Spring Scheme of Learning

Year 4

#MathsEveryoneCan

2020-21
New for 2020/21

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.

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

We have produced supporting resources for every small step from Year 1 to Year 11.

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 or email us directly at 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
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Overview

Small Steps

11 and 12 times-table
Multiply 3 numbers
Factor pairs
Efficient multiplication
Written methods
Multiply 2-digits by 1-digit (1)
Multiply 2-digits by 1-digit
Multiply 3-digits by 1-digit
Divide 2-digits by 1-digit (1)
Divide 2-digits by 1-digit (1)

Notes for 2020/21

These steps may look similar but these are difficult concepts and children need to spend time exploring different representations of multiplication with no exchange before moving on. They need to use manipulatives to support understanding and make links with repeated addition.

Similarly with division, children will first need to explore examples with no exchange or remainders, making links to the inverse.
Overview

Small Steps

- Divide 2-digits by 1-digit (2)
- Divide 2-digits by 1-digit (2)
- Divide 3-digits by 1-digit
- Correspondence problems

Notes for 2020/21

The final division steps introduce remainders and begin to look at generalisations. Continue to use place value counters and visual models to support understanding.
11 and 12 Times-table

Notes and Guidance

Building on their knowledge of the 1, 2 and 10 times-tables, children explore the 11 and 12 times-tables through partitioning. They use Base 10 equipment to build representations of the times-tables and use them to explore the inverse of multiplication and division statements. Highlight the importance of commutativity as children should already know the majority of facts from other times-tables.

Mathematical Talk

Which multiplication and division facts in the 11 and 12 times-tables have not appeared before in other times-tables?

Can you partition 11 and 12 into tens and ones? What times-tables can we add together to help us multiply by 11 and 12?

If I know 11 $\times$ 10 is equal to 110, how can I use this to calculate 11 $\times$ 11?

Varied Fluency

Fill in the blanks.

\[
\begin{align*}
2 \times 10 &= \_\_ \quad & 2 \times 1 &= \_\_ \\
2 \text{ lots of 10 doughnuts} &= \_\_ \quad & 2 \text{ lots of 1 doughnut} &= \_\_ \\
2 \times 10 + 2 \times 1 &= 2 \times 11 &= \_\_
\end{align*}
\]

Use Base 10 to build the 12 times-table. e.g.

\[
\begin{align*}
3 \times 12 &= \_\_ \\
2 \times 10 = \_\_ \\
2 \times 1 = \_\_
\end{align*}
\]

Complete the calculations.

\[
\begin{align*}
12 \times 5 &= \_\_ \quad & 5 \times 12 &= \_\_ \\
12 \times \_\_ &= 120 \quad & 12 \times \_\_ &= 132 \quad & \_\_ \div 12 &= 8 \\
48 \div 12 &= \_\_ \quad & \_\_ &= 9 \times 12
\end{align*}
\]

There are 11 players on a football team. 7 teams take part in a tournament. How many players are there altogether in the tournament?
Reasoning and Problem Solving

Here is one batch of muffins.

Teddy bakes 11 batches of muffins. How many muffins does he have altogether?

In each batch there are 3 strawberry, 3 vanilla, 4 chocolate and 2 toffee muffins. How many of each type of muffin does Teddy have in 11 batches?

Teddy sells 5 batches of muffins. How many muffins does he have left?

Teddy has 132 muffins altogether.

Strawberry: 33
Vanilla: 33
Chocolate: 44
Toffee: 22

132 − 55 = 77

Teddy has 77 muffins left.

Rosie uses a bar model to represent 88 divided by 11

Explain Rosie’s mistake.

Can you draw a bar model to represent 88 divided by 11 correctly?

Rosie has divided by grouping in 11s but has found 11 groups of 11 which is equal to 121.

To divide 88 by sharing into 11 equal groups, there would be 8 in each group.

To divide 88 by grouping in 11s, there would be 8 groups of 11.
Children are introduced to the ‘Associative Law’ to multiply 3 numbers. This law focuses on the idea that it doesn’t matter how we group the numbers when we multiply e.g. $4 \times 5 \times 2 = (4 \times 5) \times 2 = 20 \times 2 = 40$
or $4 \times 5 \times 2 = 4 \times (5 \times 2) = 4 \times 10 = 40$
They link this idea to commutativity and see that we can change the order of the numbers to group them more efficiently, e.g. $4 \times 2 \times 5 = (4 \times 2) \times 5 = 8 \times 5 = 40$

**Mathematical Talk**

Can you use concrete materials to build the calculations?

