Spring Block 1

Multiplication and division B

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Small steps

Step 1	Multiples of 10
Step 2	Related calculations
Step 3	Reasoning about multiplication
Step 4	Multiply a 2-digit number by a 1-digit number – no exchange
Step 5	Multiply a 2-digit number by a 1-digit number – with exchange
Step 6	Link multiplication and division
Step 7	Divide a 2-digit number by a 1-digit number – no exchange
Step 8	Divide a 2-digit number by a 1-digit number – flexible partitioning

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Small steps

Step 9	Divide a 2-digit number by a 1-digit number – with remainders
Step 10	Scaling
Step 11	How many ways?

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Multiples of 10

Notes and guidance

Children learnt the 10 times-table in Year 2 and revisited multiples of 10 in the Autumn term. In this small step, they further develop their understanding of multiples of 10 by looking at greater multiples.

Children reinforce their earlier work on place value and use a range of representations, such as ten frames, Gattegno charts and place value charts. They recognise that multiples of 10 end in a zero and use this fact to solve basic multiplication and division problems beyond the 10 times-table.

Understanding multiples of 10 is crucial for the next step, when children explore multiplying by 20, 30 and so on. This is the foundation of multiplying other 2-digit numbers using the expanded method later in this block and for more formal methods in Year 4 and beyond.

Things to look out for

- Children may think that multiplying by 10 is always equivalent to adding a zero, rather than considering place value, which could lead to misconceptions in later years when they multiply decimals.
- Children may need support to recognise when to multiply and when to divide by 10

Key questions

- What is the multiple of 10 before _____?
- What is the multiple of 10 after _____?
- Is _____ a multiple of 10? How can you tell?
- How many tens are there in _____?
- How can you use a Gattegno chart/place value chart to help multiply or divide a number by 10?
- What is the same about all multiples of 10?
  What is different?

Possible sentence stems

- I know _____ is a multiple of 10 because ...
- _____ multiplied by 10 is equal to _____
- _____ is 10 times the size of _____
- There are _____ tens in _____

National Curriculum links

- Recall and use multiplication facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers (Y2)

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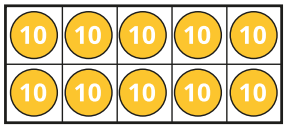
Multiples of 10

Key learning

- Complete the number track.

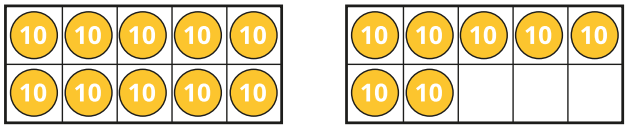
10	20		40		60			90	100

- Use the ten frame to complete the sentence.



10 tens are equal to _____

Use the ten frames to complete the calculation.



17 × 10 = 10 × 10 + 7 × 10 = _____ + _____ = _____

- Work out the multiplications.

14 × 10	19 × 10	23 × 10	10 × 26

- Dexter has 13 bags of marbles.

There are 10 marbles in each bag.

How many marbles does Dexter have altogether?

- Which of these numbers are multiples of 10?

50	150	65	98	450	150	805	25	340

Explain how you know.

- A bush is 4 m tall.

A tree is 10 times as tall as the bush.

How tall is the tree?

- Fill in the missing numbers.
  - 23 × 10 = _____
  - _____ × 10 = 280
  - 64 × _____ = 640
  - _____ × 10 = 420

- A ribbon is 270 cm long.

270 cm

Ron wants to cut the ribbon into 10 cm pieces.

How many pieces can he cut?

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Multiples of 10

Reasoning and problem solving

Teddy saves £10 a week.

How many weeks will it take him to save £120?

How do you know?

12 weeks

Mr Trent has a piece of wood.

Mr Trent cuts it into three parts, A, B and C.

- Part A is 10 times as long as part C.
- Part B is 4 times as long as part C.
- Part A is 100 cm long.

How long was the piece of wood before Mr Trent cut it?

150 cm

Here is a Gattegno chart and a place value chart.

100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9

Hundreds	Tens	Ones

Show each number on both charts.

21 **14** **32** **40** **26**

Multiply each number by 10

Show the results on the charts.

What is the same and what is different?

210, 140, 320, 400, 260

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Related calculations

Notes and guidance

This small step builds on the previous step and children's existing knowledge of times-tables to explore calculations related to known facts.

Children explore scaling facts by 10, for example using $3 \times 4 = 12$ to derive $3 \times 40 = 120$ and $30 \times 4 = 120$. A range of representations are used to expose the link between multiples of 1 and multiples of 10. Children begin by using base ten, before moving on to the slightly more abstract representation of place value counters. Children go on to explore this relationship with division, for example using $12 \div 3 = 4$ to derive $120 \div 3 = 40$. This will be revisited later in the block.

Care should be taken to ensure that children do not also think that $12 \div 30 = 40$. This is a good opportunity to remind them that multiplication is commutative while division is not.

Things to look out for

- Children may derive incorrect division facts by using the rules they have learnt about related multiplication facts.
- Children may try to find results by calculation rather than recognising the relationship between one fact and another.

Key questions

- What is the same and what is different about the two calculations?
- How can you represent the calculation using place value counters/base 10?
- How is multiplying by 10s different from multiplying by 1s?
- What is the connection between the two calculations?

Possible sentence stems

- _____ × _____ ones is equal to _____ ones,
  so _____ × _____ tens is equal to _____ tens.
- _____ ÷ _____ is equal to _____,
  so _____ tens ÷ _____ is equal to _____ tens.

National Curriculum links

- Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for 2-digit numbers times 1-digit numbers, using mental and progressing to formal written methods

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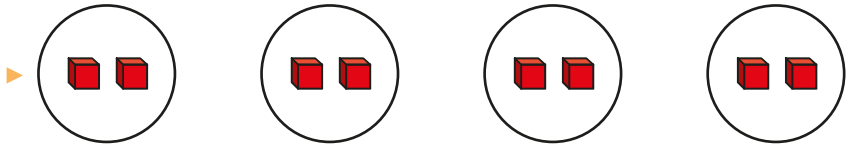
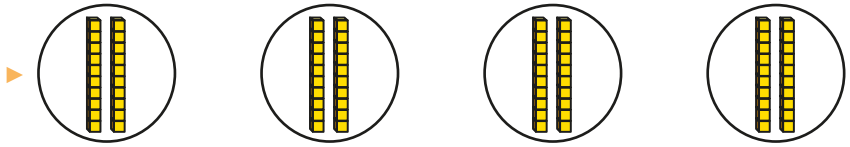
Related calculations

Key learning

- Complete the number sentences to match the pictures.

