Released December 2017

Years 3/4

Small Steps Guidance and Examples

Block 1 – Multiplication & Division

White Rose Maths

Year 3/4 – Yearly Overview

	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			Consolidation
Spring	Number: Multiplication and Division		Measurement: Length, Perimeter and Area		Number: Fractions				Year 3: Fractions Year 4: Decimals			Consolidation
Summer	Measurement: Money		Statistics		Measurement: Time			Geometry – Properties of Shapes		Year 3: Mass and Capacity Year 4: Position and Direction		Consolidation

Week 1 to 2 – Number: Multiplication & Division

Overview

Small Steps

Year 3	Year 4
	Multiply 3 numbers
	Factor pairs
Comparing statements	Efficient multiplication
Related calculations	Written methods
Multiply 2-digits by 1-digit (1)	Multiply 2-digits by 1-digit
Multiply 2-digits by 1-digit (2)	Multiply 3-digits by 1-digit
Divide 2-digits by 1-digit (1)	Divide 2-digit by 1-digit (1)
Divide 2-digits by 1-digit (2)	Divide 2-digits by 1-digit (2)
Divide 2-digits by 1-digit (3)	Divide 3-digits by 1-digit
How many ways?	Correspondence Problems

Multiply 3 Numbers

Notes and Guidance

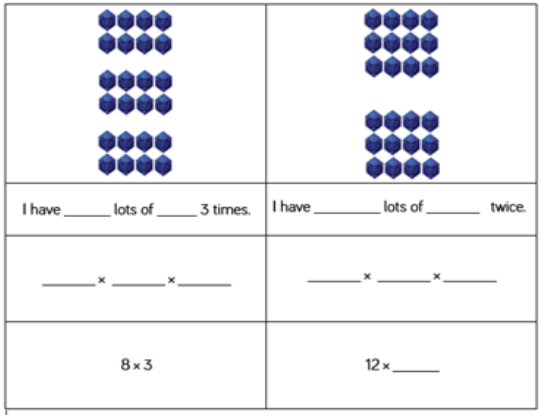
They use their knowledge that multiplication is commutative to find the most efficient order in which to multiply three single digit numbers.
For example, $2 \times 7 \times 5 = 2 \times 5 \times 7$
Children are introduced to the 'Associative Law' where they can group the numbers they would prefer to calculate first and explore the most efficient way to group the calculation.

Mathematical Talk

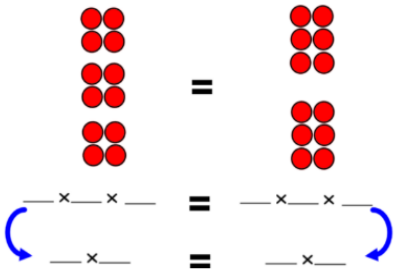
What calculation do the cubes represent? If you rearrange the cubes, what calculation do the cubes represent? What is the same? What is different?
Can you use counters to build your calculation? What do you notice?
What does commutativity mean? Would it work for division? Why?
Which would you prefer to calculate mentally
8×3 or 12×2? Why?

Varied Fluency

1 Complete the table.



2 Complete the calculations.
Using counters, create your own examples and record the calculations.



3 Choose 3 single digit cards. Arrange them to create a multiplication calculation and work out the answer.

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

Rearrange the cards to create 2 different calculations.
What do you notice about the three answers?

Multiply 3 Numbers

Reasoning and Problem Solving

Tom records this in his maths book:

$6 \times 3 \times 5 > 3 \times 5 \times 6$

He says,

6 × 3 × 5 is larger because the first calculation starts with a 6 which is larger than the first number in the second calculation.

Do you agree with Tom?
Prove why.

Tom is wrong because both answers are equal. Children could prove it using commutative law.
$6 \times 3 \times 5 = 90$
$3 \times 5 \times 6 = 90$

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

7	5	3	4	6	2

____ × ____ × ____ = 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 different orders.

Factor Pairs

Notes and Guidance

Children use counters initially to create arrays as a way of exploring factor pairs.
They develop their understanding of factor pairs alongside systematic recording of factors.
E.g. Factor pairs for 12 - begin with 1 × 12, 2 × 6, 3 × 4. At this stage, children should recognise that they have already used 4 in the previous calculation and therefore all factor pairs have been identified.

Mathematical Talk

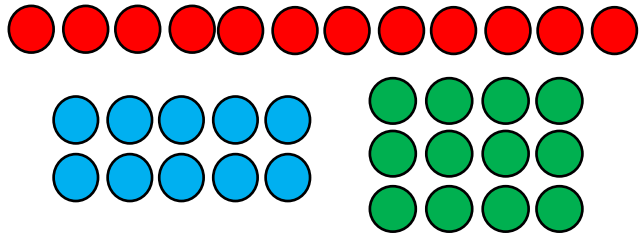
Are there any other factor pairs for 12?

Can you prove this using arrays?

Do you notice a number that always appears when finding factor pairs?

Varied Fluency

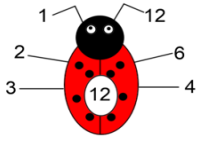
1 What factor pairs for 12 do these arrays show?

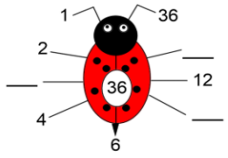


Use counters to create arrays for 24. How many factor pairs can you find?

2 Here is an example of a factor bug.
Complete the factor bug for 36.

Draw your own factor bugs for 16, 48, 56 and 35.





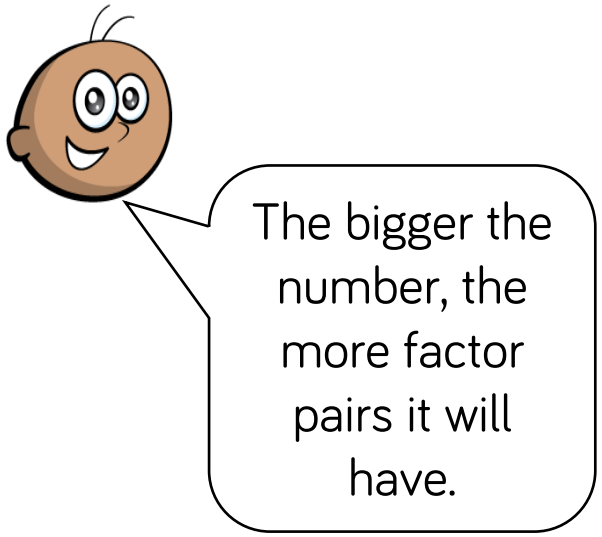
3 Complete the sentences.

42 has ____ factors.
The factors of 42 are _____.

Factor Pairs

Reasoning and Problem Solving

Ismail says,



Do you agree?
Draw or make arrays to prove your answer.

No.
For example,
12 = 1 × 12, 2 × 6, 3 × 4
19 = 1 × 19

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

6 is a special number.

The sum of its factors: 1 + 2 + 3 equal 6

Can you work systematically to find the next number that this works for?