How will you decide which order to do the multiplication in?

What’s the same and what’s different about the arrays?

Which order do you find easier to calculate efficiently?

**Complete the calculations.**

Can you use concrete materials to build the calculations?

How will you decide which order to do the multiplication in?

What’s the same and what’s different about the arrays?

Which order do you find easier to calculate efficiently?
Choose three digit cards.
Arrange them in the calculation.

Possible answers using 3, 4 and 7:

\[7 \times 3 \times 4 = 84\]
\[7 \times 4 \times 3 = 84\]
\[4 \times 3 \times 7 = 84\]
\[4 \times 7 \times 3 = 84\]
\[3 \times 4 \times 7 = 84\]
\[3 \times 7 \times 4 = 84\]

Children may find it easier to calculate \(7 \times 3\) first and then multiply it by 4 as 21 multiplied by 4 has no exchanges.

How many different calculations can you make using your three digit cards?
Which order do you find it the most efficient to calculate the product?
How have you grouped the numbers?

Make the target number of 84 using three of the digits below.

Possible answers:

\[7 \times 2 \times 6 = 84\]
\[4 \times 3 \times 5 = 60\]
\[7 \times 3 \times 4 = 84\]
\[2 \times 6 \times 5 = 60\]

60 is smaller than 84

Multiply the remaining three digits together, what is the product of the three numbers?

Is the product smaller or larger than 84?

Can you complete this problem in more than one way?

Children may also show the numbers in a different order.
Children learn that a factor is a whole number that multiplies by another number to make a product e.g. $3 \times 5 = 15$, factor $\times$ factor $=$ product. They develop their understanding of factor pairs using concrete resources to work systematically, e.g. factor pairs for 12 – begin with $1 \times 12$, $2 \times 6$, $3 \times 4$. At this stage, children recognise that they have already used 4 in the previous calculation therefore all factor pairs have been identified.

**Notes and Guidance**

**Factor Pairs**

**Mathematical Talk**

Which number is a factor of every whole number?

Do factors always come in pairs?

Do whole numbers always have an even number of factors?

How do arrays support in finding factors of a number?

How do arrays support us in seeing when a number is not a factor of another number?

**Varied Fluency**

Complete the factor pairs for 12

12 has ____ factor pairs. 12 has ____ factors altogether.

Use counters to create arrays for 24

How many factor pairs can you find?

Here is an example of a factor bug for 12

Complete the factor bug for 36

Are all the factors in pairs?

Draw your own factor bugs for 16, 48, 56 and 35
Reasoning and Problem Solving

Tommy says

The greater the number, the more factors it will have.

Is Tommy correct?

Use arrays to explain your answer.

Tommy is incorrect. Children explain by showing an example of two numbers where the greater number has less factors. For example, 15 has 4 factors 1, 3, 5 and 15, 17 has 2 factors 1 and 17.

Some numbers are equal to the sum of all their factors (not including the number itself).

- e.g. 6
  6 has 4 factors, 1, 2, 3 and 6
  Add up all the factors not including 6 itself.
  \[1 + 2 + 3 = 6\]
  6 is equal to the sum of its factors (not including the number itself).

How many other numbers can you find that are equal to the sum of their factors?
Which numbers are less than the sum of their factors?
Which numbers are greater than the sum of their factors?

Possible answers
- 28 = 1 + 2 + 4 + 7 + 14
- 28 is equal to the sum of its factors.
- 12 < 1 + 2 + 3 + 4 + 6
- 12 is less than the sum of its factors.
- 8 > 1 + 2 + 4
- 8 is greater than the sum of its factors.
Children develop their mental multiplication by exploring different ways to calculate. They partition two-digit numbers into tens and ones or into factor pairs in order to multiply one and two-digit numbers. By sharing mental methods, children can learn to be more flexible and efficient.

Class 4 are calculating $25 \times 8$ mentally. Can you complete the calculations in each of the methods?