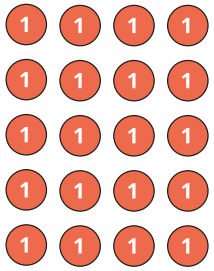


4 × 2 ones = _____ ones 4 × 2 = _____

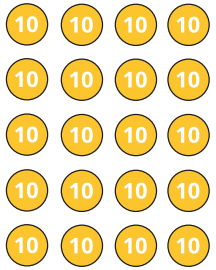


4 × 2 tens = _____ tens 4 × 20 = _____

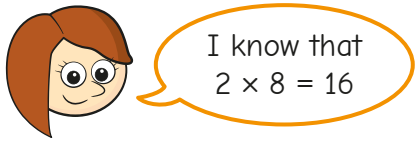
- Complete the multiplication facts.



_____ × 4 = _____



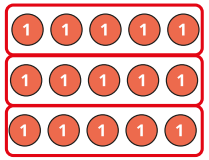
_____ × 40 = _____

- 

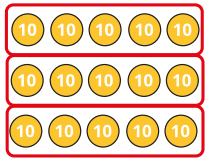
Use Rosie's fact to complete the multiplications.

▶ 2 × 80 = _____ ▶ 20 × 8 = _____ ▶ 8 × 20 = _____

- Use the place value counters to complete the divisions.



15 ÷ 3 = _____



15 tens ÷ 3 = _____

- Use place value counters to help complete the calculations.

▶ 27 ÷ 9 = _____ ▶ 54 ÷ 6 = _____ ▶ 48 ÷ 4 = _____

270 ÷ 9 = _____ 540 ÷ 6 = _____ 480 ÷ 4 = _____

- 4 family tickets to a theme park cost £240 in total.

How much does 1 family ticket cost?

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Related calculations

Reasoning and problem solving

I know
2 × 6 = 12, so
2 × 60 = 120

Tiny is correct.

Write the fact family for this multiplication.

60 × 2 = 120

120 ÷ 2 = 60

120 ÷ 60 = 2

Use the number cards to complete the calculations.

9	9	10	10	100	900	900

You can use each card only once.

900 ÷ ☐ = 100

☐ ÷ ☐ = 9

☐ × ☐ = ☐ ÷ ☐

900 ÷ **9** = 100

900 ÷ **100** = 9

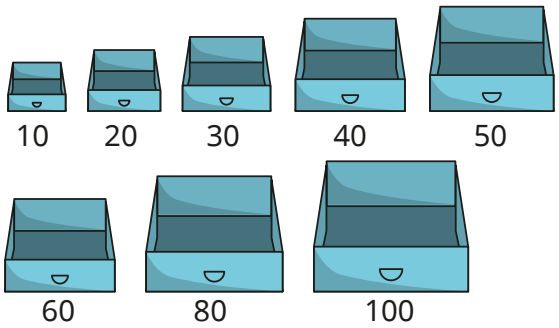
9 × **10** = **900** ÷ **10**

Scott has 240 cakes to sell.

He chooses one size of box and puts the same number of cakes in each box.

He has no cakes left over.

Which of these boxes could he use?



10, 20, 30, 40, 60 or 80

Is the statement true or false?

5 × 30 = 3 × 50

Explain your answer.

True

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Reasoning about multiplication

Notes and guidance

In this small step, children develop their knowledge and understanding of the structure of multiplication.

Children begin by recapping what multiplication looks like with objects, and gradually use more abstract representations. These include cubes, base 10, arrays and number sentences. They use the symbols <, > and = to compare groups using multiplication and division structures, both in context and within number sentences. Children are encouraged to realise that, for example, $6 \times 3 > 6 \times 2$ without doing any calculation, but by recognising the relationship between the calculations and that the first must give an answer greater than the second because the same number is being multiplied by 3 and 2

Things to look out for

- When comparing number sentences, children may find it difficult to recognise which digit is referring to the size of the group and which digit is referring to the number of groups.
- Children may try to work out the calculations to make comparisons, rather than using their understanding of the multiplicative structure.

Key questions

- What number sentences are shown by the array?
- What is the same and what is different about 8×3 and 8×4?
- Which digit represents the size of the group?
- Which digit refers to the number of groups?
- What happens if you increase/decrease the number of groups?
- What happens if you increase/decrease the size of the groups?
- Do you need to complete the calculations to compare them?

Possible sentence stems

- _____ lots of _____ is greater than _____ lots of _____
- _____ lots of _____ is less than _____ lots of _____
- I know that _____ is greater because ...

National Curriculum links

- Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for 2-digit numbers times 1-digit numbers, using mental and progressing to formal written methods

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Reasoning about multiplication

Key learning

- Complete the number sentences to match the pictures.

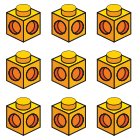
6 × 3 = _____

6 × 5 = _____

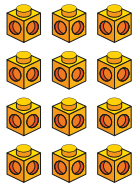
Write > or < to complete the statement.

6 × 3 ◯ 6 × 5

- Complete the number sentences and write <, > or = to compare the arrays.



_____ × _____ = _____



_____ × _____ = _____

- Write <, > or = to complete the statement.

2 × 30 ◯ 4 × 30

- Write <, > or = to compare the multiplications.

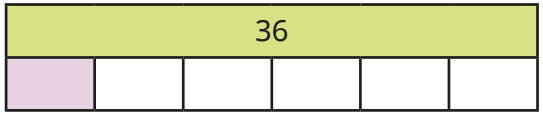
8 × 3 ◯ 7 × 4

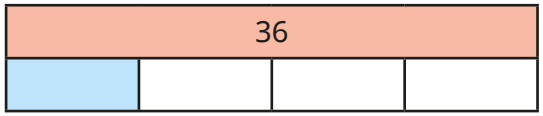
8 × 2 ◯ 6 × 4

80 × 3 ◯ 70 × 4

8 × 20 ◯ 6 × 40

- How do the bar models show that 36 ÷ 6 < 36 ÷ 4?





Draw bar models to compare the pairs of calculations.

