes equally between two friends.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I divide it equally between 2 friends.</td>
<td>In the first question we are sharing, whereas in the second question we are grouping.</td>
<td>Possible answer:</td>
</tr>
<tr>
<td>How much will they get each?</td>
<td></td>
<td>He must have started with an even number of grapes.</td>
</tr>
<tr>
<td>I have 24p in 2p coins.</td>
<td>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 $2 \times 4$</td>
<td>He could have started with 40 grapes.</td>
</tr>
<tr>
<td>How many 2p coins do I have?</td>
<td>Tommy shares his counters into 2 equal groups. He has 15 in each group.</td>
<td>He can’t have started with 100 grapes.</td>
</tr>
<tr>
<td>Consider the two questions above. What is the same and what is different?</td>
<td>Annie groups her counters in twos. She has 19 groups.</td>
<td></td>
</tr>
<tr>
<td>Tommy and Annie have some counters.</td>
<td>Who has more counters and by how many? How did you work it out?</td>
<td></td>
</tr>
<tr>
<td>Tommy shares his counters into 2 equal groups. He has 15 in each group.</td>
<td>Ron’s friends</td>
<td></td>
</tr>
<tr>
<td>Annie groups her counters in twos. She has 19 groups.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Who has more counters and by how many? How did you work it out?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Year 2 | Spring Term | Week 1 to 2 – Number: Multiplication & Division

### Odd & Even Numbers

**Notes and Guidance**

Building on from Year 1, children should be able to recognise odd and even numbers.

They will use concrete manipulatives to explore odd and even numbers and the structure of these.

### Mathematical Talk

Can you sort these objects (number pieces, ten frames, cubes, pictures etc) into an odd set and an even set?

What makes these odd/even?

How do you find out if ___ is an odd or even number?

Can you find all the odd and even numbers on a 100 square? What do you notice?

### Varied Fluency

- **Use counters to make each number and share them into two equal groups.** How does this help you decide whether a number is odd or even? Show this in the table.

<table>
<thead>
<tr>
<th>odd</th>
<th>even</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

Can you see any patterns?

- **Which number pieces are odd? Explain why.** Find or draw other odd and even pieces. What do you notice?

- **Spot the mistakes:**

<table>
<thead>
<tr>
<th>odd</th>
<th>even</th>
</tr>
</thead>
<tbody>
<tr>
<td>nine</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>eight</td>
<td>10</td>
</tr>
<tr>
<td>25</td>
<td></td>
</tr>
</tbody>
</table>

Can you make your own odd and even sets?
**True or false?**

12 is an odd number.

Prove your answer using concrete, pictorial and abstract representations. Explain each approach.

<table>
<thead>
<tr>
<th>Tommy says that when he adds two odd numbers together, his total will be even.</th>
<th>Tommy is correct because two odd numbers will always make an even total. Children can use any manipulatives to show this.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is he correct? Convince me.</td>
<td>What else can you find out?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Whitney says,</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have added two one-digit numbers. My answer divides into 2 equal groups.</td>
</tr>
</tbody>
</table>

What could Whitney’s numbers be?

Is this the only possible answer?

Which numbers would not be possible?

Explain your answers.

Any two even one digit numbers or any two odd one digit numbers will give an even total. E.g. 1 + 3 = 4 2 + 4 = 6

However, an odd number added to an even number will give an odd total so Whitney could not have this combination.
**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?

**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.

**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.

  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 = ___
Reasoning and Problem Solving

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

Ron has 75 sweets.

How many party bags will he need?

How many jars will he need?

Use the number cards to make multiplication and division sentences.

15 party bags.
3 jars.

10 ÷ 2 = 5
10 ÷ 5 = 2
20 ÷ 2 = 10
20 ÷ 10 = 2
2 × 10 = 20
10 × 2 = 20

4 × 5 = 20
5 × 4 = 20
20 ÷ 4 = 5
20 ÷ 5 = 4
5 × 2 = 10
2 × 5 = 10
10 ÷ 2 = 5
10 ÷ 5 = 2
20 ÷ 2 = 10
20 ÷ 10 = 2
2 × 10 = 20
10 × 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?

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.

- $70 ÷ 10 = ___$
- $6 \text{ tens} ÷ 1 \text{ ten} = ___$
- $5 = ___ ÷ 10$
- There are ___ tens in 40
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?

<table>
<thead>
<tr>
<th>True or false?</th>
<th>They could have:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dividing by 10 is the same as dividing by 5 then dividing by 2</td>
<td>10 ÷ 10 = 1</td>
</tr>
<tr>
<td></td>
<td>20 ÷ 10 = 2</td>
</tr>
<tr>
<td></td>
<td>30 ÷ 10 = 3</td>
</tr>
<tr>
<td></td>
<td>40 ÷ 10 = 4</td>
</tr>
<tr>
<td></td>
<td>50 ÷ 10 = 5</td>
</tr>
</tbody>
</table>

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.

The tens digit is the same as the answer.