**Method 1**
$25 \times 8 = 20 \times 8 + 5 \times 8$
$= 160 + \square = \square$

**Method 2**
$25 \times 8 = 5 \times 5 \times 8$
$= 5 \times \square = \square$

**Method 3**
$25 \times 8 = 25 \times 10 - 25 \times 2$
$= \square - \square = \square$

**Method 4**
$25 \times 8 = 50 \times 8 \div 2$
$= \square \div \square = \square$

Can you think of any other ways to mentally calculate $25 \times 8$? Which do you think is the most efficient? How would you calculate $228 \times 5$ mentally?
Efficient Multiplication

Reasoning and Problem Solving

Teddy has calculated $19 \times 3$

- $20 \times 3 = 60$
- $60 - 1 = 59$
- $19 \times 3 = 59$

Can you explain his mistake and correct the diagram?

Teddy has subtracted one, rather than one group of 3

- He should have calculated,
  - $20 \times 3 = 60$
  - $60 - 1 \times 3 = 57$

Here are three number cards.

- Dora has 38
- Annie has 21
- Eva has 42

Dora, Annie and Eva choose one of the number cards each. They multiply their number by 5.

Dora says,

- I did $40 \times 5$ and then subtracted 2 lots of five.

Annie says,

- I multiplied my number by 10 and then divided 210 by 2

Eva says,

- I halved my 2-digit number and doubled 5 so I calculated $21 \times 10$

Which number card did each child have? Would you have used a different method to multiply the numbers by 5?

Children can then discuss the methods they would have used and why.
Written Methods

Mathematical Talk

Children use a variety of informal written methods to multiply a two-digit and a one-digit number. It is important to emphasise when it would be more efficient to use a mental method to multiply and when we need to represent our thinking by showing working.

Notes and Guidance

Varied Fluency

There are 8 classes in a school. Each class has 26 children. How many children are there altogether? Complete the number line to solve the problem.

Why are there not 26 jumps of 8 on the number line?

Could you find a more efficient method?

Can you calculate the multiplication mentally or do you need to write down your method?

Can you partition your number into more than two parts?

Rosie uses Base 10 and a part-whole model to calculate $26 \times 3$ Complete Rosie’s calculations.

Use Rosie’s method to work out:

- $36 \times 3$
- $24 \times 6$
- $45 \times 4$
Reasoning and Problem Solving

Written Methods

Here are 6 multiplications:

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<thead>
<tr>
<th>Multiplication</th>
<th>43 × 5</th>
<th>54 × 6</th>
<th>38 × 6</th>
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<td>33 × 2</td>
<td>19 × 7</td>
<td>84 × 5</td>
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</table>

Which of the multiplications would you calculate mentally?
Which of the multiplications would you use a written method for?

Explain your choices to a partner. Did your partner choose the same methods as you?

Children will sort the multiplications in different ways.

It is important that teachers discuss with the children why they have made the choices and refer back to the efficient multiplication step to remind children of efficient ways to multiply mentally.

Ron is calculating 46 multiplied by 4 using the part-whole model.

Can you explain Ron's mistake?

Ron has multiplied the parts correctly, but added them up incorrectly.

\[ 160 + 24 = 184 \]
Multiply 2-digits by 1-digit (1)

Notes and Guidance

Children use their understanding of repeated addition to represent a two-digit number multiplied by a one-digit number with concrete manipulatives. They use the formal method of column multiplication alongside the concrete representation. They also apply their understanding of partitioning to represent and solve calculations.

In this step, children explore multiplication with no exchange.

Mathematical Talk

How does multiplication link to addition?

How does partitioning help you to multiply 2-digits by a 1-digit number?

How does the written method match the concrete representation?

Varied Fluency

There are 21 coloured balls on a snooker table.
How many coloured balls are there on 3 snooker tables?

Use Base 10 to calculate:
21 \times 4 \text{ and } 33 \times 3

Complete the calculations to match the place value counters.

Annie uses place value counters to work out 34 \times 2

Use Annie’s method to solve:
23 \times 3
32 \times 3
42 \times 2

©White Rose Maths
Alex completes the calculation:

$$43 \times 2$$

Can you spot her mistake?

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| 1 | 4 |

Alex has multiplied 4 by 2 rather than 40 by 2.

Teddy completes the same calculation as Alex.
Can you spot and explain his mistake?

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| 8 | 0 | 6 |

Teddy has written 80 where he should have just put an 8 because he is multiplying 4 tens by 2 which is 8 tens. The answer should be 86.