12 ÷ 6 ◯ 12 ÷ 4

15 ÷ 5 ◯ 15 ÷ 3

27 ÷ 3 ◯ 24 ÷ 3

20 ÷ 5 ◯ 20 ÷ 4

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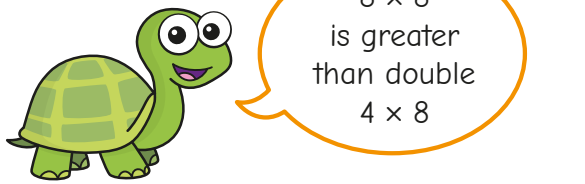
Reasoning about multiplication

Reasoning and problem solving



Do you agree with Tiny?

Use counters to show your answer.

No

8 × 8 = double 4 × 8

Is each statement true or false?

6 × 7 < 6 + 6 + 6 + 6 + 6 + 6 + 6

7 × 6 = 7 × 3 + 7 × 3

2 × 3 > 5 × 3

False

True

False

Use all the cards to complete the statements.

4 × 5	3 × 8	3 × 4
5 × 5	4 × 8	3 × 5

_____ < _____

_____ > _____

_____ < _____

various possible answers, e.g.

3 × 5 < 4 × 5

4 × 8 > 3 × 8

3 × 4 < 5 × 5

Find three different ways to complete each number sentence.

_____ × 3 + _____ × 3 < _____ × 3

_____ × 4 < _____ × 4 < _____ × 4

_____ × 8 > _____ × 8 > _____ × 8

multiple possible answers, e.g.

1 × 3 + 2 × 3 < 5 × 3

2 × 4 < 8 × 4 < 12 × 4

7 × 8 > 2 × 8 > 1 × 8

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Multiply a 2-digit number by a 1-digit number – no exchange

Notes and guidance

In this small step, children explore multiplying 2-digit numbers by 1-digit numbers. At this stage, none of the multiplication calculations require exchanges.

Children apply their understanding of partitioning to represent and solve calculations using the expanded method. The 2-digit number is partitioned into tens and ones, both are multiplied by the 1-digit number and then the partial products are added to find the total product. This is explored through a progression of representations from base 10 to place value counters and part-whole models, alongside number sentences.

The expanded method allows children to gain a deep understanding of the structure of the calculation before progressing to formal short multiplication in Year 4

Things to look out for

- Children may partition a 2-digit number into single digits rather than tens and ones, for example $48 \times 8 = 4 \times 8 + 8 \times 8$
- Errors may occur if partial products are lined up incorrectly.

Key questions

- How can you partition a 2-digit number into tens and ones?
- What is the product of the tens and the single digit?
- What is the product of the ones and the single digit?
- What do you need to do to find the final answer?

Possible sentence stems

- _____ tens and _____ ones multiplied by _____ is equal to _____ tens multiplied by _____ and _____ ones multiplied by _____
- _____ tens multiplied by _____ is equal to _____
  _____ ones multiplied by _____ is equal to _____
  _____ multiplied by _____ is equal to _____
- _____ × _____ = _____ tens × _____ + _____ × _____

National Curriculum links

- Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for 2-digit numbers times 1-digit numbers, using mental and progressing to formal written methods

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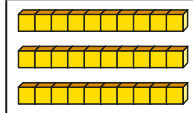
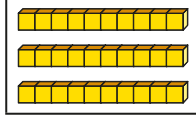
Multiply a 2-digit number by a 1-digit number – no exchange

Key learning

- Complete the number sentences.

  Use the place value chart to help you.

Tens	Ones
	
	

3 tens × 2 = _____ tens

2 ones × 2 = _____ ones

_____ + _____ = _____

32 × 2 = _____

- A minibus has space for 21 people.

  How many people can fit on 3 minibuses?

  Use a place value chart and base 10 to help you.

- Use the place value chart and counters to work out 21 × 4

Tens	Ones
10 10	1
10 10	1
10 10	1
10 10	1

2 tens × 4 = _____ tens

1 one × 4 = _____ ones

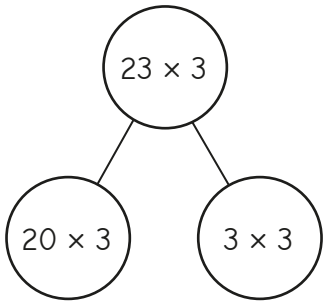
_____ + _____ = _____

21 × 4 = _____

- Work out the multiplications.

32 × 3	23 × 2	12 × 4	41 × 2

- Ron has used a part-whole model to multiply 23 by 3



20 × 3 = 60
3 × 3 = 9
23 × 3 = 69

Use a part-whole model to help you work out the multiplications.

21 × 5	42 × 2	52 × 2	21 × 6

- Complete the number sentences.

  ▶ 32 × 4

  = ___ tens × 4 + ___ ones × 4

  = ___ + ___

  = ___

  ▶ 42 × 3

  = ___ tens × 3 + ___ ones × 3

  = ___ + ___

  = ___

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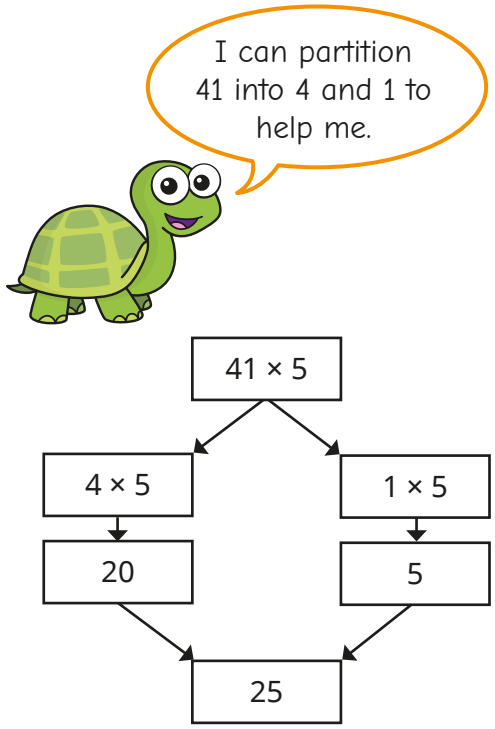
Multiply a 2-digit number by a 1-digit number – no exchange

Reasoning and problem solving

Tiny is working out 41 × 5



What has Tiny done wrong?

