Autumn Scheme of Learning

Year 4/5

#MathsEveryoneCan

2019-20

White Rose Maths

How to use the mixed-age SOL

In this document, you will find suggestions of how you may structure a progression in learning for a mixed-age class.

Firstly, we have created a yearly overview.

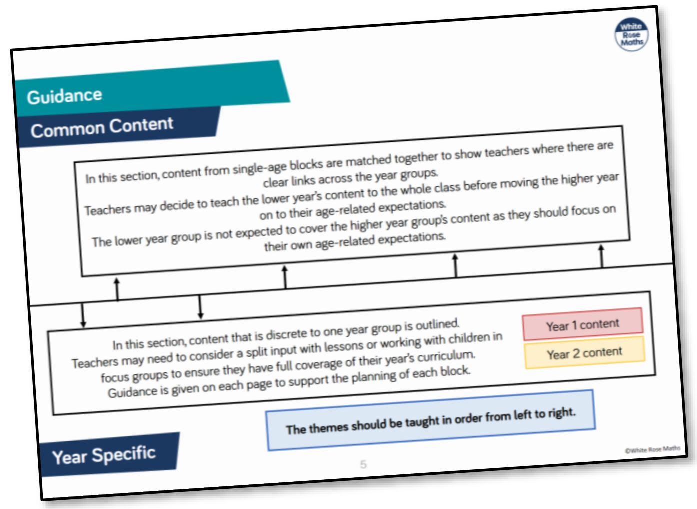
<table>
<tr><th></th><th>Week 1</th><th>Week 2</th><th>Week 3</th><th>Week 4</th><th>Week 5</th><th>Week 6</th><th>Week 7</th><th>Week 8</th><th>Week 9</th><th>Week 10</th><th>Week 11</th><th>Week 12</th></tr>
<tr><td>Autumn</td><td colspan="3">Number: Place Value
Y1 – Numbers to 20
Y2 – Numbers to 100</td><td colspan="6">Number: Addition and Subtraction
Year 1- Numbers within 20 (including recognising money)
Year 2- Numbers within 100 (including money)</td><td colspan="3">Number:
Year 1: Place Value to 50 and Multiplication
Year 2: Multiplication</td></tr>
<tr><td rowspan="2">Spring</td><td colspan="2" rowspan="2">Number:
Year 1: Division & consolidation
Year 2: Division</td><td colspan="2">Year 1: Place Value to 100</td><td rowspan="2">Measurement: Length and Height</td><td colspan="3" rowspan="2">Geometry:
Year 1: Shape and Consolidation
Year 2: Properties of Shape</td><td colspan="3" rowspan="2">Number:
Year 1: Fractions and Consolidation
Year 2: Fractions</td><td rowspan="2">Consolidation</td></tr>
<tr><td colspan="2">Year 2: Statistics</td></tr>
<tr><td>Summer</td><td>Geometry: Position and Direction</td><td colspan="2">Measurement: Time</td><td colspan="2">Problem solving and efficient methods</td><td colspan="3">Measurement:
Year 1: Weight and Volume
Year 2: Mass, Capacity and Temperature</td><td colspan="4">Consolidation and Investigations</td></tr>
</table>

Each term has 12 weeks of learning. We are aware that some terms are longer and shorter than others, so teachers may adapt the overview to fit their term dates.

The overview shows how the content has been matched up over the year to support teachers in teaching similar concepts to both year groups. Where this is not possible, it is clearly indicated on the overview with 2 separate blocks.

For each block of learning, we have grouped the small steps into themes that have similar content. Within these themes, we list the corresponding small steps from one or both year groups. Teachers can then use the single-age schemes to access the guidance on each small step listed within each theme.

The themes are organised into common content (above the line) and year specific content (below the line). Moving from left to right, the arrows on the line suggest the order to teach the themes.



How to use the mixed-age SOL

Here is an example of one of the themes from the Year 1/2 mixed-age guidance.

Subtraction

Year 1 (Aut B2, Spr B1)
- How many left? (1)
- How many left? (2)
- Counting back
- Subtraction - not crossing 10
- Subtraction - crossing 10 (1)
- Subtraction - crossing 10 (2)

Year 2 (Aut B2, B3)
- Subtract 1-digit from 2-digits
- Subtract with 2-digits (1)
- Subtract with 2-digits (2)
- Find change - money

In order to create a more coherent journey for mixed-age classes, we have re-ordered some of the single-age steps and combined some blocks of learning e.g. Money is covered within Addition and Subtraction.

The bullet points are the names of the small steps from the single-age SOL. We have referenced where the steps are from at the top of each theme e.g. Aut B2 means Autumn term, Block 2. Teachers will need to access both of the single-age SOLs from our website together with this mixed-age guidance in order to plan their learning.

Points to consider

- Use the mixed-age schemes to see where similar skills from both year groups can be taught together. Learning can then be differentiated through the questions on the single-age small steps so both year groups are focusing on their year group content.
- When there is year group specific content, consider teaching in split inputs to classes. This will depend on support in class and may need to be done through focus groups .
- On each of the block overview pages, we have described the key learning in each block and have given suggestions as to how the themes could be approached for each year group.
- We are fully aware that every class is different and the logistics of mixed-age classes can be tricky. We hope that our mixed-age SOL can help teachers to start to draw learning together.

Guidance

Common Content

In this section, content from single-age blocks are matched together to show teachers where there are clear links across the year groups.
Teachers may decide to teach the lower year's content to the whole class before moving the higher year on to their age-related expectations.
The lower year group is not expected to cover the higher year group's content as they should focus on their own age-related expectations.

In this section, content that is discrete to one year group is outlined.
Teachers may need to consider a split input with lessons or working with children in focus groups to ensure they have full coverage of their year's curriculum.
Guidance is given on each page to support the planning of each block.

Year 4 content

Year 5 content

Year Specific

The themes should be taught in order from left to right.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value				Number: Addition and Subtraction			Number: Multiplication and Division			Measurement: Length, Perimeter and Area	
Spring	Number: Multiplication and Division			Number: Fractions					Number: Decimals (including Y5 Percentages)			
Summer	Number: Decimals (including Y4 Money)		Measurement: Time	Statistics		Geometry: Properties of Shape			Geometry: Position and Direction	Y4: Consolidation Y5: Converting Units & Volume		Consolidation

Multiplication and Division

Common Content

Times-tables and multiples

Year 4 (Aut B4, Spr B1)

- Multiply and divide by 6
- 6 times table and division facts
- Multiply and divide by 9
- 9 times table and division facts
- Multiply and divide by 7
- 7 times table and division facts
- 11 and 12 times table

Year 5 (Aut B4)

- Multiples

Factors

Year 4 (Spr B1)

- Factor pairs

Year 5 (Aut B4)

- Factors
- Common factors

× and ÷ by multiples of 10

Year 4 (Aut B4)

- Multiply by 10
- Multiply by 100
- Divide by 10
- Divide by 100

Year 5 (Aut B4)

- Multiply by 10, 100 and 1,000
- Divide by 10,100 and 1,000
- Multiples of 10, 100 and 1,000

× and ÷ by 1 and 0

Year 4 (Aut B4)

- Multiply by 1 and 0
- Divide by 1

Multiply 3 numbers

Year 4 (Spr B1)

- Multiply 3 numbers

Primes, Squares and Cubes

Year 5 (Aut B4)

- Prime numbers
- Square numbers
- Cube numbers

In this block, Year 4 children focus on times-tables and Year 5 children link this learning to the concept of multiples. It is important that children focus on all times-tables up to the 12 times-table to improve fluency. Practicing on a daily basis will support children with retention.

