

Lesson 3: Multiplying 2-digit numbers (2)

→ pages 12–14

1. $10 \times 24 = 240$ $2 \times 24 = 48$

$240 + 48 = 288$

There are 288 pencils in total.

2. $21 \times 36 = 10 \times 36 + 10 \times 36 + 1 \times 36$
 $= 360 + 360 + 36$
 $= 756$

There are 756 jelly beans in total.

3. a) Lexi's working

$30 \times 12 = 360$

$2 \times 12 = 24$

$360 + 24 = 384$

Danny's working

$32 \times 10 = 320$

$32 \times 2 = 64$

$320 + 64 = 384$

b) Answers may vary. Ensure children explain their preferred method with justification.

4. a) $25 \times 13 = 25 \times 10 + 25 \times 3$
 $= 250 + 75$
 $= 325$

b) $41 \times 24 = 984$

c) $14 \times 62 = 868$

5. $41 \times 14 = 574$

6. The shopkeeper made £1,292 last month.
 (£51 – £34 = £17; £17 × 76 = £1,292)

Reflect

$45 \times 23 = 1,035$. Explanations and methods may vary. Encourage children to use formal as well as informal methods, justifying and reasoning to demonstrate real understanding.

Lesson 4: Multiplying 2-digit numbers (3)

→ pages 15–17

1. a) Olivia's method

	34
10	340
2	68

	H	T	O
+	3	4	0
		6	8
	4	0	8

Jamilla's method

	3	4
x	1	2
	6	8
	3	4
	4	0
	4	0
	8	

$34 \times 12 = 408$

b) Answers may vary. Ensure children explain their preferred method with justification.

2. a) $29 \times 23 = 667$

	2	9	
x	2	3	
	8	27	29 × 3
	5	80	29 × 20
	6	67	29 × 23

b) $37 \times 16 = 592$

	3	7	
x	1	6	
	2	2	2
	3	7	0
	5	9	2

3. a) $45 \times 27 = 1,215$

	4	5	
x	2	7	
	3	1	5
	9	0	0
	1	2	1

45 × 7

45 × 20

45 × 27

b) $52 \times 17 = 884$

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

52 × 7

52 × 10

52 × 17

c) 1,666 (Children to show long multiplication method)

d) 2,128 (Children to show long multiplication method)

4. There are 2,040 calories in a pack of 24 snack bars.

5. The bar model represents $14 \times 89 = 1,246$

6. a)

	3	6
x	1	3
	1	0
	3	6
	4	6

b)

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Reflect

Explanations may vary. Encourage children to see that $99 \times 47 = 100 \times 47 - 47 = 4,653$. Children could use visuals representations such as place value counters or place value grids to support their explanations.

Lesson 5: Multiplying a 3-digit number by a 2-digit number

→ pages 18–20

1. a) $172 \times 24 = 4,128$

		100	70	2
20	$100 \times 20 = 2,000$	$20 \times 70 = 1,400$	$20 \times 2 = 40$	
4	$4 \times 100 = 400$	$4 \times 70 = 280$	$4 \times 2 = 8$	

Th	H	T	O
2	0	0	0
1	4	0	0
		4	0
	4	0	0
	2	8	0
+			8
4	1	2	8

- b) $325 \times 18 = 5,850$

		300	20	5
10	$10 \times 300 = 3,000$	$10 \times 20 = 200$	$10 \times 5 = 50$	
8	$8 \times 300 = 2,400$	$8 \times 20 = 160$	$8 \times 5 = 40$	

Th	H	T	O
3	0	0	0
	2	0	0
		5	0
2	4	0	0
	1	6	0
+		4	0
5	8	5	0

2. a)

		1	7	2
x		2	4	
	6	2	8	8
	3	1	4	0
	4	1	2	8

- b)

		3	2	5
x		1	8	
	2	2	6	0
	3	2	5	0
	5	8	5	0

3. a) $145 \times 39 = 5,655$ (Children to show long multiplication method)
b) $408 \times 25 = 10,200$ (Children to show long multiplication method)
c) $418 \times 72 = 30,096$ (Children to show long multiplication method)
d) $529 \times 44 = 23,276$ (Children to show long multiplication method)

4. $72 \times 314 = 22,608$

The second method is more efficient as the answer is found in 3 steps, whereas the first method uses 4 steps.

5. There are 1,066 bottles of water left.
 $(288 \times 12 = 3,456; 3,456 - 2,390 = 1,066)$

6. Explanations may vary. Children may say since the answer has 5 in the ones digit, the ones digit of the missing number must be 5 (the only single-digit number that has an answer ending in 5 when multiplied by 7). They may say they then worked out $5 \times 567 = 2,835$ and put this in the top row. They may say they then worked out that 5,670 must be in the second row ($8,505 - 2,835$). This is 10×567 so the missing number is $10 + 5 = 15$.

		5	6	7
x		1	5	
	2	8	3	5
+	5	6	7	0
	8	5	0	5

Reflect

Answers may vary. Encourage children to see that 354×30 can be worked out as 354×3 and then multiply the answer by 10. With 300×52 , this can be worked out as 3×52 then multiply the answer by 100.

$$354 \times 30 = 10,620$$

$$300 \times 52 = 15,600$$

Lesson 6: Multiplying a 4-digit number by a 2-digit number

→ pages 21–23

1. a) $1,203 \times 26 = 31,278$ (Children to show long multiplication method)
b) $1,612 \times 24 = 38,688$ (Children to show long multiplication method)
c) $25 \times 2,459 = 61,475$ (Children to show long multiplication method)
d) $3,006 \times 37 = 111,222$ (Children to show long multiplication method)

2. 23 bags of marbles weigh 38,042 g.