Work out the correct answer.

205

Whitney is comparing calculations.

Is Whitney correct?

How does she know this?

Yes

Ron multiplies a 2-digit number by a 1-digit number.

What might Ron's numbers be?

48 and 1

24 and 2

12 and 4

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Multiply a 2-digit number by a 1-digit number – with exchange

Notes and guidance

In this small step, children continue to explore multiplying 2-digit numbers by 1-digit numbers, now looking at calculations that involve an exchange.

As in the previous step, children apply their understanding of partitioning to represent and solve calculations using the expanded method. This involves partitioning the 2-digit number into tens and ones, multiplying separately, then adding the partial products together. Children use the same representations as in the previous steps to provide familiarity and focus their attention on the new aspect of making an exchange.

Use of the expanded method allows children to gain a deep understanding of the structure of the calculation before progressing to formal short multiplication in Year 4

Things to look out for

- Children may partition a 2-digit number into single digits rather than tens and ones, for example $48 \times 8 = 4 \times 8 + 8 \times 8$
- Children may not line up partial products correctly.
- Children may struggle when making an exchange, including forgetting to add on any exchanges.

Key questions

- How can you partition a 2-digit number into tens and ones?
- What is the product of the tens and the single digit?
- What is the product of the ones and the single digit?
- What do you need to do to find the final answer?
- What do you do if you have ten or more ones?

Possible sentence stems

- _____ tens and _____ ones multiplied by _____ is equal to _____ tens multiplied by _____ and _____ ones multiplied by _____
- _____ ones is _____ tens and _____ ones.
- _____ × _____ = _____ tens × _____ + _____ × _____

National Curriculum links

- Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for 2-digit numbers times 1-digit numbers, using mental and progressing to formal written methods

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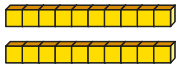
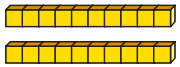
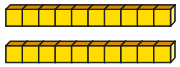
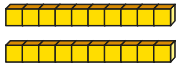
Multiply a 2-digit number by a 1-digit number – with exchange

Key learning

- Complete the number sentences.

  Use the place value chart to help you.

Tens	Ones
	
	
	
	

  2 tens × 4 = _____ tens

  4 ones × 4 = _____ ones

  24 × 4 = _____ + _____ = _____

  24 × 4 = _____

- Use the place value chart and counters to work out 45 × 3

Tens	Ones
10 10 10 10	1 1 1 1 1
10 10 10 10	1 1 1 1 1
10 10 10 10	1 1 1 1 1

  4 tens × 3 = _____ tens

  5 ones × 3 = _____ ones

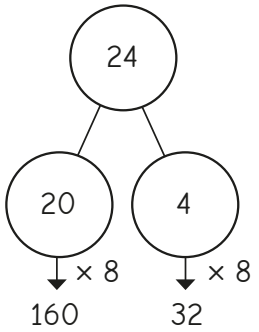
  _____ + _____ = _____

  45 × 3 = _____

- Use a place value chart and base 10 to work out the multiplications.

  13 × 4 | 23 × 4 | 14 × 8 | 25 × 3

- Mo uses a part-whole model to work out 24 × 8



  160 + 32 = 192

  24 × 8 = 192

  Use Mo's method to work out the multiplications.

  18 × 4 | 73 × 5 | 42 × 5 | 28 × 8

- Complete the workings.

  ▶ 64 × 3

  = ___ tens × 3 + ___ ones × 3

  = ___ + ___

  = ___

  ▶ 24 × 8

  = 20 × 8 + 4 × 8

  = ___ + ___

  = ___

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Multiply a 2-digit number by a 1-digit number – with exchange

Reasoning and problem solving

Is the statement always true, sometimes true or never true?

A 2-digit number multiplied by a 1-digit number has a 2-digit answer.

Explain your answer.

sometimes true

Here are some digit cards.

2	3	4

Use each digit card once to create a multiplication.

□□ × □

Which multiplication gives an answer closest to 100?

23 × 4 = 92

Aisha is sorting out two cupboards.

In the first cupboard, there are 4 boxes with 34 pencils in each box.

In the second cupboard, there are 5 boxes with 28 pencils in each box.

Which cupboard has more pencils?

second cupboard

Use the fact to compare the multiplications. Write < or > to make the statement correct.

8 × 44 = 352

8 × 45 ◯ 9 × 44

How did the fact help you?

<

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Link multiplication and division

Notes and guidance

In this small step, children develop their understanding of related facts from earlier in the block, with a focus on linking multiplication and division facts.

In particular, children explore what happens when a number within a calculation is multiplied by 10 and how this affects the answer. They use these facts by unitising in tens, for example using 8 ÷ 2 = 4 to derive 8 tens ÷ 2 = 4 tens, so 80 ÷ 2 = 40.
A range of representations are used to make the link between multiples of one and ten, which will be familiar from the multiplication steps earlier in the block.

This step will support children to work out divisions in the next few steps of the block.

Things to look out for

- Children may try to find results by calculation, rather than recognising the relationship between two facts.
- In examples such as 240 ÷ 80, children may think the answer is 30 because they know 24 ÷ 8 = 3 and they assume that they need to add a zero.

Key questions

- What is the same and what is different about the two calculations?
- How can you show the calculation using place value counters/ base 10?
- How is multiplying by 10s different from multiplying by 1s?
- What division facts do you know by using the fact _____ × _____ = _____?

Possible sentence stems

- _____ × _____ ones is equal to _____ ones, so _____ × _____ tens is equal to _____ tens.
- _____ ÷ _____ is equal to _____, so _____ tens ÷ _____ is equal to _____ tens.

National Curriculum links

- Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects

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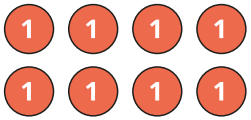
Link multiplication and division

Key learning

- What multiplication and division facts does the array show?



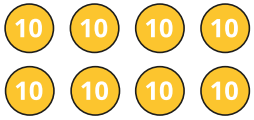
_____ × _____ = _____

_____ × _____ = _____

_____ ÷ _____ = _____

_____ ÷ _____ = _____

What multiplication and division facts does the array show?



_____ × _____ = _____

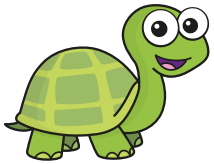
_____ × _____ = _____

_____ ÷ _____ = _____

_____ ÷ _____ = _____

What is the same and what is different about these arrays?