Year 5 move onto learning about prime, square and cube numbers whilst Year 4 may focus on multiplying 3 numbers and the associative law.

Year Specific

White Rose Maths

Multiplication & Division

Theme 1 – Multiply/divide by 1 and 0

Multiply by 1 and 0

Notes and Guidance

Children explore the result of multiplying by 1, using concrete equipment.

Linked to this, they look at multiplying by 0 and use concrete equipment and pictorial representations of multiplying by 0

Mathematical Talk

Use number pieces to show me 9 × 1, 3 × 1, 5 × 1

What do you notice?

What does 0 mean?

What does multiplying by 1 mean?

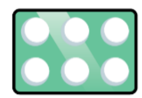
What's the same and what's different about multiplying by 1 and multiplying by 0?

Varied Fluency

- Complete the calculation shown by the number pieces.

There are ____ ones.

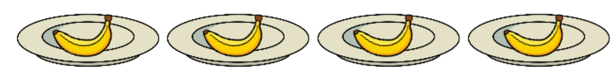
____ × ____ = ____



There is ____ six.

____ × ____ = ____

- Complete the sentences.



There are ____ plates. There is ____ banana on each plate.
Altogether there are ____ bananas.
____ × ____ = ____

- Complete:

4 × ____ = 4	____ = 1 × 7	0 = ____ × 42
63 × 1 = ____	____ × 27 = 0	50 × ____ = 50

Multiply by 1 and 0

Reasoning and Problem Solving

Which answer could be the odd one out?
What makes it the odd one out?

$3 + 0 =$ ___

$3 - 0 =$ ___

$3 \times 0 =$ ___

Explain why the answer is different.

$3 \times 0 = 0$ is the odd one out because it is the only one with 0 as an answer.

The addition and subtraction calculations have an answer of 3 because they started with that amount and added or subtracted 0 (nothing).

3×0 means '3 lots of nothing', so the total is zero.

Circle the incorrect calculations and write them correctly.

$5 \times 0 = 50$

$19 \times 1 = 19$

$7 \times 0 = 7$

$1 \times 1 = 2$

$0 \times 35 = 0$

$0 \times 0 = 1$

$1 \times 8 = 9$

Choose one calculation and create a drawing to show it.

The incorrect calculations are:
$5 \times 0 = 50$
$7 \times 0 = 7$
$1 \times 1 = 2$
$0 \times 0 = 1$
$1 \times 8 = 9$

Corrected calculations:

$5 \times 0 = 0$
$7 \times 0 = 0$
$1 \times 1 = 1$
$0 \times 0 = 0$
$1 \times 8 = 8$

White Rose Maths

Divide by 1

Notes and Guidance

Children learn what happens to a number when you divide it by 1 or by itself. Using concrete and pictorial representations, children demonstrate how both the sharing and grouping structures of division can be used to divide a number by 1 or itself. Use stem sentence to encourage children to see this e.g.
5 grouped into 5s equals 1 ($5 \div 5 = 1$)
5 grouped into 1s equals 5 ($5 \div 1 = 5$)

Mathematical Talk

What does sharing mean? Give an example.

What does grouping mean? Give an example.

Can you write a worded question where you need to group?

Can you write a worded question where you need to share?

Varied Fluency

Use counters and hands to complete.

- 4 counters **shared** between 4 hands ____ ÷ ____ = ____
- 4 counters **shared** between 1 hand ____ ÷ ____ = ____
- 9 counters **grouped** in 1s ____ ÷ ____ = ____
- 9 counters **grouped** in 9s ____ ÷ ____ = ____

Choose the correct bar model to help you answer this question.
Annie has £4 in total. She gives away £4 at a time to her friends.
How many friends receive £4?

£4			
£1	£1	£1	£1

£4
£4

Draw a bar model for each question to help you work out the answer.

- Tommy baked 7 cookies and shared them equally between his 7 friends. How many cookies did each friend receive?
- There are 5 sweets. Children line up and take 5 sweets at a time. How many children have 5 sweets?

Divide by 1

Reasoning and Problem Solving

Use <, > or = to complete the following:

$8 \div 1 \bigcirc 7 \div 1$

$6 \div 6 \bigcirc 5 \div 5$

$4 \div 4 \bigcirc 4 \div 1$

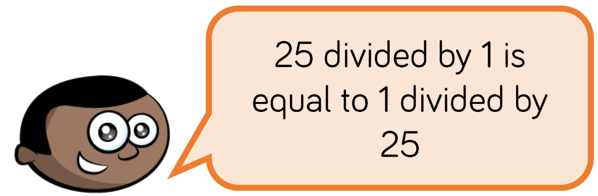
Draw an image for each one to show that you are correct.

>

=

<

Mo says,



Do you agree?

Explain your answer.

No, Mo is incorrect because division is not commutative.

$25 \div 1 = 25$

$1 \div 25 = \frac{1}{25}$

Multiplication & Division

Theme 2 – Times-tables and multiples

Multiply and Divide by 6

Notes and Guidance

Children draw on their knowledge of times tables facts in order to multiply and divide by 6

They use their knowledge of equal groups in using concrete and pictorial methods to solve multiplication and division problems.

Mathematical Talk

How many equal groups do we have? How many are in each group? How many do we have altogether?

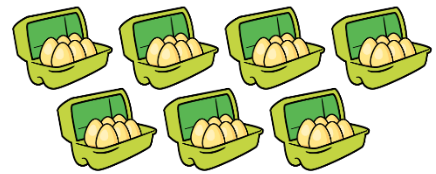
Can you write a number sentence to show this?

Can you represent the problem in a picture?

What does each number in the calculation represent?

Varied Fluency

- Complete the sentences.



There are ____ lots of ____ eggs.

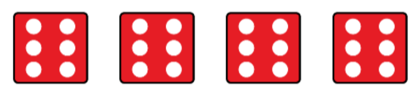
There are ____ eggs in total.

____ × ____ = ____

First there were ____ eggs. Then they were shared into ____ boxes.
Now there are ____ eggs in each box.

____ ÷ ____ = ____

- Complete the fact family.



____ × ____ = ____
____ × ____ = ____
____ ÷ ____ = ____
____ ÷ ____ = ____

- There are 9 baskets.
Each basket has 6 apples in.
How many apples are there in total?
Write a multiplication sentence to describe this word problem.

Multiply and Divide by 6

Reasoning and Problem Solving

Always, Sometimes, Never

When you multiply any whole number by 6 it will always be an even number.

Explain your answer.

Always, because 6 itself is even and odd × even and even × even will always give an even product.

Teddy says,

If
$6 \times 12 = 72$
then
$12 \div 6 = 72$

Is Teddy correct?
Explain your answer.

Teddy is not correct because $12 \div 6 = 2$ not 72

He should have written
$72 \div 6 = 12$ or
$72 \div 12 = 6$

6 Times Table & Division Facts

Notes and Guidance

Children use known table facts to become fluent in the six times table.
For example, applying knowledge of the 3 times table by understanding that each multiple of 6 is double the equivalent multiple of 3
Children should also be able to apply this knowledge to multiplying and dividing by 10 and 100 (for example, knowing that $30 \times 6 = 180$ because they know that $3 \times 6 = 18$).

Mathematical Talk

What do you notice about the 3 times table and the 6 times table?

Can you use 3 × ___ to work out 6 × ___?

Can you use 7×5 to work out 7×6?

Which known fact did you use?

Varied Fluency

Complete the number sentences.