28

An even number always has an even number of factor pairs and an odd number always has an odd number of factor pairs.

Is this true or false?
Prove it.

False.

15 is an odd number, it has two factor pairs- 1 × 15 and 3 × 5

12 has three pairs of factors- 1 × 12, 2 × 6 and 3 × 4.

Comparing Statements

Notes and Guidance

Children use their knowledge of multiplication and division facts to compare statements using inequality symbols.

It is important that children are exposed to a variety of representations of multiplication and division, including arrays and repeated addition.

Mathematical Talk

What other number sentences does the array show?

If you know 4 ×, how can you use this to work out your 8 ×?

What's the same and what's different about 8 × 3 and 7 × 4?

Varied Fluency

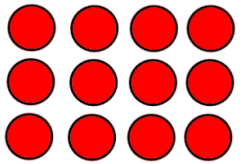
1 Use the array to complete the number sentences:

3 × 4 = ☐

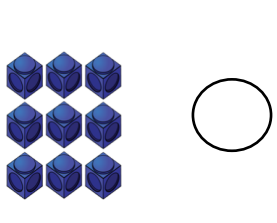
4 × 3 = ☐

☐ ÷ 3 = ☐

☐ ÷ 4 = ☐

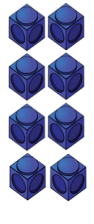


2 Use < > or



___ × ___ = ___

8 × 3 ◯ 7 × 4



___ × ___ = ___

36 ÷ 6 ◯ 36 ÷ 4

3 Complete the number sentences:

5 × 1 < _____ × _____

4 × 3 = _____ ÷ 3

Comparing Statements

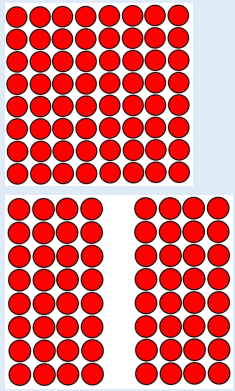
Reasoning and Problem Solving

Shadya says,

8 × 8 is greater than 4 × 8 twice

Do you agree?
Can you prove your answer?

Possible answer:
She is wrong because they are equal.



True or false

- 6 × 7 < 6 + 6 + 6 + 6 + 6 + 6 + 6
- 7 × 6 = 7 × 3 + 7 × 3
- 2 × 3 + 3 > 5 × 3

- False
- True
- False

Can you find three different ways to complete each number sentence?

___ × 3 + ___ × 3 < ___ ÷ 3

___ ÷ 4 < ___ × 4 < ___ × 4

___ × 8 > ___ ÷ 8 > ___ × 8

Possible answers:

1 × 3 + 1 × 3 < 21 ÷ 3

1 × 3 + 1 × 3 < 24 ÷ 3

1 × 3 + 1 × 3 < 27 ÷ 3

1 × 3 + 2 × 3 < 30 ÷ 3

24 ÷ 4 < 8 × 4 < 12 × 4

16 ÷ 4 < 5 × 4 < 7 × 4

8 ÷ 4 < 3 × 4 < 4 × 4

4 × 8 > 88 ÷ 8 > 1 × 8

2 × 8 > 80 ÷ 8 > 1 × 8

6 × 8 > 96 ÷ 8 > 1 × 8

Efficient Multiplication

Notes and Guidance

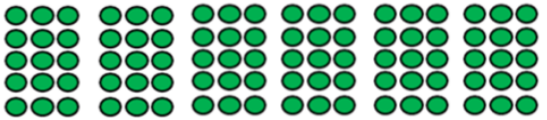
Children build on their understanding of factor pairs to expand calculations. They then apply their understanding of commutative and associative law to find the most efficient way to solve a problem.
Children also partition 2 digit numbers and combine multiplication with addition and subtraction to solve calculations.

Mathematical Talk

Which is easier to do? 5 × 6 × 3? 3 × 6 × 8?
Why is 3 × 5 × 6 not the most efficient?
If we know what 2 × 4 is, how do we know what 20 × 4 is?
What's the same and what's different about the images?
How else could we solve 99 × 9? E.g. 100 × 9 – 9
30 × 9 + 60 × 9 + 9

Varied Fluency

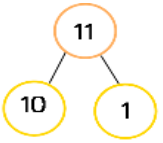
1 We can use our knowledge of factors to help us solve 15 × 6

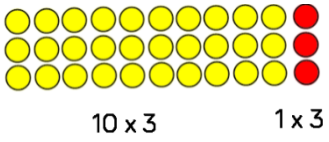


15 × 6
3 × 5 × 6

We have ___ lots of ___ × ___
The question becomes 3 × 5 × 6
How could you use this to help you work out the answer?

2 11 × 3

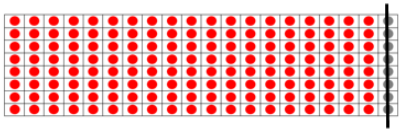




Ten lots of 3 = _____ One lot of 3 = _____
Eleven lots of 3 = _____
11 × 3 = ____ × 3 + 3
____ × 3 + ____ × 3 = 11 × 3

Use this method to solve:
21 × 5 31 × 6 7 × 22

3 19 × 8 = 20 × 8 – 1 × 8

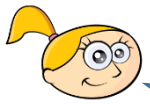


How could we use this method to solve 29 × 8?
Use this method to solve
19 × 4, 39 × 7, 48 × 4

Efficient Multiplication

Reasoning and Problem Solving

Three children worked out 28 × 5
Molly says,



I did 28 × 10, then halved it to get 140

Nisha says,

I halved 28 to get 14 and doubled 5 to get 10. Then I did 14 × 10, which is the same as 28 × 5

Harry says,

I did 30 × 5 which equals 150, then subtracted 2 × 5 to get 140

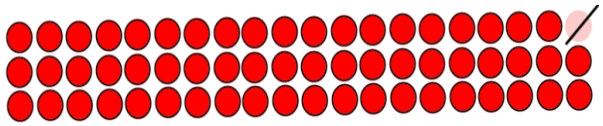
Which method would you use and why?
Can you think of another method?
Use your preferred method to calculate 42 × 5

Children's responses will vary, encourage all children to justify why the prefer their method and discuss its efficiency.

Other possible method could be partitioning the two-digit number:
20 × 5 = 100
8 × 5 = 40
100 + 40 = 140

42 × 5 = 210

Daisy has calculated 19 × 3



20 × 3 = 60
60 – 1 = 59
19 × 3 = 59

Can you explain her mistake and correct the diagram?

Daisy has subtracted one, rather than one lot of 3. She should have done

20 × 3 = 60

60 – 1 × 3 = 57

Related Calculations

Notes and Guidance

Children use known multiplication facts to solve other multiplication problems. Children understand that because one of the numbers in the calculation has got ten times bigger, then the answer will also become ten times bigger.
It is important that children develop their conceptual understanding through the use of concrete manipulatives.

Mathematical Talk

What is the same and what is different about the place value counters?