- Tiny is working out 60 ÷ 3



I know 6 ones ÷ 3 is equal to 2 ones.
So 6 tens ÷ 3 is equal to 2 tens.
60 ÷ 3 = 20

Use Tiny's method to work out the divisions.

80 ÷ 4	90 ÷ 3	60 ÷ 2	70 ÷ 7

- Fill in the missing numbers.

▶ 2 × 6 = _____ ▶ 3 × 8 = _____ ▶ _____ = 5 × 3

2 × 60 = _____ 3 × _____ = 240 150 = 5 × _____

- 1 ticket to the zoo costs £20

How much do 4 tickets cost?

How many tickets can you buy for £180?

- There are 80 children in Year 3

The children are put into pairs.

How many pairs are there altogether?

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Link multiplication and division

Reasoning and problem solving

Eight friends go to a theme park for the day.

- Tickets to the theme park cost £20 each.
- Lunch costs £10 each.

Four of the friends share the cost between them.

How much do they each pay?

£60

Write <, > or = to compare the statements.

8 ÷ 2 ◯ 80 ÷ 2

80 ÷ 2 ◯ 80 ÷ 4

60 × 3 ◯ 60 ÷ 3

4 × 80 ◯ 8 × 40

<

>

>

=

Work out the divisions.

320 ÷ 2	320 ÷ 20
320 ÷ 4	320 ÷ 40
320 ÷ 8	320 ÷ 80

What do you notice?

160 16

80 8

40 4

Amir is finding related calculations.

I know 5 × 8 = 40, so I also know all these other facts.

5 × 80 = 400	400 ÷ 5 = 80
50 × 8 = 400	400 ÷ 8 = 50

Which facts are correct?

They are all correct.

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Divide a 2-digit number by a 1-digit number – no exchange

Notes and guidance

In this small step, children build on their knowledge of times-tables and division facts, using these to support them when dividing a 2-digit number by a 1-digit number. This step focuses on partitioning a number into tens and ones and sharing into equal groups, dividing numbers that do not involve exchanging or remainders. For example, 63 ÷ 3 can be partitioned into 60 and 3 and then shared into three equal groups: 60 ÷ 3 = 20 and 3 ÷ 3 = 1, therefore 63 ÷ 3 = 21

Children use part-whole models and place value counters to represent the calculations and support their understanding. It is important that children divide the tens first and then the ones. While it would not have an impact on their answers in this particular step, getting used to dividing in this way is beneficial for when they move on to dividing numbers involving exchanging and remainders in future steps.

Things to look out for

- Children may be used to working out a calculation starting with the ones column as this is what they have done with addition, subtraction and multiplication.
- Children may need support partitioning numbers into tens and ones.

Key questions

- What is _____ partitioned into tens and ones?
- What is _____ shared into _____ equal groups?
- How can the place value counters help you divide _____ by _____?
- How can you use the part-whole model to work out the division?
- What is _____ divided by _____?

Possible sentence stems

- _____ partitioned into tens and ones is _____ tens and _____ ones.
- _____ divided by _____ is equal to _____

National Curriculum links

- Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for 2-digit numbers times 1-digit numbers, using mental and progressing to formal written methods

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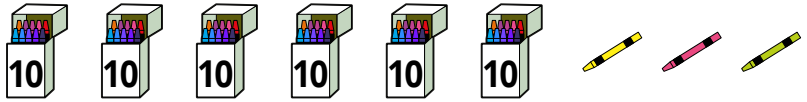
Divide a 2-digit number by a 1-digit number – no exchange

Key learning

- There are 63 crayons.



  - Share the crayons into three equal groups.

    Use a place value chart and some counters to help you.
  - Complete the sentences.

    6 tens ÷ 3 = _____ tens

    3 ones ÷ 3 = _____ one

    63 ÷ 3 = _____

- Dani uses place value counters to work out 39 ÷ 3

Tens	Ones
10	1 1 1
10	1 1 1
10	1 1 1

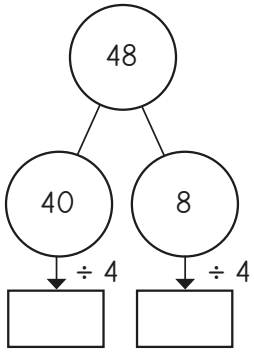
39 ÷ 3 = 13

Use Dani's method to work out the divisions.

84 ÷ 4 | 66 ÷ 2 | 66 ÷ 3 | 69 ÷ 3

- Eva uses a part-whole model to work out 48 ÷ 4

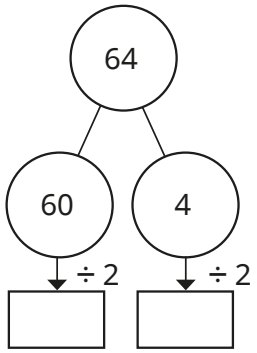
  Complete Eva's workings.



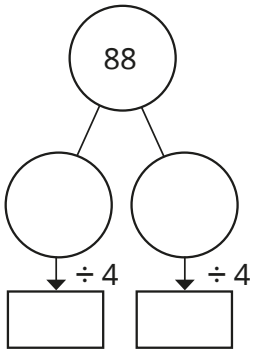
48 ÷ 4 = _____

- Work out the divisions.

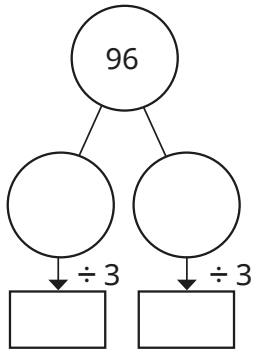
64 ÷ 2 = _____



88 ÷ 4 = _____



96 ÷ 3 = _____



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Divide a 2-digit number by a 1-digit number – no exchange

Reasoning and problem solving

Tommy has 3 jars of buttons.

He shares all the buttons equally between 4 people.

How many buttons will each person get?

21

Write <, > or = to compare the calculations.

24 ÷ 2 ◯ 36 ÷ 3

84 ÷ 2 ◯ 84 ÷ 4

Explain your answers.

=

>

Tiny uses place value counters to work out 44 ÷ 4

Tens	Ones
10 10	1 1
10 10	1 1

Is Tiny correct?

How do you know?