1 × 3 = ___	1 × ___ = 6
2 × ___ = 6	2 × 6 = ___
3 × 3 = ___	3 × 6 = ___

What do you notice about the 5 times table and the 6 times table?

5 times table:	5	10	15	20	25	30
6 times table:	6	12	18	24	30	36

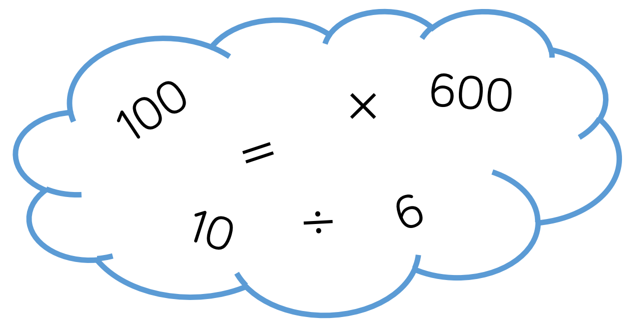
Use your knowledge of the 6 times table to complete the missing values?

6 × 2 = ___	___ × 6 = 12	6 × 2 × 10 = ___
___ × 20 = 120	20 × ___ = 120	6 × 2 × ___ = 1,200
6 × ___ = 1,200	200 × 6 = ___	10 × ___ × 6 = 120

6 Times Table and Division Facts

Reasoning and Problem Solving

I am thinking of 2 numbers where the sum of the numbers is 15 and the product is 54 What are my numbers? Think of your own problem for a friend to solve?	6 and 9 because $9 \times 6 = 54$ $6 \times 9 = 54$ $6 + 9 = 15$ $9 + 6 = 15$
Always, Sometimes, Never If a number is a multiple of 3 it is also a multiple of 6 Explain why you think this.	Sometimes. Every even multiple of 3 is a multiple of 6, but the odd multiples of 3 are not multiples of 6

Choose the correct number or symbol from the cloud to fill in the boxes.  ___ ÷ ___ = 6 60 = 600 ___ 10	$600 \div 100 = 6$ $60 = 600 \div 10$

Multiply and Divide by 9

Notes and Guidance

Children use their previous knowledge of multiplying and dividing to become fluent in the 9 times table.

They apply their knowledge in different contexts.

Mathematical Talk

Can you use concrete or pictorial representations to help you answer the questions?

What other facts can you link to this fact?

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

What does each number in the calculation represent?

How many lots of 9 do we have?

How many groups of 9 do we have?

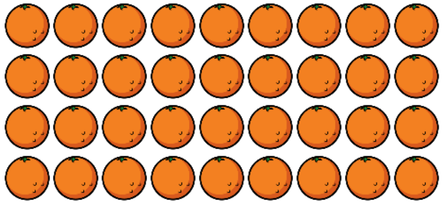
Varied Fluency

- Complete the sentences to describe the oranges:

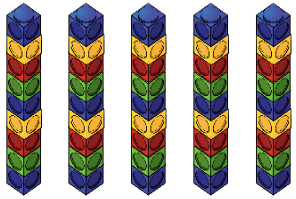
  There are ____ lots of 9

  There are ____ nines.

  4 × ____ = ____



- Complete the fact family.



  ____ × ____ = ____
  ____ × ____ = ____
  ____ ÷ ____ = ____
  ____ ÷ ____ = ____

- Complete the sentences.

  There are ____ lots of ____.
  ____ × ____ = ____
  ____ ÷ ____ = ____

9	9	9

  There are ____ lots of ____.
  ____ × ____ = ____
  ____ ÷ ____ = ____

3	3	3	3	3	3	3	3	3

  What's the same about each question? What's different?

Multiply and Divide by 9

Reasoning and Problem Solving

True or False?

$6 \times 9 = 9 \times 3 \times 2$

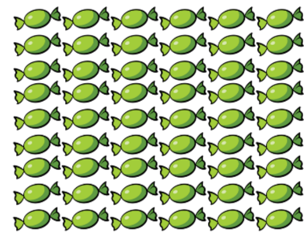
$9 \times 6 = 3 \times 9 + 9$

Explain your answer.

$6 \times 9 = 9 \times 3 \times 2$ is true because
$6 \times 9 = 54$
and
$9 \times 3 = 27$
$27 \times 2 = 54$

$9 \times 6 = 3 \times 9 + 9$ is false because
$6 \times 9 = 54$
and
$3 \times 9 = 27$
$27 + 9 = 36$

Amir and Whitney both receive some sweets.

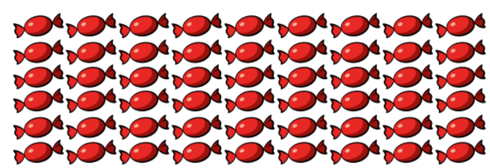


Amir

I have more sweets because I have more rows.

Whitney

I have more sweets because I have more in each row.



Who has more sweets? Explain your reasoning.

They both have 54 sweets, arranged in two different arrays.

9 Times Table & Division Facts

Notes and Guidance

Children use known times table facts to become fluent in the 9 times table.

For example, knowing that each multiple of 9 is one less than the equivalent multiple of 10, and using that knowledge to derive related facts.

Children should also be able to apply the knowledge of the 9 times table when multiplying and dividing by 10 and 100

Mathematical Talk

How did you work out the missing numbers?

What do you notice about the multiples of 9?

What do you notice about the 9 times table and the 10 times table?

Varied Fluency

What are the missing numbers from the 9 times table?

9	18	27	___	45
54	___	72	81	90

Circle the multiples of 9.

54 108 18 24 9 67 72 37

Use your knowledge of the 9 times table to complete the missing values.

$1 \times 9 =$ ___	___ $\times 1 = 9$	$1 \times 9 \times$ ___ $= 90$
___ $\times 9 = 90$	$900 = 100 \times$ ___	$9 \times 1 \times 10 =$ ___
$9 \times$ ___ $= 900$	$4 \times 9 =$ ___	$9 \times 1 \times$ ___ $= 900$

What do you notice about the 9 times table and the 10 times table?

9 times table:	9	18	27	36	45	54
10 times table:	10	20	30	40	50	60

9 Times Table and Division Facts

Reasoning and Problem Solving

Can you complete the calculations using some of the symbols or numbers in the box? ÷ 9 100 10 900 = ___ ÷ ___ = 9 90 = 900 ___ 10	$900 \div 100 = 9$ $90 = 900 \div 10$

I am thinking of two numbers. The sum of the numbers in 17. The product of the numbers is 72. What are my secret numbers? Can you choose your own two secret numbers from the 9 times table and create clues for your partner?	8 and 9 because $8 \times 9 = 72$ or $9 \times 8 = 72$ and $8 + 9 = 17$ or $9 + 8 = 17$
Always, Sometimes, Never All multiples of 9 have digits that have a sum of 9.	Always.

Multiply and Divide by 7

Notes and Guidance

Children use their knowledge of multiplication and division to multiply by 7
They count in 7s, and use their knowledge of equal groups supported by use of concrete and pictorial methods to solve multiplication calculations and problems.
They explore commutativity and also understand that multiplication and division are inverse operations.

Mathematical Talk

How many do we have altogether?

What do you notice?

Can you work out the answers by partitioning 7 into 4 and 3?

Which multiples of 7 do you already know from your other tables?

Varied Fluency

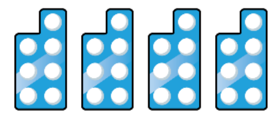
- Use a number stick to support counting in sevens. What do you notice?