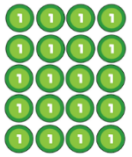
How does this fact help us solve this problem?

If we know these facts, what other facts do we know?

Can you prove your answer using manipulatives?

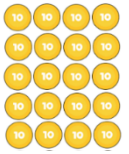
Varied Fluency

1 Complete the multiplication fact:



___ × ___ = ___

Use this to help you solve:



___ × ___ = ___

2 The number pieces represent 5 × ___ = ____

If each hole was worth ten, what would the pieces represent?

3 Complete the fact family for this calculation:

If we know that 2 × 6 = 12, we also know that...

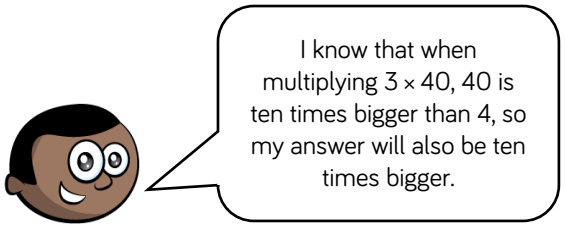
2 × 60 = 120	….. × ….. = …..
….. ÷ ….. = …..	….. ÷ ….. = …..

Can you do the same for these calculations:

- 3 × 30 = ☐
- ☐ = 4 × 80
- 160 ÷ 2 = ☐

Related Calculations

Reasoning and Problem Solving



Is Saif correct?
Prove it.

Saif is correct. I know 3 × 4 = 12, so if he has 3 × 40 then his answer will be ten times bigger because 4 has become ten times bigger.

Chloe has 240 cakes to sell.
Boxes come in different sizes and can hold different multiples of 10
Which boxes could she use, making sure all boxes are full and there are no cakes left over?

Possible response:
She could use 10, 20, 30, 40, 60, 80 because 240 is a multiple of all of these numbers. E.g
10 × 24 = 240
20 × 12 = 240
30 × 8 = 240
40 × 6 = 240
60 × 4 = 240
80 × 3 = 240

True or false?

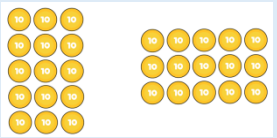
$$5 \times 30 = 3 \times 50$$

Prove it!

Possible response:

Children may represent it with place value counters.

True because they are equal.



Children may explore how it is different in a context though. For example, 5 lots of 30 apples compared to 3 lots of 50 apples.

Written Methods

Notes and Guidance

Children use their understanding of repeated addition to represent a two-digit number multiplied by a one-digit number with concrete manipulatives.

They also apply their understanding of partitioning to represent and solve calculations.
Children then move on to explore multiplication with exchange.

Mathematical Talk

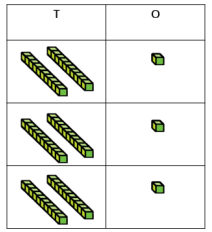
What is the value of each digit in my calculation?

Will this calculation involve an exchange?

In which column will the exchange take place?

Varied Fluency

1 There are 21 chocolate bars in each vending machine.
How many chocolate bars are there in 3 vending machines?

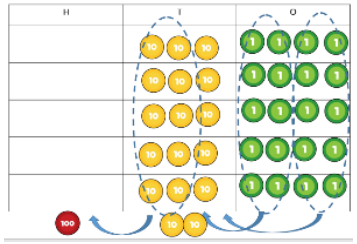


	T	O			
	2	1			
×		3			
		3		(3	× 1)
+	6	0		(3	× 20)
	6	3			

Use this method to solve

22 × 3 12 × 4 33 × 3

2 Tamsin uses place value counters to calculate 5 × 34



	3	4			
	×	5			
	2	0		(5	× 4)
1	5	0		(5	× 30)

Use Tamsin's method to complete:

5 × 42 23 × 6 48 × 3

3 There are 76 sweets in a bag.
I buy 3 bags.
How many sweets do I have in total?

Written Methods

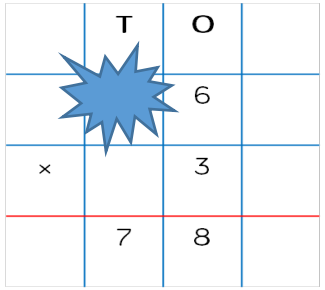
Reasoning and Problem Solving

Grace answered the question 35 × 3, her answer is 9015

Can you explain the mistake she may have made?

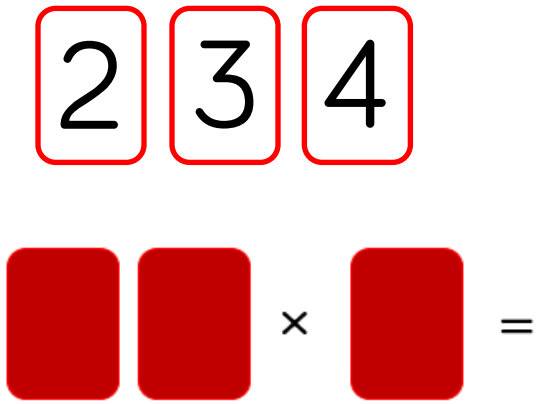
Grace has multiplied 3 by 5 giving an answer of 15. She has then multiplied 30 by 3 giving an answer of 90. She has then put the two numbers together to make 9015, rather than adding 15 and 90 to get the answer 105

Nicky thinks the value of the digit under the splat is 2.
Do you agree?



Nicky is incorrect because the value of the digit is 20, the 2 represents 2 tens.

Using the digit cards in the multiplication below how close can you get to 100?



23 × 4 = 92 this is the closest answer.

24 ;× 3 = 72

32 × 4 = 128

34 × 2 = 68

Children may also use estimation as part of their reasoning. For example, 23 is near 25 and there are 4 lots of 25 in 100

Multiply 2-digits by 1-digit (1)

Notes and Guidance

Children use their understanding of repeated addition to represent a two-digit number multiplied by a one-digit number with concrete manipulatives.
They also apply their understanding of partitioning to represent and solve calculations.
Children explore multiplication with no exchange on this step.

Mathematical Talk

What is the value of each digit in my calculation?

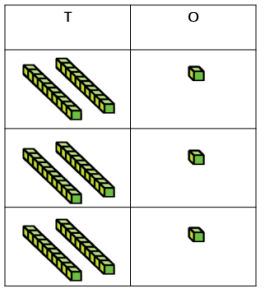
If we have 21 and we are multiplying it by 3, what is this the same as?

Explain where the digits go in my answer to match the calculation.

Can you write a sensible story to represent the calculation?