Dexter says,

$$4 \times 21 = 2 \times 42$$

Is Dexter correct?

True. Both multiplications are equal to 84.

Children may explore that one number has halved and the other has doubled.
Year 4 | Spring Term | Week 1 to 3 – Number: Multiplication & Division

Multiply 2-digits by 1-digit

Notes and Guidance

Children build on their understanding of formal multiplication from Year 3 to move to the formal short multiplication method.
Children use their knowledge of exchanging ten ones for one ten in addition and apply this to multiplication, including exchanging multiple groups of tens. They use place value counters to support their understanding.

Mathematical Talk

Which column should we start with, the ones or the tens?

How are Ron and Whitney’s methods the same?
How are they different?

Can we write a list of key things to remember when multiplying using the column method?

Varied Fluency

Whitney uses place value counters to calculate $5 \times 34$

Ron also uses place value counters to calculate $5 \times 34$

Use Whitney’s method to solve:
$5 \times 42$
$23 \times 6$
$48 \times 3$

Use Ron’s method to complete:

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Reasoning and Problem Solving

Always, sometimes, never

- When multiplying a two-digit number by a one-digit number, the product has 3 digits.  
- When multiplying a two-digit number by 8 the product is odd.  
- When multiplying a two-digit number by 7 you need to exchange.

Prove it.

Sometimes: 12 × 2 has only two-digits; 23 × 5 has three digits.

Never: all multiples of 8 are even.

Sometimes: most two-digit numbers need exchanging, but not 10 or 11.

Here are three incorrect multiplications.

Correct the multiplications.

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Multiplying 3-digits by 1-digit

Notes and Guidance

Children build on previous steps to represent a three-digit number multiplied by a one-digit number with concrete manipulatives. Teachers should be aware of misconceptions arising from 0 in the tens or ones column. Children continue to exchange groups of ten ones for tens and record this in a written method.

Mathematical Talk

How is multiplying a three-digit number by one-digit similar to multiplying a two-digit number by one-digit?

Would you use counters to represent 84 multiplied by 8? Why?

Varied Fluency

Complete the calculation.

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<th>Hundreds</th>
<th>Tens</th>
<th>Ones</th>
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<td>100</td>
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A school has 4 house teams. There are 245 children in each house team. How many children are there altogether?

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<tr>
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<td>40</td>
<td>5</td>
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Write the multiplication represented by the counters and calculate the answer using the formal written method.
**Multiply 3-digits by 1-digit**

**Reasoning and Problem Solving**

**Spot the mistake**

Alex and Dexter have both completed the same multiplication.

Alex

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\[ \times \ 6 \]

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Dexter

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\[ \times \ 6 \]

1 4 0 4

Who has the correct answer? What mistake has been made by one of the children?

Dexter has the correct answer. Alex has forgotten to add the two hundreds she exchanged from the tens column.

Teddy and his mum were having a reading competition.

In one month, Teddy read 814 pages.

His mum read 4 times as many pages as Teddy.

How many pages did they read altogether?

How many fewer pages did Teddy read?

Use the bar model to help.

Teddy

\[ 814 \]

Mum

\[ 814 \quad 814 \quad 814 \quad 814 \]

They read 4,070 pages altogether.

814 \( \times 3 = 2,442 \)

Teddy read 2,442 fewer pages than his mum.
Children divide 2-digit numbers by a 1-digit number by partitioning into tens and ones and sharing into equal groups.

They divide numbers that involve exchanging between the tens and ones. The answers do not have remainders.

Children use their times-tables to partition the number into multiples of the divisor.

**Mathematical Talk**

Why have we partitioned 42 into 30 and 12 instead of 40 and 2?

What do you notice about the partitioned numbers and the divisor?

Why do we partition 96 in different ways depending on the divisor?

Ron uses place value counters to divide 42 into three equal groups.

He shares the tens first and exchanges the remaining ten for ones.

Then he shares the ones.

42 ÷ 3 = 14

Use Ron’s method to calculate 48 ÷ 3, 52 ÷ 4 and 92 ÷ 8

Annie uses a similar method to divide 42 by 3.