No

Huan thinks that 88 sweets can be shared equally between 8 people.

Is he correct?

How do you know?

Yes

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Divide a 2-digit number by a 1-digit number – flexible partitioning

Notes and guidance

In this small step, children continue to divide a 2-digit number by a 1-digit number. They now begin to look at calculations that involve exchanging between the tens and the ones.

Children use their previous learning on flexible partitioning to support them with this. For example, to calculate 42 ÷ 3, they need to identify multiples of 3 that 42 can be partitioned into. Children use their knowledge of times-tables facts to partition the number into multiples of the number they are dividing by. For this example, they can partition 42 into 30 and 12, and then use 30 ÷ 3 = 10 and 12 ÷ 3 = 4 to find that 42 ÷ 3 = 14

Children can use place value counters to support their understanding and part-whole models to show what calculations have been done.

Things to look out for

- Children may be used to working out a calculation starting with the ones column as this is what they have done with addition, subtraction and multiplication.
- Children may not be confident with their times-table facts, which means they may find it difficult to partition the number into multiples of the number they are dividing by.

Key questions

- How can you flexibly partition _____ so that the tens and ones are both multiples of the number you are dividing by?
- What is _____ shared into _____ equal groups?
- How can the place value counters help you divide _____ by _____?
- How can you use the part-whole model to work out the division?
- What is _____ divided by _____?

Possible sentence stems

- _____ can be partitioned into _____ and _____, as these numbers are both multiples of _____
- _____ divided by _____ is equal to _____

National Curriculum links

- Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for 2-digit numbers times 1-digit numbers, using mental and progressing to formal written methods

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Divide a 2-digit number by a 1-digit number – flexible partitioning

Key learning

- Ron uses place value counters to work out 42 ÷ 3

  First, he shares the tens into 3 equal groups.

  He has 1 ten and 2 ones left over.

Tens	Ones
10	
10	
10	

1 10 1

  Ron exchanges the remaining ten for 10 ones.

  Then he shares the ones into 3 equal groups.

Tens	Ones
10	1 1 1 1
10	1 1 1 1
10	1 1 1 1

42 ÷ 3 = 14

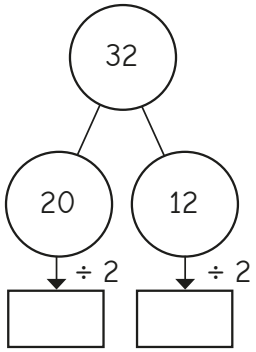
  Use Ron's method to work out the divisions.

48 ÷ 3	52 ÷ 4	65 ÷ 5	72 ÷ 6

- Use place value counters to divide 54 by 3

  What do you notice?

- Annie uses a part-whole model to work out 32 ÷ 2



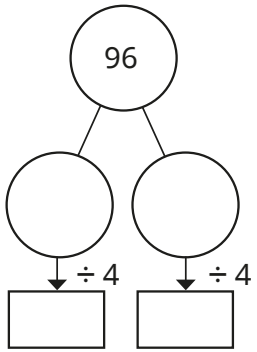
32 ÷ 2 = _____

  Why did Annie partition 30 into 20 and 12?

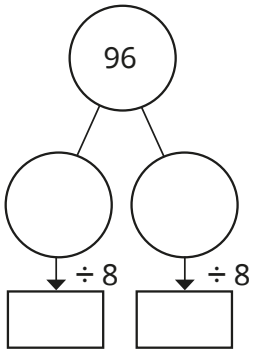
  Complete Annie's workings.

- Use part-whole models to work out the divisions.

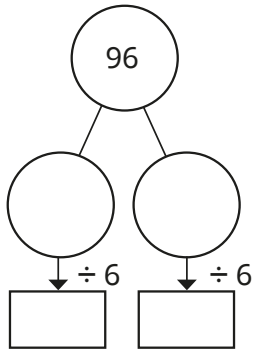
96 ÷ 4 = _____



96 ÷ 8 = _____



96 ÷ 6 = _____



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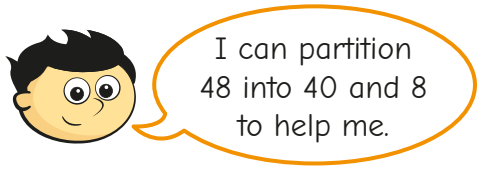
Divide a 2-digit number by a 1-digit number – flexible partitioning

Reasoning and problem solving

Jack is working out 48 ÷ 3



Is there a way to improve Jack's method?

partition 48 into 30 and 18, as these are both divisible by 3

Write <, > or = to complete the statements.

48 ÷ 4 ◯ 45 ÷ 3

52 ÷ 4 ◯ 42 ÷ 3

54 ÷ 3 ◯ 60 ÷ 4

Did you need to work out all of the divisions?

<

<

>

Tiny uses the place value chart to work out 54 ÷ 3

Tens	Ones
10 10	1 1
10 10	1
10	1

Explain the mistake Tiny has made.

Work out the correct answer.

18

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Divide a 2-digit number by a 1-digit number – with remainders

Notes and guidance

In this small step, children continue to divide a 2-digit number by a 1-digit number. They apply their knowledge from the previous small steps and also make links between division and repeated subtraction, building on earlier learning.

Children look at calculations that may involve exchanging between the tens and ones, and that have a remainder. This will be the first time children have encountered remainders, so they will need to be explicitly taught the notation, for example 43 ÷ 3 = 14 remainder 1 or 14 r1

Practical equipment, such as lolly sticks and place value counters, can be used to support children's understanding.

Things to look out for

- Children may be used to working out a calculation starting with the ones column, as this is what they have done with addition, subtraction and multiplication.
- Children may miscount when using repeated subtraction.
- Children may end up with a remainder that is greater than the number they are dividing by and need support to complete the calculation.

Key questions

- Do you need to exchange any tens for ones?
- Is there a remainder?
- How can place value counters help you divide _____ by _____?
- How do you know _____ divided by _____ will have a remainder?
- Can a remainder ever be greater than the number you are dividing by?

Possible sentence stems

- There are _____ groups of _____

  There are _____ remaining.

  So _____ ÷ _____ = _____ r_____

National Curriculum links

- Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for 2-digit numbers times 1-digit numbers, using mental and progressing to formal written methods

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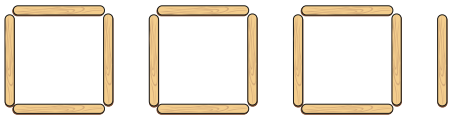
Divide a 2-digit number by a 1-digit number – with remainders

Key learning

- Esther has 13 lolly sticks.