  Write down the first five multiples of 7

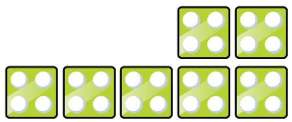
  ___ ___ ___ ___ ___

- Rosie uses number pieces to represent seven times four. She does it in two ways.

  4 sevens
  4 lots of 7
  4×7

  7 fours
  7 lots of 4
  7×4

  Use Rosie's method to represent seven times six in two ways.

- Seven children share 56 stickers. How many stickers will they get each?
  Use a bar model to solve the problem.

  One apple costs 7 pence. How much would 5 apples cost?
  Use a bar model to solve the problem.

Multiply and Divide by 7

Reasoning and Problem Solving

Mrs White's class are selling tickets at £2 each for the school play. The class can sell one ticket for each chair in the hall. There are 7 rows of chairs in the hall. Each row contains 9 chairs. How much money will they make?	Number of tickets (chairs): $7 \times 9 = 63$ $63 \times £2 = £126$

What do you notice about the pattern when counting in 7s from 0? Does this continue beyond 7 times 12? Can you explain why? In which other times tables will you see the same pattern?	Odd, even pattern because odd + odd = even. Then even + odd = odd, and this will continue throughout the whole times table. The same pattern will occur in all other odd multiplication tables (e.g. 1, 3, 5, 9).

7 Times Table & Division Facts

Notes and Guidance

Children apply the facts from the 7 times table (and other previously learned tables) to solve calculations with larger numbers.

They need to spend some time exploring links between multiplication tables and investigating how this can help with mental strategies for calculation.

e.g. $7 \times 7 = 49$, $5 \times 7 = 35$ and $2 \times 7 = 14$

Mathematical Talk

If you know the answer to three times seven, how does it help you?

What's the same and what's different about the number facts?

How does your 7 times table help you work out the answers?

Varied Fluency

- Complete.

  $3 \times 7 =$ ____

  $30 \times 7 =$ ____

  $300 \times 7 =$ ____

- Use your knowledge of the 7 times table to calculate.

  $80 \times 7 =$ ____ ____ $= 60 \times 7$

  $70 \times 7 =$ ____ $7 \times 500 =$ ____

- How would you use times tables facts to help you calculate how many days there are in 15 weeks? Complete the sentences.

  There are ____ days in one week.

  ____ $\times 10 =$ ____
  There are ____ days in 10 weeks.

  ____ $\times 5 =$ ____
  There are ____ days in 5 weeks.

  ____ + ____ = ____
  There are ____ days in 15 weeks.

7 Times Table & Division Facts

Reasoning and Problem Solving

True or False? $7 \times 6 = 7 \times 3 \times 2$ $7 \times 6 = 7 \times 7 + 8$ Explain your answer to a friend. Prove using a drawing.	True. False, because $7 \times 6 = 42$ whereas $7 \times 7 = 49$ then $49 + 8 = 57$ Children could draw a bar model or bundles of straws.
Children were arranged into rows of seven. There were 5 girls and 2 boys in each row.  Use your times table knowledge to show how many girls would be in 10 rows and in 100 rows. Show as many number sentences using multiplication and division as you can which are linked to this picture. How many children in total are there in 200 rows? How many girls? How many boys?	<u>10 rows</u> $5 \times 10 = 50$ girls <u>100 rows</u> $5 \times 100 = 500$ girls <u>200 rows</u> Children in total: $7 \times 200 = 1{,}400$ Girls: $5 \times 200 = 1{,}000$ Boys: $2 \times 200 = 400$

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 11×10 is equal to 110, how can I use this to calculate 11×11?

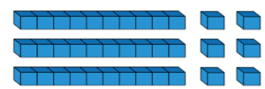
Varied Fluency

- Fill in the blanks.

$2 \times 10 =$ ____ $2 \times 1 =$ ____

2 lots of 10 doughnuts = ____ 2 lots of 1 doughnut = ____
2 lots of 11 doughnuts = ____
$2 \times 10 + 2 \times 1 = 2 \times 11 =$ ____

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



$3 \times 12 = \square$

Complete the calculations.

$12 \times 5 = \square$ $5 \times 12 = \square$ $48 \div 12 = \square$ $84 \div 12 = \square$

$12 \times \square = 120$ $12 \times \square = 132$ $\square \div 12 = 8$ $\square = 9 \times 12$

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

11 and 12 Times-table

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

88										
11	11	11	11	11	11	11	11	11	11	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

Multiples

Notes and Guidance

Building on their times tables knowledge, children will find multiples of whole numbers. Children build multiples of a number using concrete and pictorial representations e.g. an array. Children understand that a multiple of a number is the product of the number and another whole number.

Multiplying decimal numbers by 10, 100 and 1,000 forms part of Year 5 Summer block 1 .

Mathematical Talk

What do you notice about the multiples of 5? What is the same about each of them, what is different?

Look at multiples of other numbers, is there a pattern that links them to each other?

Are all multiples of 8 multiples of 4?

Are all multiples of 4 multiples of 8?

Varied Fluency

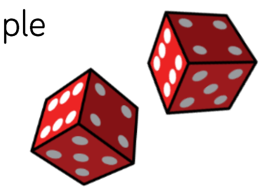
- Circle the multiples of 5

  25 32 54 175 554 3000

  What do you notice about the multiples of 5?

- 7,135 is a multiple of 5. Explain how you know.

- Roll 2 dice (1-6), and multiply the numbers the you roll.
  List all the numbers that this number is a multiple of.
  Repeat the dice roll.
  Use a table to show your results.
  Multiply the numbers you roll to complete the table.



Multiples

Reasoning and Problem Solving

Use 0 – 9 digit cards. Choose 2 cards and multiply the digits shown.

What is your number a multiple of?

Is it a multiple of more than one number?

Find all the numbers you can make using the digit cards.

Use the table below to help.

	0	1	2	3	4	5	6	7	8	9
0										
1										
2										
3										
4										
5										
6										
7										
8										
9										

Always, Sometimes, Never

- The product of two even numbers is a multiple of an odd number.
- The product of two odd numbers is a multiple of an even number.

Always - all integers are multiples of 1, which is an odd number.

Never - Two odd numbers multiplied together are always a multiple of an odd number.

Eva's age is a multiple of 7 and is 3 less than a multiple of 8

She is younger than 40

How old is Eva?

Eva is 21 years old.

Multiplication & Division

Theme 3 – Multiply 3 numbers

Multiply 3 Numbers

Notes and Guidance

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?

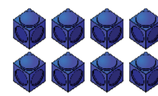
What's the same and what's different about the arrays?
Which order do you find easier to calculate efficiently?

Varied Fluency

- Complete the calculations.

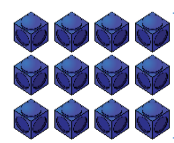
$2 \times 4 =$ ____

$2 \times 4 =$ ____

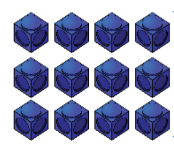


$2 \times 4 =$ ____

$3 \times 2 \times 4 = 3 \times 8 =$ ____



$\square \times \square = \square$



$\square \times \square = \square$

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

- Use counters or cubes to represent the calculations.
Choose which order you will complete the multiplication.

$5 \times 2 \times 6$ $\quad$ $8 \times 4 \times 5$ $\quad$ $2 \times 8 \times 6$

Multiply 3 Numbers

Reasoning and Problem Solving

Choose three digit cards.
Arrange them in the calculation.

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

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?