Use Annie’s method to calculate:

96 ÷ 8 \hspace{1cm} 96 ÷ 4 \hspace{1cm} 96 ÷ 3 \hspace{1cm} 96 ÷ 6
Divide 2-digits by 1-digit (2)

Reasoning and Problem Solving

Compare the statements using <, > or =

\[
\begin{align*}
48 \div 4 & \quad 36 \div 3 & = \\
52 \div 4 & \quad 42 \div 3 & < \\
60 \div 3 & \quad 60 \div 4 & >
\end{align*}
\]

Amir partitioned a number to help him divide by 8

Some of his working out has been covered with paint.

What number could Amir have started with?

The answer could be 56 or 96
Divide 2-digits by 1-digit (1)

Notes and Guidance

Children build on their knowledge of dividing a 2-digit number by a 1-digit number from Year 3 by sharing into equal groups.

Children use examples where the tens and the ones are divisible by the divisor, e.g. 96 divided by 3 and 84 divided by 4. They then move on to calculations where they exchange between tens and ones.

Mathematical Talk

How can we partition 84?
How many rows do we need to share equally between?
If I cannot share the tens equally, what do I need to do?
How many ones will I have after exchanging the tens?
If we know $96 \div 4 = 24$, what will $96 \div 8$ be?
What will $96 \div 2$ be? Can you spot a pattern?

Varied Fluency

Jack is dividing 84 by 4 using place value counters.

First, he divides the tens. Then, he divides the ones.

Use Jack's method to calculate:

- $69 \div 3$
- $88 \div 4$
- $96 \div 3$

Rosie is calculating 96 divided by 4 using place value counters. First, she divides the tens. She has one ten remaining so she exchanges one ten for ten ones. Then, she divides the ones.

Use Rosie's method to solve:

- $65 \div 5$
- $75 \div 5$
- $84 \div 6$
### Divide 2-digits by 1-digit (1)

#### Reasoning and Problem Solving

| Dora is calculating $72 \div 3$  
Before she starts, she says the calculation will involve an exchange.  
Do you agree? Explain why. | Dora is correct because $70$ is not a multiple of $3$ so when you divide $7$ tens between $3$ groups there will be one remaining which will be exchanged. | Eva has $96$ sweets.  
She shares them into equal groups.  
She has no sweets left over.  
How many groups could Eva have shared her sweets into? | Possible answers  
$96 \div 1 = 96$  
$96 \div 2 = 48$  
$96 \div 3 = 32$  
$96 \div 4 = 24$  
$96 \div 6 = 16$  
$96 \div 8 = 12$ |
<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Use $&lt;$, $&gt;$ or $=$ to complete the statements.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$69 \div 3$ $&gt;$ $96 \div 3$</td>
<td>$&lt;$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$96 \div 4$ $&lt;$ $96 \div 3$</td>
<td>$&lt;$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$91 \div 7$ $&lt;$ $84 \div 6$</td>
<td>$&lt;$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Children move onto solving division problems with a remainder. Links are made between division and repeated subtraction, which builds on learning in Year 2. Children record the remainders as shown in Tommy’s method. This notation is new to Year 3 so will need a clear explanation.

**Mathematical Talk**

- How do we know 13 divided by 4 will have a remainder?
- Can a remainder ever be more than the divisor?
- Which is your favourite method?
- Which methods are most efficient with larger two digit numbers?

**Varied Fluency**

- **How many squares can you make with 13 lollipop sticks?**
  - There are ___ lollipop sticks.
  - There are ___ groups of 4
  - There is ___ lollipop stick remaining.
  - $13 \div 4 = ___ \text{ remainder } ___$
  - Use this method to see how many triangles you can make with 38 lollipop sticks.

- **Tommy uses repeated subtraction to solve $31 \div 4$**
  - $31 \div 4 = 7 \text{ r } 3$
  - Use Tommy’s method to solve 38 divided by 3
  - Use place value counters to work out $94 \div 4$
  - Did you need to exchange any tens for ones?
  - Is there a remainder?
Which calculation is the odd one out? Explain your thinking.

64 ÷ 8  77 ÷ 4
49 ÷ 6  65 ÷ 3

64 ÷ 8 could be the odd one out as it is the only calculation without a remainder.

Make sure other answers are considered such as 65 ÷ 3 because it is the only one being divided by an odd number.

Jack has 15 stickers. He sorts his stickers into equal groups but has some stickers remaining. How many stickers could be in each group and how many stickers would be remaining?