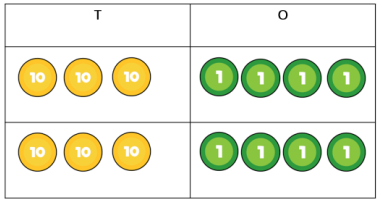
Varied Fluency

1 There are 21 chocolate bars in a vending machine.
How many chocolate bars will there be in 3 vending machines?
Use this method to solve:
21 × 4 and 33 × 3



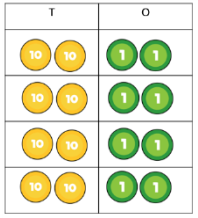
2 Complete the following calculations using place value counters:

- 34 × 2
- 23 × 3



	T	O	
	3	4	
×		2	
	6	8	

3 Fill in the blanks and solve the calculation:



□ × □ = □

Multiply 2-digits by 1-digit (1)

Reasoning and Problem Solving

Martin completes the following calculation:

$$42 \times 2$$

Can you spot his mistake?

	T	O				
	4	2				
×		2				
		4		(2	×	2)
+		8		(4	×	2)
	1	2				

Martin has not understood the value of the digit 4 in the number 42. He has therefore multiplied 4 by 2 giving him an answer of 8, rather than multiplying 40 by 2 giving an answer of 80

Martin completes another calculation:

$$43 \times 2$$

Can you spot and explain his mistake?

	T	O
	4	3
x		2
8	0	6

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

I think of a number and multiply it by 3
My total is 99
What was my calculation?
Represent it with place value counters.

Children could begin by creating a place value grid with 3 rows and then use repeated addition to work out that the number would be 33

Multiply 2-digits by 1-digit

Notes and Guidance

Children move from expanded multiplication to the short multiplication method.

They begin with no exchange and then use their knowledge of place value and exchange in addition to show what happens when there are 10 ones or tens in a column.

Mathematical Talk

Which digit should we start with; the ones or the tens? Does it matter?

Which calculations need an exchange? How can you tell?

Where do we write the number that we are exchanging?

Varied Fluency

1 Calculate 12 × 4

Use place value counters and the formal method.

	1	2
x		4

2 Calculate:

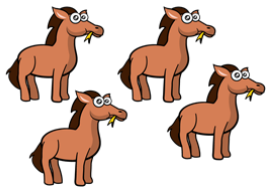
	4	3
x		3

	3	6
x		4

	7	4
x		5

	3	9
x		☐
1	☐	6

3 Each horse eats 37 carrots a day. How many do they eat altogether?



Multiply 2-digits by 1-digit

Reasoning and Problem Solving

Here are three multiplications.

$$\begin{array}{r} 61 \\ \times\ 5 \\ \hline 35 \end{array} \qquad \begin{array}{r} 74 \\ \times\ 7 \\ \hline 498 \end{array} \qquad \begin{array}{r} 26 \\ \times\ 4 \\ \hline 824 \end{array}$$

Correct the multiplications.

$$\begin{array}{r} 61 \\ \times\ 5 \\ \hline 305 \end{array} \qquad \begin{array}{r} 74 \\ \times\ 7 \\ \hline 518 \\ {\scriptstyle 2} \end{array} \qquad \begin{array}{r} 26 \\ \times\ 4 \\ \hline 84 \end{array}$$

Tom baked muffins in a tray like this.

Tom wasn't sure how many he baked, but he used 27, 28 or 29 tins!

When he counted them there were 174 muffins. How many tins did he use?

Tom used 29 tins.

$$\begin{array}{r} 29 \\ \times\ 6 \\ \hline 174 \end{array}$$

Always, sometimes, never

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

Prove it!

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

Never: all multiplications by 8 are even.

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

Multiply 2-digits by 1-digit (2)

Notes and Guidance

Children continue to use their understanding of repeated addition to represent a two-digit number multiplied by a one-digit number with concrete manipulatives.

They move on to explore multiplication with exchange. Children apply their understanding of place value to exchange when there are 10 or more in a place value column.

Mathematical Talk

How many ones are we multiplying? What will happen when I have more than 9 in my column?

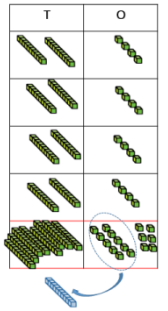
Will this calculation involve an exchange? Which column will the exchange take place?

Where can we see the exchange in the pictorial representation and the written method?

Varied Fluency

1 Calculate 24 × 4

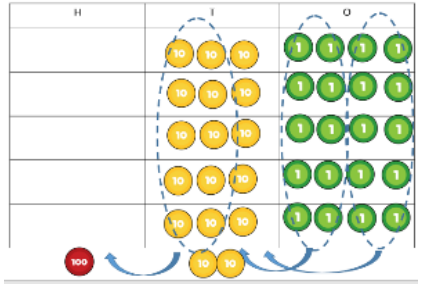
Use this method to work out the following.
28 × 3 16 × 6



	T	O	
	2	4	
×		4	
	9	6	
	1		

2 Use place value counters work out 5 × 35

Use this method to work out:
36 × 6
48 × 4



	T	O	
	3	5	
×		5	
1	7	5	
1	2		

3 There are 76 sweets in a bag. I buy 3 bags.
How many sweets do I have in total?

Multiply 2-digits by 1-digit (2)

Reasoning and Problem Solving

Always, Sometimes, Never

A two-digit number multiplied by a one-digit number makes a two-digit answer.

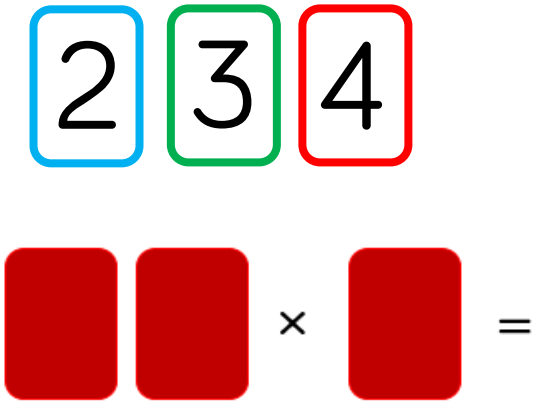
There are lots of solutions children may find. It will be sometimes as it can make a two or three digit answer depending on the number being multiplied.

Charlotte answered the question 27 × 3, her answer is 6021

What mistake could she have made?

Possible response: She has then put the 60 and 21 together to make 6021, rather than adding 21 and 60 to get the answer 81

Using the digit cards in the multiplication below how close can you get to 100?



23 × 4 = 92 this is the closest answer.

24 × 3 = 72

32 × 4 = 128

34 × 2 = 68

Children may also use estimation as part of their reasoning. For example, 23 is near 25 and there are 4 lots of 25 in 100

Multiply 3-digits by 1-digit

Notes and Guidance

Children build on previous steps to represent a three-digit number multiplied by a one-digit number with concrete manipulatives.
Teachers should be aware of misconceptions arising from 0 in the tens or ones column.
Children then move on to explore multiplication with exchange in first one column and then more than one column.

Mathematical Talk

Why is it important to set out using columns?

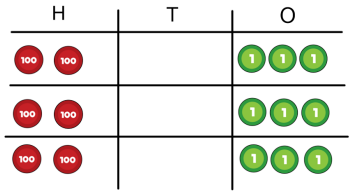
What happens when there is a 0 in the ones column, tens column or hundreds column?