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 7×3 first and then multiply it by 4 as 21 multiplied by 4 has no exchanges.

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

7	5	3	4	6	2

$\square \times \square \times \square = 84$

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?

Possible answers:

$7 \times 2 \times 6 = 84$

$4 \times 3 \times 5 = 60$

60 is smaller than 84

$7 \times 3 \times 4 = 84$

$2 \times 6 \times 5 = 60$

60 is smaller than 84

Children may also show the numbers in a different order.

Multiplication & Division

Theme 4 – Factors

Factor Pairs

Notes and Guidance

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

Mathematical Talk

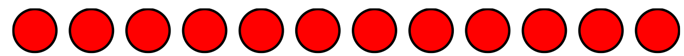
Which number is a factor of every whole number?

Do factors always come in pairs?
Do whole numbers always have an even number of factors?

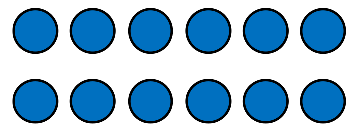
How do arrays support in finding factors of a number?
How do arrays support us in seeing when a number is not a factor of another number?

Varied Fluency

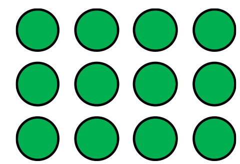
- Complete the factor pairs for 12



1 × $\square$ = 12



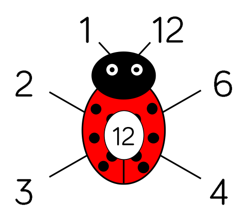
$\square$ × 6 = 12

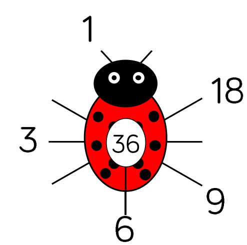


$\square$ × $\square$ = 12

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

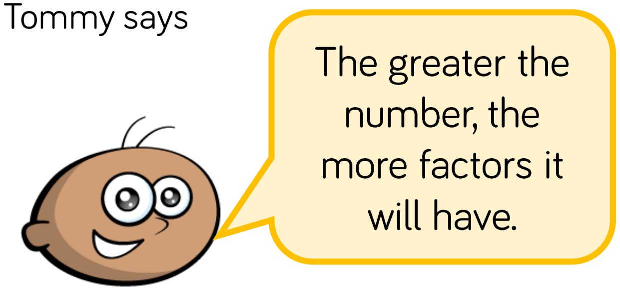




Are all the factors in pairs?
Draw your own factor bugs for 16, 48, 56 and 35

Factor Pairs

Reasoning and Problem Solving

Tommy says  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.

Factors

Notes and Guidance

Children understand the relationship between multiplication and division and use arrays to show the relationship between them. Children learn that factors of a number multiply together to give that number, meaning that factors come in pairs. Factors are the whole numbers that you multiply together to get another whole number (factor × factor = product).

Mathematical Talk

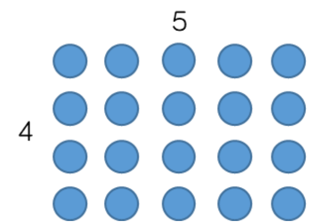
How can you work in a systematic way to prove you have found all the factors?

Do factors always come in pairs?

How can we use our multiplication and division facts to find factors?

Varied Fluency

- If you have twenty counters, how many different ways of arranging them can you find?



How many factors of twenty have you found by arranging your counters in different arrays?

- Circle the factors of 60

9, 6, 8, 4, 12, 5, 60, 15, 45

Which factors of 60 are not shown?

- Fill in the missing factors of 24

1 × ____ ____ × 12

3 × ____ ____ × ____

What do you notice about the order of the factors?
Use this method to find the factors of 42

Factors

Reasoning and Problem Solving

Here is Annie's method for finding factor pairs of 36

1	36
2	18
3	12
4	9
5	X
6	6

When do you put a cross next to a number?

How many factors does 36 have?

Use Annie's method to find all the factors of 64

If it is not a factor, put a cross.

36 has 9 factors.

Factors of 64:

1	64
2	32
3	X
4	16
5	X
6	X
7	X
8	8

Always, Sometimes, Never

- An even number has an even amount of factors.
- An odd number has an odd amount of factors.

Sometimes, e.g. 6 has four factors but 36 has nine.

Sometimes, e.g. 21 has four factors but 25 has three.

True or False?

The bigger the number, the more factors it has.

False. For example, 12 has 6 factors but 13 only has 2

Common Factors

Notes and Guidance

Using their knowledge of factors, children find the common factors of two numbers.

They use arrays to compare the factors of a number and use Venn diagrams to show their results.

Mathematical Talk

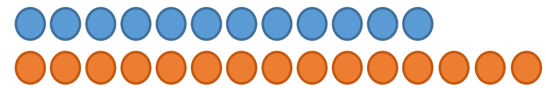
How can we find the common factors systematically?

Which number is a common factor of a pair of numbers?

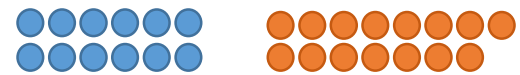
How does a Venn diagram help to show common factors? Where are the common factors?

Varied Fluency

- Use arrays to find the common factors of 12 and 15
  Can we arrange each number in counters in one row?

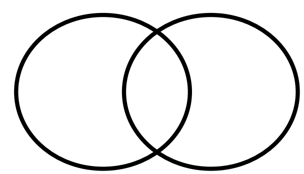


Yes- so they have a common factor of one.
Can we arrange each number in counters in two equal rows?



We can for 12, so 2 is a factor of 12, but we can't for 15, so 2 is not a factor of 15, meaning 2 is not a common factor of 12 and 15
Continue to work through the factors systematically until you find all the common factors.

- Fill in the Venn diagram to show the factors of 20 and 24



Where are the common factors of 20 and 24?
Use a Venn diagram to show the common factors of 9 and 15

Common Factors

Reasoning and Problem Solving

True or False?	
• 1 is a factor of every number.	True
• 1 is a multiple of every number.	False
• 0 is a factor of every number.	False
• 0 is a multiple of every number.	True

I am thinking of two 2-digit numbers. Both of the numbers have a digit total of six. Their common factors are: 1, 2, 3, 4, 6, and 12 What are the numbers?	24 and 60

Multiplication & Division

Theme 5 - Primes, Squares and Cubes

Prime Numbers

Notes and Guidance

Using their knowledge of factors, children see that some numbers only have two factors. They are taught that these are numbers called prime numbers, and that non-primes are called composite numbers. Children can recall primes up to 19 and are able to establish whether a number is prime up to 100. Using primes, they break a number down into its prime factors. Children learn that 1 is not a prime number because it does not have exactly two factors (it only has 1 factor).

Mathematical Talk

How many factors does each number have?

How many other numbers can you find that have this number of factors?

What is a prime number?

What is a composite number?

How many factors does a prime number have?

Varied Fluency

- Use counters to find the factors of the following numbers.

  5, 13, 17, 23

  What do you notice about the arrays?

- A prime number has exactly 2 factors, one and itself. A composite number can be divided by numbers other than 1 and itself to give a whole number answer.
  Sort the numbers into the table.

  2 3 5 9 15 24 29 30

	Prime	Composite
Exactly 2 factors (1 and itself)		
More than 2 factors		

  Put two of your own numbers into the table.
  Why are two of the boxes empty?
  Would 1 be able to go in the tablet? Why or why not?

Prime Numbers

Reasoning and Problem Solving

Find all the prime numbers between 10 and 100, sort them in the table below.