Dora and Eva are planting bulbs. They have 76 bulbs altogether. Dora plants her bulbs in rows of 8 and has 4 left over. Eva plants her bulbs in rows of 10 and has 2 left over. How many bulbs do they each have?

There are many solutions, encourage a systematic approach. e.g. 2 groups of 7, remainder 1 3 groups of 4, remainder 3 2 groups of 6, remainder 3

Dora has 44 bulbs. Eva has 32 bulbs.
Divide 2-digits by 1-digit (2)

Notes and Guidance

Children explore dividing 2-digit numbers by 1-digit numbers involving remainders.

They continue to use the place value counters to divide in order to explore why there are remainders. Teachers should highlight, through questioning, that the remainder can never be greater than the number you are dividing by.

Mathematical Talk

If we are dividing by 3, what is the highest remainder we can have?

If we are dividing by 4, what is the highest remainder we can have?

Can we make a general rule comparing our divisor (the number we are dividing by) to our remainder?

Varied Fluency

Teddy is dividing 85 by 4 using place value counters.

First, he divides the tens. Then, he divides the ones.

Use Teddy's method to calculate:

86 ÷ 4 87 ÷ 4 88 ÷ 4 97 ÷ 3 98 ÷ 3 99 ÷ 3

Whitney uses the same method, but some of her calculations involve an exchange.

Use Whitney's method to solve:

57 ÷ 4 58 ÷ 4 58 ÷ 3
## Divide 2-digits by 1-digit (2)

### Reasoning and Problem Solving

<table>
<thead>
<tr>
<th>Rosie writes, 85 ÷ 3 = 28 r 1</th>
<th>I agree, remainder 1 means there is 1 left over. 85 is one more than 84 which is a multiple of 3</th>
<th>Whitney is thinking of a 2-digit number that is less than 50</th>
</tr>
</thead>
<tbody>
<tr>
<td>She says 85 must be 1 away from a multiple of 3 Do you agree?</td>
<td></td>
<td>When it is divided by 2, there is no remainder.</td>
</tr>
<tr>
<td>37 sweets are shared between 4 friends. How many sweets are left over?</td>
<td>Alex is correct as there will be one remaining sweet. Mo has found how many sweets each friend will receive. Eva has written the answer to the calculation. Jack has found a remainder that is larger than the divisor so is incorrect.</td>
<td>When it is divided by 3, there is a remainder of 1</td>
</tr>
<tr>
<td>Four children attempt to solve this problem.</td>
<td>Can you explain who is correct and the mistakes other people have made?</td>
<td>When it is divided by 5, there is a remainder of 3</td>
</tr>
</tbody>
</table>
| • Alex says it’s 1 | • Mo says it’s 9 
• Eva says it’s 9 r 1 
• Jack says it’s 8 r 5 | What number is Whitney thinking of? |
| Can you explain who is correct and the mistakes other people have made? | | Whitney is thinking of 28 |
Divide 3-digits by 1-digit

Notes and Guidance

Children apply their previous knowledge of dividing 2-digit numbers to divide a 3-digit number by a 1-digit number.

They use place value counters and part-whole models to support their understanding.

Children divide numbers with and without remainders.

Mathematical Talk

What is the same and what’s different when we are dividing 3-digit numbers by a 1-digit number and a 2-digit number by a 1-digit number?

Do we need to partition 609 into three parts or could it just be partitioned into two parts?

Can we partition the number in more than one way to support dividing more efficiently?

Varied Fluency

Annie is dividing 609 by 3 using place value counters.

<table>
<thead>
<tr>
<th>Hundreds</th>
<th>Tens</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>100</td>
<td>11</td>
</tr>
<tr>
<td>100</td>
<td>100</td>
<td>11</td>
</tr>
<tr>
<td>100</td>
<td>100</td>
<td>11</td>
</tr>
</tbody>
</table>

609 ÷ 3 = 203
600 ÷ 3 = 200
0 ÷ 3 = 0
9 ÷ 3 = 3

Use Annie’s method to calculate the divisions.

906 ÷ 3  884 ÷ 4  884 ÷ 8  489 ÷ 2

Rosie is using flexible partitioning to divide 3-digit numbers. She uses her place value counters to support her.