She uses them to make squares.

Complete the sentences.

There are _____ lolly sticks.

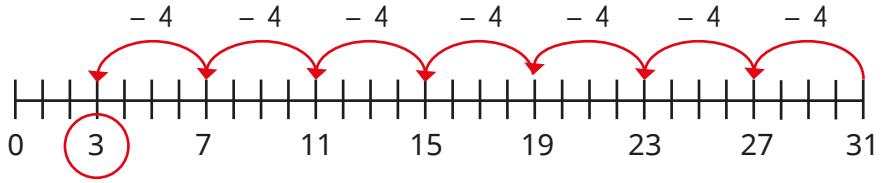
There are _____ groups of 4

There is _____ lolly stick remaining.

13 ÷ 4 = _____ remainder _____

Esther can make _____ squares.

- Tommy uses repeated subtraction to work out 31 ÷ 4

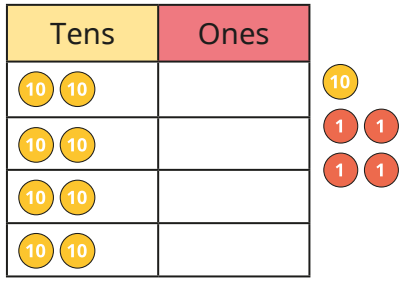


31 ÷ 4 = 7 r3

Use Tommy's method to work out 38 ÷ 3

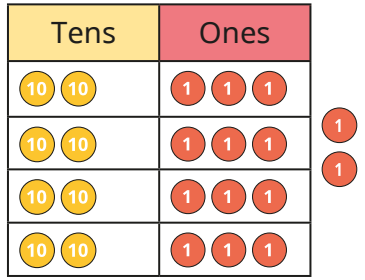
- Alex uses place value counters to work out 94 ÷ 4

First, she shares the tens into 4 equal groups.



She needs to exchange the remaining ten for 10 ones.

Alex shares as many of the ones as possible into 4 equal groups.



94 ÷ 4 = 23 r2

Use Alex's method to work out the divisions.

76 ÷ 3	62 ÷ 5	58 ÷ 4	83 ÷ 6

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Divide a 2-digit number by a 1-digit number – with remainders

Reasoning and problem solving

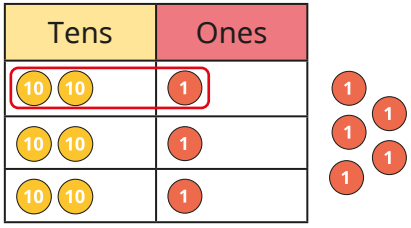
Which division is the odd one out?

64 ÷ 8	77 ÷ 4
49 ÷ 6	65 ÷ 3

How do you know?

various possible answers, e.g.
64 ÷ 8, as it is the only calculation without a remainder

Tiny uses place value counters to work out 68 ÷ 3



Tiny's answer is 21 r5

What mistake has Tiny made?

Work out the correct answer.

22 r2

Teddy has some buttons.

- There are more than 30, but fewer than 50
- Teddy shares the buttons equally into 5 bowls. There is 1 button left over.
- Teddy shares the buttons equally into 4 bowls. There are no buttons left over.

How many buttons has Teddy got?

36

Dora and Tom are planting bulbs.

They have 76 bulbs altogether.

Dora plants her bulbs in rows of 8 and has 4 left over.

Tom plants his bulbs in rows of 10 and has 2 left over.

How many bulbs do they each have?

Dora: 44

Tom: 32

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Scaling

Notes and guidance

In this small step, children develop their understanding of multiplication by focusing on scaling as opposed to repeated addition.

Building on concepts such as "3 times as many", children use language such as "3 times the size of" when comparing, for example, lengths. It is important that children see this type of multiplication as well as repeated addition, as it will help them in their later study of ratio and scales. They can relate this to their knowledge of place value and understanding that the value of the column directly to the left of another is 10 times the value.

Bar models can be useful to represent the concept. String can be used to illustrate the idea of, for example, "twice as long as" and be related to a bar model representation.

Things to look out for

- Children may not be familiar with models of multiplication other than those involving repeated addition.
- Children who are unfamiliar with the vocabulary may think that "3 times as many" means they need to add another three lots, resulting in a scale factor of 4 instead of 3

Key questions

- What number is 10 times the size of _____?
- What number is _____ times the size of _____?
- What length is _____ times as long as _____?
- What time is _____ times as long as _____?
- Which is the larger object? How many times larger is it?
- How can you show the problem as a bar model?

Possible sentence stems

- _____ is _____ times the length of _____
- _____ multiplied by _____ is equal to _____
- _____ times the size of _____ is _____

National Curriculum links

- Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects

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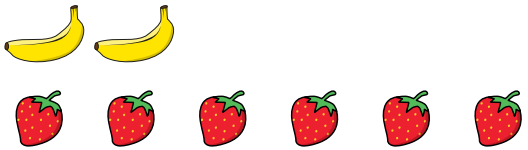
Scaling

Key learning

- Complete the sentences to describe the fruit.

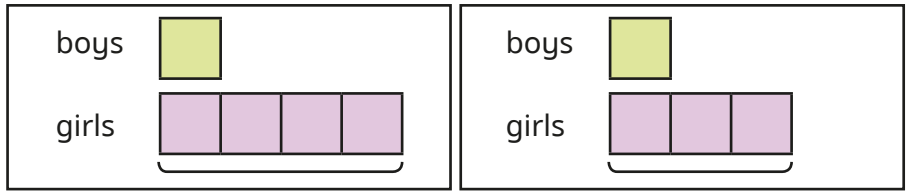


There are _____ bananas.

There are _____ strawberries.

There are _____ times as many strawberries as bananas.

- In a playground, there are 3 times as many girls as boys.



Which bar model shows the number of boys and girls?

Explain your choice.