End in a 1	End in a 3	End in a 7	End in a 9

End in a 1	End in a 3
11, 31, 41, 61, 71,	13, 23, 43, 53, 73
End in a 7	**End in a 9**
17, 37, 47, 67, 97	19, 29, 59, 79, 89

Why do no two-digit prime numbers end in an even digit?

Because all two-digit even numbers have more than 2 factors.

Why do no two-digit prime numbers end in a 5?

Because all two-digit numbers ending in 5 are divisible by 5 as well as 1 and itself, so have more than 2 factors.

Dora says all prime numbers have to be odd.

Her friend Amir says that means all odd numbers are prime, so 9, 27 and 45 are prime numbers.

Explain Amir's and Dora's mistakes and correct them.

Dora is incorrect because 2 is a prime number (it has exactly 2 factors).

Amir thinks all odd numbers are prime but he is incorrect because most odd numbers have more than 2 factors.

E.g.
Factors of 9:
1, 3 and 9

Factors of 27:
1, 3, 9 and 27

Square Numbers

Notes and Guidance

Children will need to be able to find factors of numbers. Square numbers have an odd number of factors and are the result of multiplying a whole number by itself.

Children learn the notation for squared is ^{2}

Mathematical Talk

Why are square numbers called 'square' numbers?

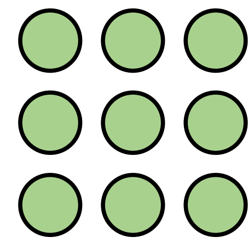
Are there any patterns in the sequence of square numbers?

Are the squares of even numbers always even?

Are the squares of odd numbers always odd?

Varied Fluency

- What does this array show you?
  Why is this array square?



- How many ways are there of arranging 36 counters in an array?
  What is the same about each array?
  What is different?

- Find the first 12 square numbers.
  Show why they are square numbers.
  How many different squares can you make using counters?
  What do you notice?
  Are there any patterns?

Square Numbers

Reasoning and Problem Solving

Teddy says,

Do you agree?
Explain your reasoning.

No.

Square numbers have an odd number of factors (e.g. the factors of 25 are 1, 25 and 5).

How many square numbers can you make by adding prime numbers together?

Here's one to get you started:

$2 + 2 = 4$

Solutions include:
$2 + 2 = 4$
$2 + 7 = 9$
$11 + 5 = 16$
$23 + 2 = 25$
$29 + 7 = 36$

Whitney thinks that 4^2 is equal to 16

Do you agree?
Convince me.

Amir thinks that 6^2 is equal to 12

Do you agree?
Explain what you have noticed.

Children may use concrete materials or draw pictures to prove it.
Children should spot that 6 has been multiplied by 2
They may create the array to prove that $6^2 = 36$ and $6 \times 2 = 12$

Always, Sometimes, Never

A square number has an even number of factors.

Never. Square numbers have an odd number of factors because one of their factors does not have a pair.

Cube Numbers

Notes and Guidance

Children learn that a cube number is the result of multiplying a whole number by itself three times e.g. $6 \times 6 \times 6$

If you multiply a number by itself, then itself again, the result is a cube number.

Children learn the notation for cubed is ^{3}

Mathematical Talk

Why are cube numbers called 'cube' numbers?

How are squared and cubed numbers similar?

How are they different?

True or False: cubes of even numbers are even and cubes of odd numbers are odd.

Varied Fluency

- Use multilink cubes to investigate how many are needed to make different sized cubes.

How many multilink blocks are required to make the first cube number? The second? Third?

Can you predict what the tenth cube number is going to be?

- Complete the table.

		8
3^3	$3 \times 3 \times 3$	27
4^3		
5^3	$5 \times 5 \times 5$	
	$6 \times 6 \times 6$	

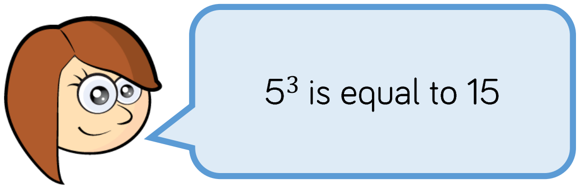
- Calculate:

$4^3 =$ ____ $5^3 =$ ____

3 cubed = ____ 6 cubed = ____

Cube Numbers

Reasoning and Problem Solving

Rosie says,  Do you agree? Explain your answer.	Rosie is wrong, she has multiplied 5 by 3 rather than by itself 3 times. $5^3 = 5 \times 5 \times 5$ $5 \times 5 \times 5 = 125$
Here are 3 cards A B C On each card there is a cube number. Use these calculations to find each number. $A \times A = B$ $B + B - 3 = C$ Digit total of $C = A$	$A = 8$ $B = 64$ $C = 125$

Dora is thinking of a two-digit number that is both a square and a cube number. What number is she thinking of?	64
Teddy's age is a cube number. Next year his age will be a square number. How old is he now?	8 years old
The sum of a cube number and a square number is 150 What are the two numbers?	125 and 25

White Rose Maths

Multiplication & Division

Theme 6 – Multiply/divide by multiples of 10

Multiply by 10

Notes and Guidance

Children need to be able to visualise and understand making a number ten times bigger and that 'ten times bigger' is the same as 'multiply by 10'

The language of 'ten lots of' is vital to use in this step. The understanding of the commutative law is essential because children need to see calculations such as 10 × 3 and 3 × 10 as equal.

Mathematical Talk

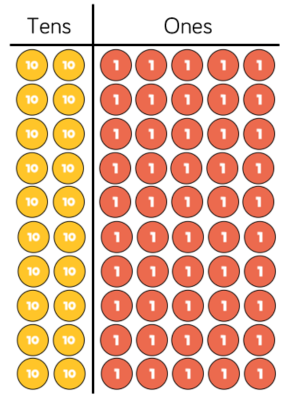
Can you represent these calculations with concrete objects or a drawing?

Can you explain what you did to a partner?

What do you notice when multiplying by 10? Does it always work?

What's the same and what's different about 5 buses with 10 passengers on each and 10 buses with 5 passengers on each?

Varied Fluency



Write the calculation shown by the place value counters.

Each row has ____ tens and ____ ones.

Each row has a value of ____.

There are ____ rows.

The calculation is ____ × ____ = ____.

Use place value counters to calculate:

10 × 3 4 × 10 12 × 10

Match each statement to the correct bar model.

5 buses have ten passengers.

8 pots each have ten pencils.

10 chickens lay 5 eggs each.

10	10	10	10	10

5	5	5	5	5	5	5	5	5	5

10	10	10	10	10	10	10	10

Multiply by 10

Reasoning and Problem Solving

Always, Sometimes, Never

If you write a whole number in a place value grid and multiply it by 10, all the digits move one column to the left.

Always.

Discuss the need for a placeholder after the new rightmost digit.

Annie has multiplied a whole number by 10

Her answer is between 440 and 540

What could her original calculation be?

How many possibilities can you find?

45×10
46×10
47×10
48×10
49×10
50×10
51×10
52×10
53×10

(or the above calculations written as 10×45 etc.).

Multiply by 100

Notes and Guidance

Children build on multiplying by 10 and see links between multiplying by 10 and multiplying by 100

Use place value counters and Base 10 to explore what is happening to the value of the digits in the calculation and encourage children to see a rule so they can begin to move away from concrete representations.

Mathematical Talk

How do the Base 10 help us to show multiplying by 100?

Can you think of a time when you would need to multiply by 100?

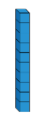
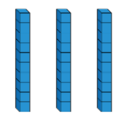
Will you produce a greater number if you multiply by 100 rather than 10? Why?