<table>
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<th>Hundreds</th>
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<th>Ones</th>
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</thead>
<tbody>
<tr>
<td>100</td>
<td>100</td>
<td>11</td>
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</tbody>
</table>

981 ÷ 4 = 245 r 1
800 ÷ 4 = 200
160 ÷ 4 = 40
21 ÷ 4 = 5 r 1

Use Rosie’s method to solve:

726 ÷ 6
846 ÷ 6
846 ÷ 7
Divide 3-digits by 1-digit

Reasoning and Problem Solving

Dexter is calculating $208 \div 8$ using part-whole models. Can you complete each model?

- $208 \div 8 = 26$
- $80 \div 8 = 10$
- $48 \div 8 = 6$
- $160 \div 8 = 20$
- $40 \div 8 = 5$
- $8 \div 8 = 1$

Children can then make a range of part-whole models to calculate $132 \div 4$.

- $120 \div 4 = 30$
- $32 \div 4 = 8$
- $160 \div 8 = 20$
- $40 \div 8 = 5$
- $8 \div 8 = 1$

How many part-whole models can you make to calculate $132 \div 4$?

You have 12 counters and the place value grid. You must use all 12 counters to complete the following.

<table>
<thead>
<tr>
<th>Hundreds</th>
<th>Tens</th>
<th>Ones</th>
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</tbody>
</table>

Create a 3-digit number divisible by 2
Create a 3-digit number divisible by 3
Create a 3-digit number divisible by 4
Create a 3-digit number divisible by 5
Can you find a 3-digit number divisible by 6, 7, 8 or 9?

2: Any even number
3: Any 3-digit number (as the digits add up to 12, a multiple of 3)
4: A number where the last two digits are a multiple of 4
5: Any number with 0 or 5 in the ones column.

Possible answers
6: Any even number
7: 714, 8: 840
9: impossible
Notes and Guidance

Children solve more complex problems building on their understanding from Year 3 of when \( n \) objects relate to \( m \) objects.

They find all solutions and notice how to use multiplication facts to solve problems.

Mathematical Talk

Can you use a table to support you to find all the combinations?

Can you use a code to help you find the combinations? e.g. VS meaning Vanilla and Sauce

Can you use coins to support you to make all the possible combinations?

Varied Fluency

An ice-cream van has 4 flavours of ice-cream and 2 choices of toppings.

<table>
<thead>
<tr>
<th>Ice-cream flavour</th>
<th>Toppings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vanilla</td>
<td>Sauce</td>
</tr>
<tr>
<td>Chocolate</td>
<td>Flake</td>
</tr>
<tr>
<td>Strawberry</td>
<td></td>
</tr>
<tr>
<td>Banana</td>
<td></td>
</tr>
</tbody>
</table>

How many different combinations of ice-cream and toppings can be made?

Complete the multiplication to represent the combinations.  
___ \( \times \) ___ = ___  There are ___ combinations.

Jack has two piles of coins. He chooses one coin from each pile.

What are all the possible combinations of coins Jack can choose?  
What are all the possible totals he can make?
Here are the meal choices in the school canteen.

<table>
<thead>
<tr>
<th>Starter</th>
<th>Main</th>
<th>Dessert</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soup</td>
<td>Pasta</td>
<td>Cake</td>
</tr>
<tr>
<td>Garlic Bread</td>
<td>Chicken</td>
<td>Ice-cream</td>
</tr>
<tr>
<td></td>
<td>Beef</td>
<td>Fruit Salad</td>
</tr>
<tr>
<td></td>
<td>Salad</td>
<td></td>
</tr>
</tbody>
</table>

There are 2 choices of starter, 4 choices of main and 3 choices of dessert.

How many meal combinations can you find? Can you use a systematic approach? Can you represent the combinations in a multiplication?

If there were 20 meal combinations, how many starters, mains and desserts might there be?

There are 24 meal combinations altogether. 
\[2 \times 4 \times 3 = 24\]

20 combinations
\[1 \times 1 \times 20\]
\[1 \times 2 \times 10\]
\[1 \times 4 \times 5\]
\[2 \times 2 \times 5\]
Accept all other variations of these four multiplications e.g. \[1 \times 20 \times 1\]

Alex has 6 T-shirts and 4 pairs of shorts. Dexter has 12 T-shirts and 2 pairs of shorts. Who has the most combinations of T-shirts and shorts? Explain your answer.

Alex and Dexter have the same number of combinations of T-shirts and shorts.