Explain the value of each digit in your calculation.

What do we do if there are ten counters in a column?

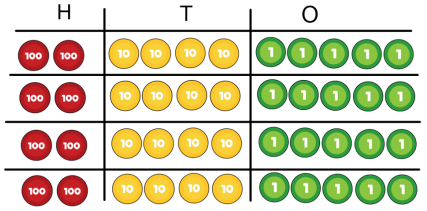
Varied Fluency

1 Complete the calculation



H	T	O
2	0	3
×		3

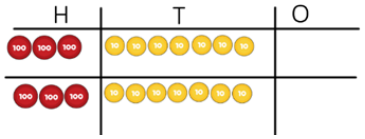
2 A school has 245 packets of sweets.
Each packet contains 4 sweets.
How many sweets are there altogether?



H	T	O
2	4	5
×		4

Use the place value counters to solve the problem.
Remember, if there are ten or more counters in a column, to make an exchange.

3 Write the multiplication calculation represented and find the answer.



Multiply 3-digits by 1-digit

Reasoning and Problem Solving

Spot the mistake

Beth and Natasha have both completed the same multiplication. Who has the correct answer?
What was the misconception that caused the error?

Beth

	2	3	4
	x		6
1	2	0	4

Natasha

	2	3	4
	x		6
1	4	0	4

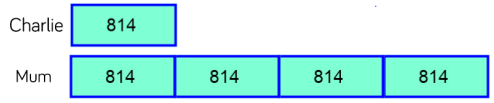
Beth didn't exchange 20 tens for 2 hundreds.

Charlie and his mum were having a reading competition.
In one month, Charlie read 814 pages.

His mum read 4 times as many pages as Charlie.

- How many pages did they read altogether?
- How many less pages than his Mum did Charlie read?

Use a bar model to help.



814 × 5 = 4,070

814 x 3 = 2,442

Divide 2-digits by 1-digit (1)

Notes and Guidance

Children build on their understanding of division from Year 2 and will continue to make connections with known multiplication facts to solve problems.
At this stage children will be using numbers that divide exactly without remainders.
Children will be exposed to different representations and will use concrete manipulatives to further their understanding.

Mathematical Talk

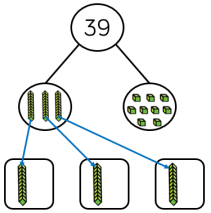
How can we partition the number?
How many tens are there?
How many ones are there?
What could we use to represent this number?

How many rows will my place value chart have?
How does this link to the number I am diving by?

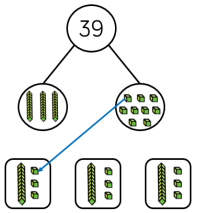
Varied Fluency

1 Using a part-whole model and Base 10 answer the following:
39 ÷ 3

Step 1: Share the tens

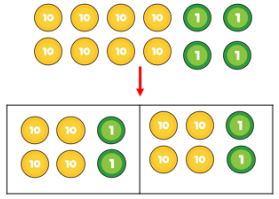


Step 2: Share the ones



Use this method to help you answer
48 ÷ 4 66 ÷ 6

2 Use counters to help you solve the following:



84 ÷ 2
69 ÷ 3
88 ÷ 4

3 Use place value counters to answer:

- 33 ÷ 3
- 86 ÷ 2
- 96 ÷ 3

T	O

Divide 2-digits by 1-digit (1)

Reasoning and Problem Solving

Jacob answers the question 44 ÷ 4 using place value counters.

T	O
10 10	1 1
10 10	1 1

Is he correct?
Explain your reasoning.

Jacob is incorrect. He has divided 44 by 2 instead of by 4

Prove it!

Lexi thinks that 88 sweets can be shared equally between eight people.

Is she correct?

Lexi is correct because 8 can be divided equally into 88 eleven times:

T	O
10	
10	
10	
10	
10	
10	
10	
10	

Grace uses place value counters to help her calculate 63 ÷ 3

T	O
10	10 1
10	10 1
10	10 1

She gets an answer of 12
Is she correct?
Use place value counters to explain how you know.

Possible answer:

Grace is incorrect because she has not shared her ten counters in the tens column.

It should look like this:

T	O
10 10	1
10 10	1
10 10	1

The answer would be 21

Divide 2-digits by 1-digit (1)

Notes and Guidance

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

Children use examples where the tens and the ones are divisible by the divisor. For example, 96 divided by 3, 84 divided by 4 and 85 divided by 5

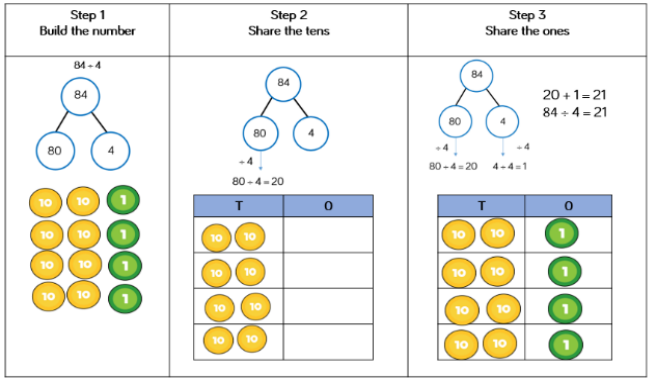
Mathematical Talk

How can we partition 84? What are we sharing it by? What is the divisor?
If I cannot share the tens equally, what do I need to do? How many ones will I have after exchanging the tens?

If we solve 96 ÷ 8 = , 96 ÷ 4 = , 96 ÷ 6, what's the same, what's different? Can we notice a pattern? Which one is the odd one out? Why?

Varied Fluency

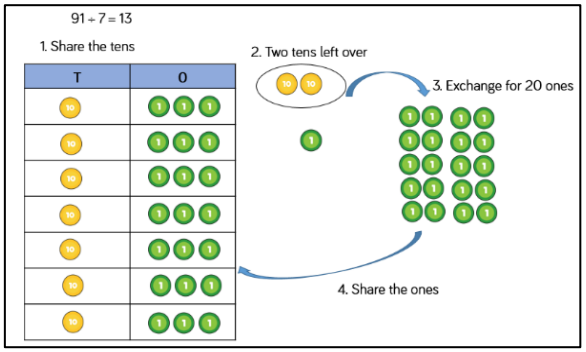
1 Charlie solves 84 ÷ 4 like this:



Use this approach to solve:

69 ÷ 3 88 ÷ 4 96 ÷ 3

2 Charlie now solves 91 ÷ 7 like this:



Use this approach to solve:

75 ÷ 5 84 ÷ 6 68 ÷ 4 98 ÷ 7

Divide 2-digits by 1-digit (1)

Reasoning and Problem Solving

Macey is working out 72 ÷ 3.
Before she starts, she says the calculation will involve an exchange.