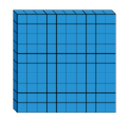
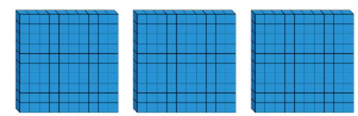
Can you use multiplying by 10 to help you multiply by 100? Explain why.

Varied Fluency

- $3 \times$  $=$  $= 3$ ones $= 3$

  Complete:

  $3 \times$  $=$  $=$ ____ tens $=$ ____

  $3 \times$  $=$  $=$ ____ hundreds $=$ ____

- Use a place value grid and counters to calculate:

7×10	63×10	80×10
7×100	63×100	80×100

  What's the same and what's different comparing multiplying by 10 and 100? Write an explanation of what you notice.

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

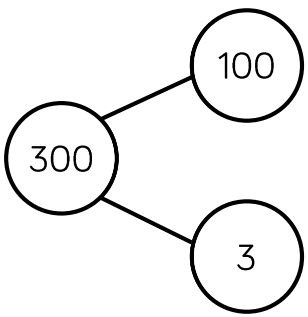
75×100	◯	75×10
39×100	◯	$39 \times 10 \times 10$
460×10	◯	100×47

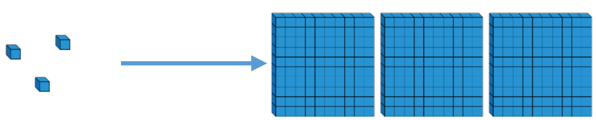
Multiply by 100

Reasoning and Problem Solving

Which representation does **not** show multiplying by 100?

Explain your answer.





The part-whole model does not represent multiplying by 100

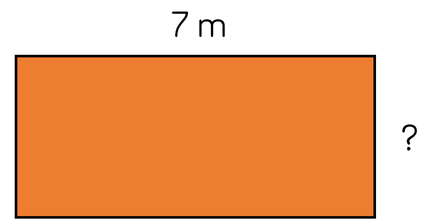
Part-whole models show addition (the aggregation structure) and subtraction (the partitioning structure), so if the whole is 300 and there are two parts, the parts added together should total 300 (e.g. 100 and 200, or 297 and 3). If the parts are 100 and 3, the whole should be 103.

To show multiplying 3 by 100 as a part-whole model, there would need to be 100 parts each with 3 in.

The perimeter of the rectangle is 26 m.

Find the length of the missing side.

Give your answer in cm.



The missing side length is 6 m so in cm it will be:

$6 \times 100 = 600$

The missing length is 600 cm.

Divide by 10

Notes and Guidance

Exploring questions with whole number answers only, children divide by 10
They should use concrete manipulatives and place value charts to see the link between dividing by 10 and the position of the digits before and after the calculation.
Using concrete resources, children should begin to understand the relationship between multiplying and dividing by 10 as the inverse of the other.

Mathematical Talk

What has happened to the value of the digits?

Can you represent the calculation using manipulatives?
Why do we need to exchange tens for ones?

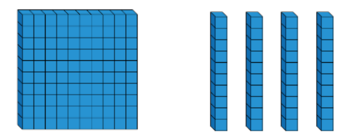
When dividing using a place value chart, in which direction do the digits move?

Varied Fluency

- Use place value counters to show the steps to divide 30 by 10

Can you use the same steps to divide a 3-digit number like 210 by 10?

- Use Base 10 to divide 140 by 10
Explain what you have done.



- Ten friends empty a money box. They share the money equally between them. How much would they have each if the box contained:
  - 20 £1 coins?
  - £120
  - £24?

  After emptying the box and sharing the contents equally, each friend has 90 p.
  How much money was in the box?

Divide by 10

Reasoning and Problem Solving

Four children are in a race. The numbers on their vests are:

350	35
3,500	53

Use the clues to match each vest number to a child.

- Jack's number is ten times smaller than Mo's.
- Alex's number is not ten times smaller than Jack's or Dora's or Mo's.
- Dora's number is ten times smaller than Jack's.

Alex – 53

Jack – 350

Dora – 35

Mo – 3,500

While in Wonderland, Alice drank a potion and everything shrank. All the items around her became ten times smaller! Are these measurements correct?

Item	Original measurement	After shrinking
Height of a door	220 cm	2,200 cm
Her height	160 cm	16 cm
Length of a book	340 mm	43 mm
Height of a mug	220 mm	?

Can you fill in the missing measurement?

Can you explain what Alice did wrong?

Write a calculation to help you explain each item.

<u>Height of a door</u>
Incorrect – Alice has multiplied by 10.

<u>Her height</u>
Correct

<u>Length of a book</u>
Incorrect – Alice has swapped the order of the digits. When dividing by 10 the order of the digits never changes.

<u>Height of a mug</u>
22 mm.

Divide by 100

Notes and Guidance

Children divide by 100 with whole number answers.

Money and measure is a good real-life context for this, as coins can be used for the concrete stage.

Mathematical Talk

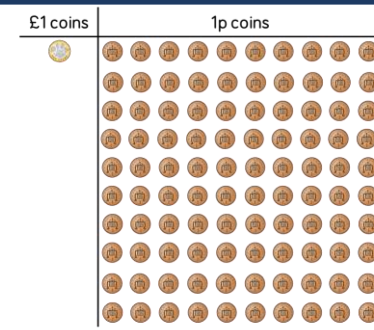
How can you use dividing by 10 to help you divide by 100?

How are multiplying and dividing by 100 related?

Write a multiplication and division fact family using 100 as one of the numbers.

Varied Fluency

- Is it possible for £1 to be shared equally between 100 people?
  How does this picture explain it?
  Can £2 be shared equally between 100 people?
  How much would each person receive?



- Match the calculation with the correct answer.

Calculation	Answer
4,200 ÷ 10	420
4,200 ÷ 100	42
420 ÷ 10	

- Use <, > or = to make each statement correct.

3,600 ÷ 10	◯	3,600 ÷ 100
2,700 ÷ 100	◯	270 ÷ 10
4,200 ÷ 100	◯	430 ÷ 10

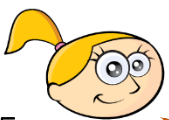
Divide by 100

Reasoning and Problem Solving

Eva and Whitney are dividing numbers by 10 and 100

They both start with the same 4-digit number.

They give some clues about their answer.



Eva

My answer has 8 ones and 2 tens.

My answer has 2 hundreds, 8 tens and 0 ones.

Whitney

What number did they both start with?

Who divided by what?

They started with 2,800

Whitney divided by 10 to get 280 and Eva divided by 100 to get 28

Use the digit cards to fill in the missing digits.

1	2	3	4	5	6	7	8	9

$170 \div 10 = \_\_\ \_\_$

$\_\_20 \times 10 = 3{,}\_\_00$

$1{,}8\_\_0 \div 10 = 1\_\_6$

$\_\_9 \times 100 = 5{,}\_\_00$

$6\_\_ = 6{,}400 \div 100$

$170 \div 10 = 17$

$320 \times 10 = 3{,}200$

$1{,}860 \div 10 = 186$

$59 \times 100 = 5{,}900$

$64 = 6{,}400 \div 100$

White Rose Maths

Multiply by 10, 100 and 1,000

Notes and Guidance

Children recap multiplying by 10 and 100 before moving on to multiplying by 1,000

They look at numbers in a place value grid and discuss the number of places to the left digits move when you multiply by different multiples of 10

Mathematical Talk

Which direction do the digits move when you multiply by 10, 100 or 1,000?