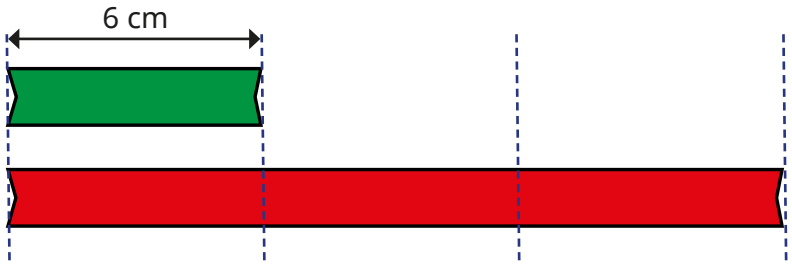
- Dexter has 2 pencils.

Kim has 5 times as many pencils as Dexter.

How many pencils has Kim got?

- The green ribbon is 6 cm long.

The red ribbon is 3 times as long as the green ribbon.



How long is the red ribbon?

Complete the number sentence.

6 cm × _____ = _____ cm

- Rosie has a red pencil and a blue pencil.

The red pencil is 2 cm long.

The blue pencil is 4 times as long as the red pencil.

How long is the blue pencil?

- Whitney runs 25 m in 7 seconds.

Filip takes 5 times as long as Whitney to run 25 m.

How long does it take Filip to run 25 m?

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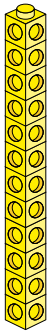
Scaling

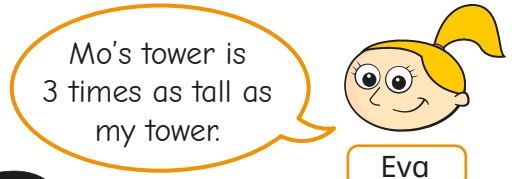
Reasoning and problem solving

Mo and Eva build towers of cubes.

Mo's tower



Eva's tower



Who do you agree with?

Explain your answer.

Eva

Annie has some green and pink counters.

- There are twice as many green counters as pink counters.
- There are 18 counters altogether.

How many green counters are there?

12

Dani, Amir and Jack are baking.

- Dani needs 40 g of butter.
- Amir needs 3 times as much butter as Dani.
- Jack needs twice as much butter as Dani.

How much butter do they need altogether?

240 g

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How many ways?

Notes and guidance

This small step focuses on correspondence problems.

Children start by systematically listing all the possible combinations resulting from combining two groups of objects. For example, if there are three buckets and four spades, children can explore how many different combinations of bucket and spade they can make.

The use of practical equipment to model a question can support children's understanding. Drawing a table helps children to take a systematic approach to ensure that they have found all the possible combinations. By the end of this step, children should be able to use multiplication to calculate the total number of possibilities, as a more efficient strategy than listing them all.

Things to look out for

- When writing lists, unless working systematically, children may omit some possibilities and/or count some possibilities more than once.
- Children may not recognise the link between listing the number of possibilities and the multiplication calculation that can be done.

Key questions

- How can you show the possibilities in a table?
- In what order should you list the possibilities?
- Starting with _____, how many combinations can you make?
- How do you know you have found all the ways?
- How many combinations are there if you have _____ and _____?

Possible sentence stems

- For every _____, there are _____

  There are _____ × _____ = _____ possibilities altogether.
- For each _____, there are _____ choices of _____

  There are _____ ways altogether.
- I know that I have found them all because ...

National Curriculum links

- Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects

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How many ways?

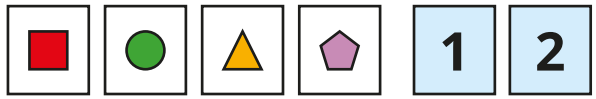
Key learning

- Huan has three T-shirts and four pairs of shorts.

  Complete the table to show how many different outfits he can make.

T-shirt	Shorts
white	blue
white	white
white	spotty
white	stripy

- Alex has four shape cards and two digit cards.



  She chooses a shape and a digit.

  Use a table to find all the different ways that she can do this.

  How many different ways can you find?

  How do you know that you have found them all?

- Ron has three hats and two scarves.

  He chooses a hat and a scarf.

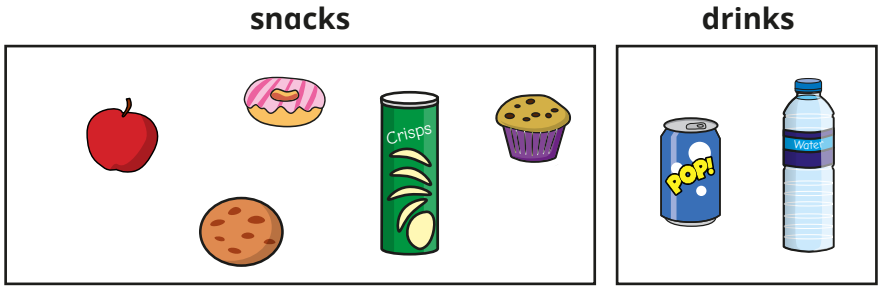
  List all the possible combinations he can wear.

  Use a multiplication to work out the number of combinations.

  How many combinations are there if Ron buys four more scarves?

- Aisha is choosing a snack and a drink.

  How many possible combinations are there?



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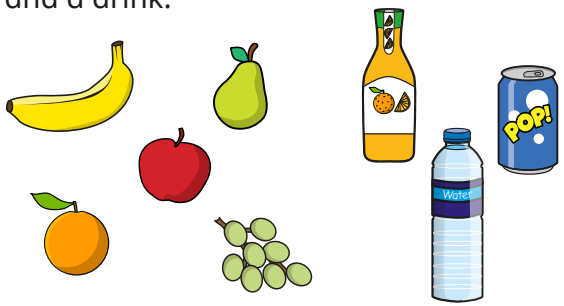
How many ways?

Reasoning and problem solving

Annie chooses a piece of fruit and a drink.



There are 5 kinds of fruit and 3 drinks.
5 + 3 = 8, so there are 8 possible combinations I could have.

Explain why Annie is wrong.

How many possible combinations are there altogether?

How many possible combinations include a bottle of drink?

15

10

Brett is choosing an ice cream.

He chooses one flavour of ice cream and one sauce.

There are 6 ice cream flavours.

There are 24 possible combinations of ice cream and sauce.

How many sauces are there?

4

Tommy has some jumpers and pairs of trousers.

He has more jumpers than pairs of trousers.

He can make 15 different outfits.

How many jumpers could he have?

How many pairs of trousers could he have?

Compare answers with a partner.

5 jumpers and 3 pairs of trousers

15 jumpers and 1 pair of trousers

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