Do you agree?
Explain why.

Macey is correct because 70 is not a multiple of 3 and if you try to share 7 tens between three you cannot do it equally. This is when she will need an exchange.

True or false?

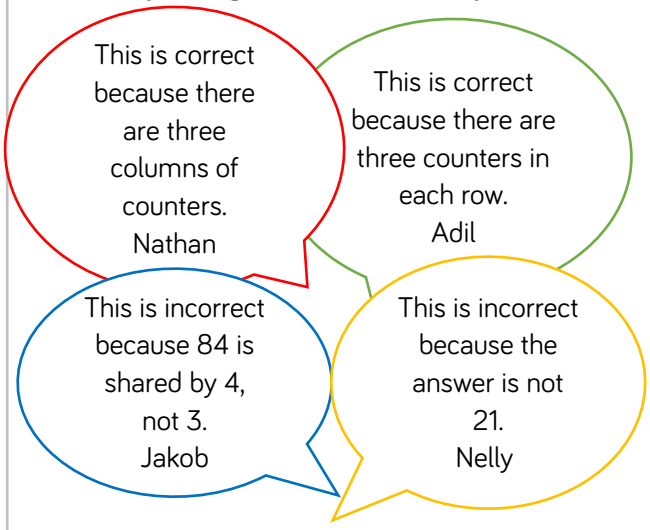
The calculations below all have the same divisor.

57 ÷ ____ = 19
72 ÷ ____ = 18
85 ÷ ____ = 17

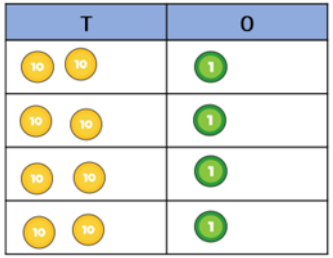
False because...
57 ÷ 3 = 19
72 ÷ 4 = 18
85 ÷ 5 = 17

72 can also be divided equally by 3 and children may investigate this.

The children in Year 4 are checking their friend's method.
Who do you agree with and why?



84 ÷ 3



Possible response:
I agree with Jakob because the counters have been shared between four groups when they should have been shared between three. Nelly is also correct but hasn't explained why.

Divide 2-digits by 1-digit (2)

Notes and Guidance

It is important that children know that there are multiple ways to partition a number.
Children will apply this partitioning knowledge and known multiplication facts to divide.
For example, 42 ÷ 3. 42 can be partitioned in to 30 and 12, these numbers are both multiples of 3 therefore they can be divided by 3 easily.

Mathematical Talk

How could you partition this number?

X can be partitioned into _____ and _____

Why did you choose to partition the number that way?

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

Varied Fluency

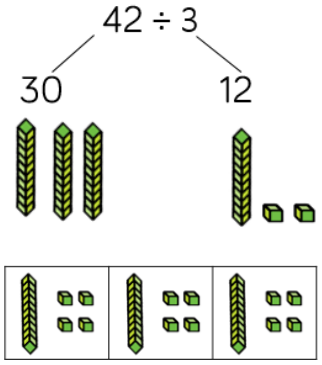
1 Calculate 42 ÷ 3 using Base 10:

42 can be partitioned into _____ and _____.

30 ÷ 3 = _____

12 ÷ 3 = _____

42 ÷ 3 = _____

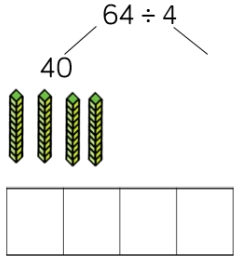


2 64 can be partitioned into _____ and _____.

40 ÷ 4 = _____

16 ÷ 4 = _____

96 ÷ 8 = _____



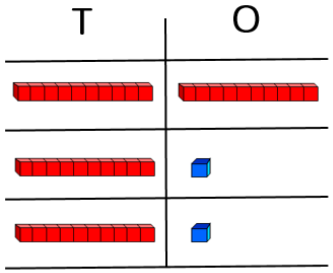
Use this method to calculate:

96 ÷ 8 96 ÷ 3 96 ÷ 6

Divide 2-digits by 1-digit (2)

Reasoning and Problem Solving

Jane is calculating 42 ÷ 3

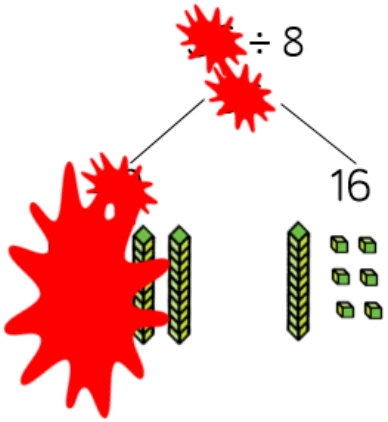


Can you spot and explain her mistake?

Jane should have partitioned 42 into 30 and 12 because both 30 and 12 are divisible by 3.
She has incorrectly placed one ten into the ones column.
She could exchange this ten for ten ones and then share the 12 ones equally between 3

Shadya partitioned a number to help her divide by 8

What number could Shadya have started with?



I know the answer would need to be in the 8 times tables.

I can see that one of the numbers used was 16, so my answer would need to end in a 6 and be in the 8 times table.

My answer could either be 56 or 96

Divide 2-digits by 1-digit (2)

Notes and Guidance

Children explore dividing two-digit numbers by one-digit numbers involving remainders.

They use the sharing method used in the previous steps to explore what happens when there are remainders.

Children will also understand that remainders are a part of the whole divisor left over.

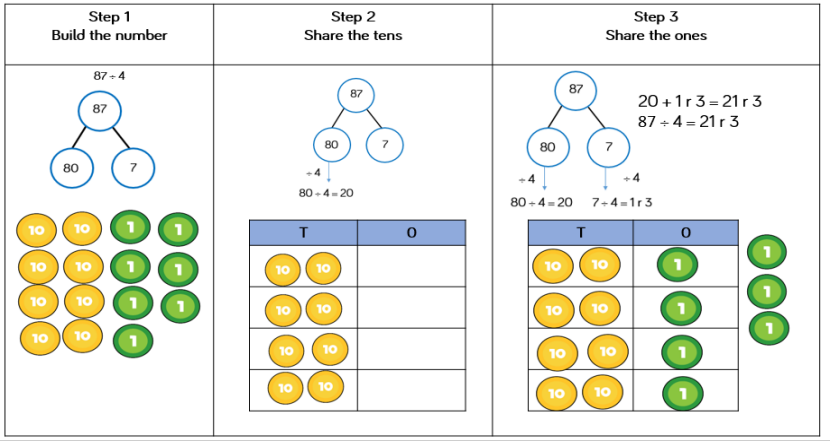
Mathematical Talk

In the calculation 87 ÷ 4, what is the divisor (4) and what is the dividend (87)? How do these help us with our method?

What is a remainder? What does this tell us?