How many places do you move to the left?

When we have an empty place value column to the right of our digits what number do we use as a place holder?

Can you use multiplying by 100 to help you multiply by 1,000? Explain why.

Varied Fluency

- Make 234 on a place value grid using counters.

HTh	TTh	Th	H	T	O

When I multiply 234 by 10, where will I move my counters?
Is this always the case when multiplying by 10?

- Complete the following questions using counters and a place value grid.

$234 \times 100 =$ ____   ____ $= 324 \times 100$

$100 \times 36 =$ ____ $1{,}000 \times 207 =$ ____

$45{,}020 \times 10 =$ ____   ____ $= 3{,}406 \times 1{,}000$

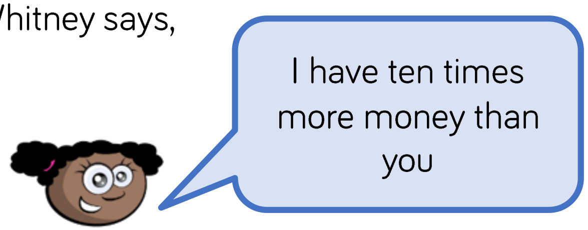
- Use <, > or = to complete the statements.

$71 \times 1{,}000$	◯	71×100
100×32	◯	$16 \times 1{,}000$
48×100	◯	$48 \times 10 \times 10 \times 10$

Multiply by 10, 100 and 1,000

Reasoning and Problem Solving

Rosie has £300 in her bank account. Tommy has 100 times more than Rosie in his bank account. How much more money does Tommy have than Rosie?	Tommy has £30,000 Tommy has £29,700 more than Rosie.
Whitney has £1,020 in her bank account. Tommy has £120 in his bank account. Whitney says,	Whitney is incorrect, she would need to have £1,200 if this were the case (Or Tommy would need to be £102).



Is Whitney correct? Explain your reasoning.

Jack is thinking of a 3-digit number. When he multiplies his number by 100, the ten thousands and hundreds digit are the same. The sum of the digits is 10 What number could Jack be thinking of?	181 262 343 424 505

Divide by 10, 100 and 1,000

Notes and Guidance

Children look at dividing by 10, 100 and 1,000 using a place value chart.

They use counters and digits to learn that the digits move to the right when dividing by powers of ten. They develop understanding of how many places to the right to move the counters to the right.

Mathematical Talk

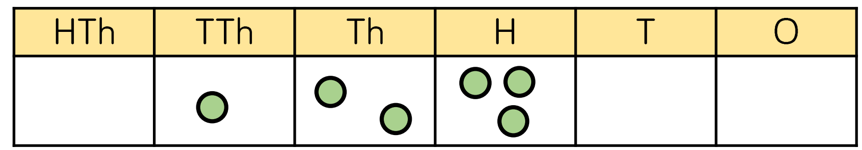
What happens to the digits?

How are dividing by 10, 100 and 1,000 related to each other?

How are dividing by 10, 100 and 1,000 linked to multiplying by 10, 100 and 1,000?

What does 'inverse' mean?

Varied Fluency



What number is represented in the place value grid?
Divide the number by 100
Which direction do the counters move?
How many columns do they move? How do you know how many columns to move?
What number do we have now?

Complete the following using a place value grid.

- Divide 460 by 10
- Divide 5,300 by 100
- Divide 62,000 by 1,000

Divide these numbers by 10, 100 and 1,000

80,000 300,000 547,000

Calculate 45,000 ÷ 10 ÷ 10
How else could you calculate this?

Divide by 10, 100 and 1,000

Reasoning and Problem Solving

Mo has £357,000 in his bank.

He divides the amount by 1,000 and takes that much money out of the bank.

Using the money he has taken out, he buys some furniture costing two hundred and sixty-nine pounds.

How much money does Mo have left from the money he took out?

Show your working out.

357,000 ÷ 1,000 = 357

If you subtract £269, he is left with £88

Here are the answers to some problems:

5,700	405	397	6,203

Can you write at least two questions for each answer involving dividing by 10, 100 or 1,000?

Possible solutions:

3,970 ÷ 10 = 397

57,000 ÷ 10 = 5,700

397,000 ÷ 1,000 = 397

40,500 ÷ 100 = 405

620,300 ÷ 100 = 6,203

Multiples of 10, 100 and 1,000

Notes and Guidance

Children have been taught how to multiply and divide by 10, 100 and 1,000

They now use knowledge of other multiples of 10, 100 and 1,000 to answer related questions.

Mathematical Talk

If we are multiplying by 20, can we break it down into two steps and use our knowledge of multiplying by 10?

How does using multiplication and division as the inverse of the other help us to use known facts?

Varied Fluency

- $36 \times 5 = 180$

  Use this fact to solve the following questions:

  $36 \times 50 =$ ____ $500 \times 36 =$ ____

  $5 \times 360 =$ ____ $360 \times 500 =$ ____

- Here are two methods to solve 24×20

Method 1	Method 2
$24 \times 10 \times 2$ $= 240 \times 2$ $= 480$	$24 \times 2 \times 10$ $= 48 \times 10$ $= 480$

  What is the same about the methods, what is different?

- The division diagram shows $7{,}200 \div 200 = 36$

  Use the diagram to solve:

  $7{,}200 \xrightarrow{\div 100} 72 \xrightarrow{\div 2} 36$

  $3{,}600 \div 200 = \square$

  $18{,}000 \div 200 = \square$

  $5{,}400 \div \square = 27$

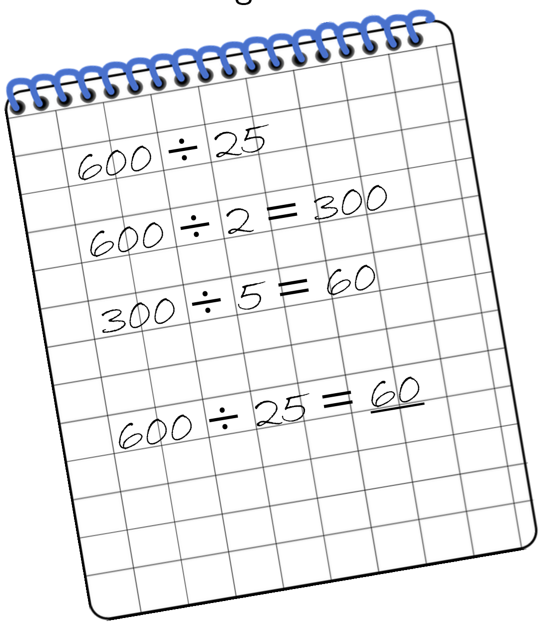
  $\square = 6{,}600 \div 200$

Multiples of 10, 100 and 1,000

Reasoning and Problem Solving

Tommy has answered a question.

Here is his working out.



Is he correct?

Explain your answer.

Tommy is not correct as he has partitioned 25 incorrectly.

He could have divided by 5 twice.

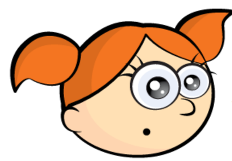
The correct answer should be 24

$6 \times 7 = 42$

Alex uses this multiplication fact to solve

$420 \div 70 =$ ____

Alex says,



The answer is 60 because all of the numbers are 10 times bigger.

Do you agree with Alex?

Explain your answer.

Alex is wrong; both numbers (the dividend and divisor) are 10 times bigger than the numbers in the multiplication so the answer is 6.

$6 \times 70 = 420$, therefore $420 \div 70 = 6$