Varied Fluency

1 Phoebe solves 87 ÷ 4 using this approach

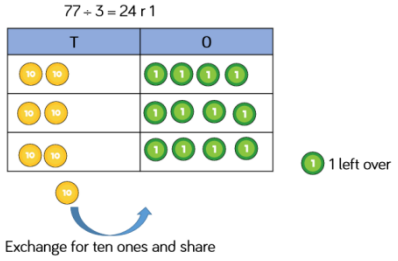


Solve the following in the same way:

95 ÷ 3 = 67 ÷ 3 = 81 ÷ 4 =

2 Phoebe uses the same approach but this time her calculations involve an exchange. Solve these in the same way:

- 97 ÷ 7 =
- 85 ÷ 3 =
- 97 ÷ 4 =



Divide 2-digits by 1-digit (2)

Reasoning and Problem Solving

Sian has the calculation
85 ÷ 3 = 28 r 1

She says 85 must be 1 away from a multiple of 3
Do you agree?

I agree, remainder 1 means there was 1 left over. There are 3 groups of 28 but 1 is left over. The multiple of 3 must be 84

76 sweets are shared between 4 friends.
How many sweets will be left over?

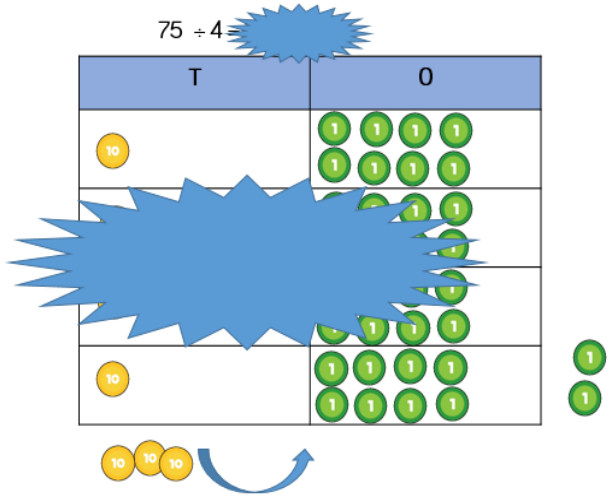
Four children attempt to solve this question.

- Alex says it's 1
- Ben says it's 9
- Charlotte says it's 9 r 1
- Damien says it's 10

Can you explain who is correct and the mistakes other people have made?

Possible response:
Alex is correct as there will be one remainder and the question asks how many sweets will be left over.

Jasmine thinks she can't use the image below to work out the calculation.
Do you agree?



Possible response:

I disagree. You can see there are 18 in each group or row. There are also two left over which must mean

75 ÷ 4 = 18 r 2

Divide 2-digits by 1-digit (3)

Notes and Guidance

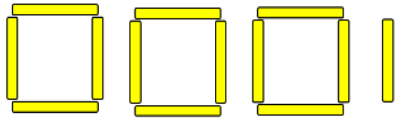
Children move onto solving division problems with a remainder.
Children make links between division and repeated subtraction, which builds on learning in Year 2.
They need to recognise that they don't have to start at the multiple when counting back from the dividend.
Questions are designed to visually represent the concept of a reminder and will require the use of exchange.

Mathematical Talk

How can we share this amount equally?
When we are counting back are we grouping or sharing?
Do we have to start at a multiple of 4 when counting back in 4s?
Can we share the tens equally? Will we need to exchange?
How does this model show that we are sharing and not grouping?

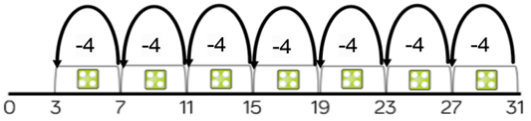
Varied Fluency

1 Use lollipop sticks to show how many squares you can make to answer 13 ÷ 4



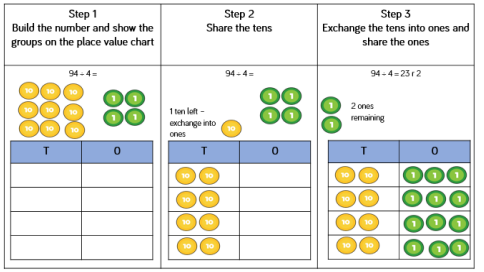
There are ___ lollipop sticks
There are ___ groups of 4
There is ___ lollipop remaining.
13 ÷ 4= ___ remainder ___
Use this method to see how many triangles you can make to answer 38 ÷ 3

2 31 ÷ 4
How many groups of 4 have you subtracted?



How many are remaining?
Use this method to solve 38 divided by 3

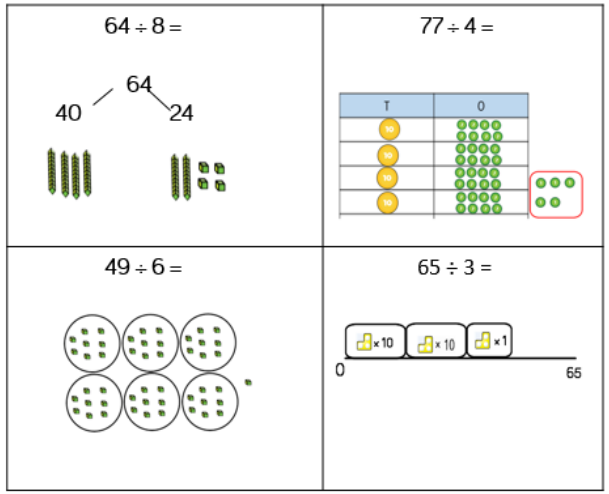
3 Here is a method to solve 94 divided by 4
Use this method to solve:
94 ÷ 7 94 ÷ 6



Divide 2-digits by 1-digit (3)

Reasoning and Problem Solving

Which calculation is the odd one out?
Explain how you know.



I know this because _____

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

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

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

Tami and Katie are planting bulbs. They have 76 bulbs altogether.

Tami plants her bulbs in rows of eight and has 4 left over.
Katie plants her bulbs in rows of 10 and has 2 left over.
How many bulbs does Tami have?
How many bulbs does Katie have?

Tami has 44 bulbs.
Katie has 32 bulbs.

Divide 3-digits by 1-digit

Notes and Guidance

Children apply their previous knowledge of division to divide a 3 digit number by a 1 digit number.

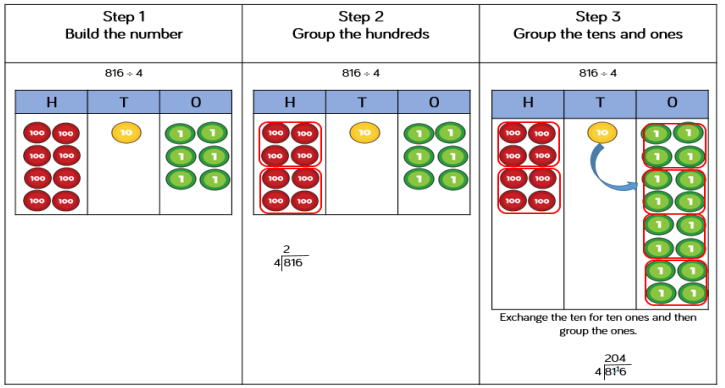
They will be using a variety of manipulatives and approaches to find the most efficient method.

Mathematical Talk

What is the same and what's different when we are dividing 3 digit number by a one digit number and a two digit number by a one digit number?
How does our written calculation show what we are doing?
If I cannot make a group in a column, what should I do?
How can we partition a number to help us divide?
If we do the same calculation with place value counters, is it the same? What is different?

Varied Fluency

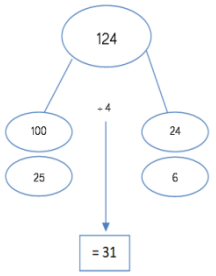
1 Karen solves this calculation 816 ÷ 4 and represents it like this:

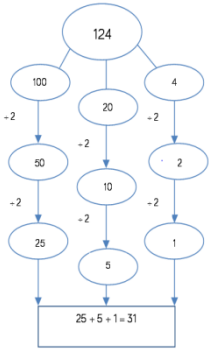


Use this method to solve:

678 ÷ 3 = 791 ÷ 7 = 216 ÷ 4 =

2 Erin uses partitioning and the part whole model to help her calculate 124 ÷ 4





Use this method to solve:

- 235 ÷ 5
- 147 ÷ 7
- 432 ÷ 8

Divide 3-digits by 1-digit

Reasoning and Problem Solving

Place < , > or = to make these number sentences correct.

738 ÷ 6		868 ÷ 7
976 ÷ 8		625 ÷ 5
584 ÷ 4		438 ÷ 3

Children will need to complete the short divisions before comparing them.

Answers:
123 > 124
122 < 125
146 = 146

You have 12 counters and the place value grid.

H	T	O

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

Divisible by 2: Any even number created.

Divisible by 3: 336, 624, 921

Divisible by 4: 228, 408, 624

Divisible by 5: 165

Divisible by 6: 534

Divisible by 7: 714

Divisible by 8: 840

There is no 3 digit number divisible by 9 however there is a pattern worth investigating!

How Many Ways?

Notes and Guidance

Pupils calculate the number of ways that an unknown number of objects can be connected to another unknown number of objects. For example, the number of ways that n objects are connected to m objects.

They use practical and visual representations to understand this relationship.

Mathematical Talk

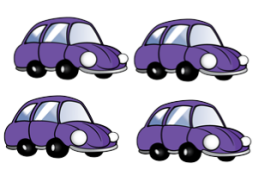
What other number sentences does the image show?

How many other ways can you find to make 30?
Can you explain your method?

How many different solutions can you find?

Varied Fluency

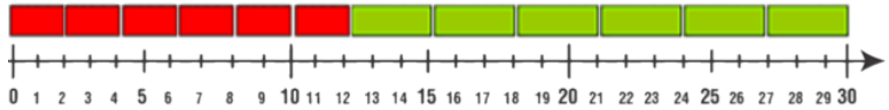
1 Represent the number of wheels using multiplication sentences:



_____ × _____ = _____ × _____ =

How many wheels are there in total?

2 The image shows that 6 × 2 + 6 × 3 = 30



Can you find another way of making 30 using multiplication facts for the 2 and 3 times tables?

3 Using the 3 and 4 times tables how can you make a total of 24?
Represent this with manipulatives.

How Many Ways?

Reasoning and Problem Solving

Tammy has £18.
She wants to buy some muffins and chocolate bars.
Muffins cost £3 and chocolate bars cost £4
How many muffins does she buy and how many chocolate bars does she buy?
Can you find more than one solution?

Tammy buys 3 chocolate bars and 2 muffins

Lottie is counting the number of wheels in a car park. Cars and bikes are in the car park. Cars have four wheels and bikes have two wheels. If there are 26 wheels altogether, how many cars and bikes might there be?

6 cars, 1 bike
$6 \times 4 = 24 \quad 1 \times 2 = 2$
$24 + 2 = 26$
5 cars, 3 bikes
$5 \times 4 = 20 \quad 3 \times 2 = 6$
$20 + 6 = 26$
4 cars, 5 bikes
$4 \times 4 = 16 \quad 5 \times 2 = 10$
$16 + 10$
3 cars, 7 bikes
$3 \times 4 = 12 \quad 7 \times 2 = 14$
$12 + 14 = 26$
2 cars, 9 bikes
$2 \times 4 = 8 \quad 9 \times 2 = 18$
$18 + 8 = 26$
1 car, 11 bikes
$1 \times 4 = 4 \quad 11 \times 2 = 22$
$22 + 4 = 26$

William has 3 t-shirts and 4 pairs of trousers.

How many different outfits can he make?

There are 12 different outfits.

T-shirt	Trousers
Blue	Black
Blue	Green
Blue	Orange
Blue	Blue
Green	Black
Green	Green
Green	Orange
Green	Blue
Orange	Black
Orange	Green
Orange	Orange
Orange	Blue

For each t-shirt, there are four possible pairs of trousers. This is the same as 3 lots of 4 different

Correspondence Problems

Notes and Guidance

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

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

Mathematical Talk

How can we represent this using multiplication?

What could you do to help you? Could you draw the shapes?

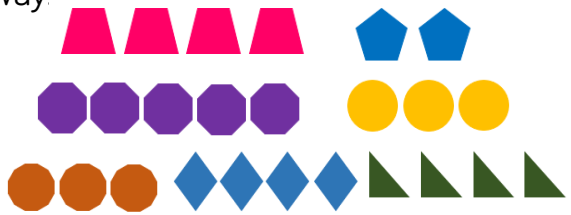
Can we represent this in a number sentence? Is there more than one possibility?
How many different solutions can you find?

Varied Fluency

1 Johnny says he can represent the total number of vertices of his shapes like this:

$4 \times 7 + 3 \times 3 = 37$

Find the total number of vertices for these sets of shapes in the same way:



2 Use circles, squares and pentagons to represent the following total of vertices:

21 22 23

3 Using the 6 and 4 times tables how many different ways can you make a total of 40?
Represent this with manipulatives.

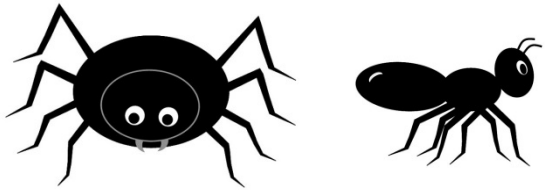
Correspondence Problems

Reasoning and Problem Solving

Using the vertices of squares and triangles, how many ways can you balance the equation?

Possible solution: Children may use their knowledge of times tables to help them or they may use trial and error with the shapes to solve it. They may choose to use a table to organise their thoughts.

Spiders have 8 legs and ants have 6 legs.



There are 288 legs in a vegetable patch.

How many spiders and ants could there be?

Possible answers:

24 spiders

16 ants

9 spiders

36 ants