3. a) $3,612 \times 38 = 137,256$
b) $6,005 \times 23 = 138,115$

4. $72 \times 17 = 1,224$

$$720 \times 17 = 12,240$$

$$7,200 \times 17 = 122,400$$

$$1,700 \times 72 = 122,400$$

Explanations may vary.

$$7,200 \times 17 = 72 \times 100 \times 17 = 72 \times 1,700 = 1,700 \times 72$$

5. The car and the motorbike cost £47,000 in total ($£2,350 \times 20$).

6. $26 \times 37 \times 49 = 47,138$

It does not matter which order you multiply the numbers in. When you multiply numbers together the order of the numbers does not affect the answer, which will always be the same.

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

Reflect

Explanations may vary. The answer cannot be correct as the ones digits are 5 and 7. 5×7 ends in 0 so the answer will have a 5 on the end, not 0.

Correct answer: 51,615

Lesson 7: Dividing up to a 4-digit number by a 1 digit number (I)

→ pages 24–26

- $200 \div 2 = 100$
 $60 \div 2 = 30$
 $8 \div 2 = 4$
 $100 + 30 + 4 = 134$
So, $268 \div 2 = 134$
 - $5,000 \div 5 = 1000$
 $50 \div 5 = 10$
 $5 \div 5 = 1$
 $1,000 + 10 + 1 = 1,011$
So, $5,055 \div 5 = 1,011$
- When dividing anything by 1, the number stays the same. Here, you can think of it as how many 1s go into 723, so 723 1s go into 723.
- Each child gets 13 marbles.
- $844 \div 4 = 211$
 - $9,690 \div 3 = 3,230$
 - $84 \div 2 = 42$
 - $7,070 \div 7 = 1,010$
- $$\begin{array}{r} 3 \ 2 \ 0 \ 1 \\ 3 \overline{) 9 \ 6 \ 0 \ 3} \end{array}$$
 - $$\begin{array}{r} 2 \ 1 \ 1 \ 0 \\ 4 \overline{) 8 \ 4 \ 4 \ 0} \end{array}$$
 - Answer may vary, for example,

$$\begin{array}{r} 1 \ 2 \ 1 \\ 3 \overline{) 3 \ 6 \ 3} \end{array}$$

6.

£6,600					
£3,300					
£2,200					
£1,100					

$6,600 \div 3 = 2,200$
 $6,600 \div 6 = 1,100$

Dividing by a larger number gives you a smaller answer as the whole is split into more equal parts, so the amount in each part will be smaller.

Reflect

Children may say they will use short division to work out how many groups of 2 there are in 4,804, or they can think of it as halving 4,804. They start with the largest value digit, so how many twos in 4 thousands = 2 thousands. Then how many twos in 8 hundreds = 4 hundreds. How many twos in 0 tens = 0 tens. Finally, how many twos in 4 ones = 2 ones. So, the answer is 2,402.

Lesson 8: Dividing up to a 4-digit number by a 1-digit number (2)

→ pages 27–29

- $78 \div 3 = 26$
- Olivia can make 16 hexagons.
- $642 \div 6 = 107$
 - $725 \div 5 = 145$
 - $5,016 \div 3 = 1,672$
- $7,924 \div 7 = 1132$
 - $711 \div 3 = 237$
 - $916 \div 4 = 229$
- The bar model represents the division $2,454 \div 6 = 409$
- Isla has made a mistake when exchanging from the thousands column to the hundreds column. Instead of exchanging the 1 thousands for 10 hundreds, she has made 30 hundreds.
- $$\begin{array}{r} 2 \ 4 \ 3 \\ 4 \overline{) 9 \ 7 \ 2} \end{array}$$
 - $$\begin{array}{r} 2 \ 2 \ 9 \ 1 \\ 3 \overline{) 6 \ 8 \ 27 \ 3} \end{array}$$
 - $$\begin{array}{r} 1 \ 2 \ 6 \\ 5 \overline{) 6 \ 3 \ 0} \end{array} \quad \text{or} \quad \begin{array}{r} 1 \ 3 \ 6 \\ 5 \overline{) 6 \ 8 \ 30} \end{array}$$
- Bella's method
 $4,755 \div 3 = 1,585$
 $1,585 \div 5 = 317$
 Ebo's method
 $4,755 \div 5 = 951$
 $951 \div 3 = 317$
 Both Bella and Ebo get the same answer.
 In the diagram you can see that dividing by 5 (the solid lines) and then dividing each part by 3 (the dotted lines) is the same as dividing the whole by 15 (there are 15 equal parts altogether).

Reflect

Explanations may vary. Children may say they know that the answer must be wrong because $7 \div 7 = 1$ so $307 \div 7$ cannot be 1. Encourage children to notice that there is no exchange, for instance, the 3 hundreds has not been exchanged for 30 tens.

Lesson 9: Division with remainders (I)

→ pages 30–32

- $74 \div 3 = 24 \text{ r } 2$
- Each friend gets 12 sweets.
 - There are 4 sweets left over.
 - There will not be 5 sweets left over as 5 is bigger than the divisor 3 so that means an extra sweet could be put in each of the 3 jars.

3. a) $56 \div 5 = 11 \text{ r } 1$
b) $329 \div 2 = 164 \text{ r } 1$
c) $418 \div 9 = 46 \text{ r } 4$
d) $4,175 \div 4 = 1,043 \text{ r } 3$
e) $973 \div 6 = 162 \text{ r } 1$
f) $1,111 \div 8 = 138 \text{ r } 7$
4. $712 \div 6 = 118 \text{ r } 4$. Toshi cannot pack all jars into boxes without any remainders.
5. Match calculations to remainders:
 $5 \overline{)48} \rightarrow \text{r } 3$ $7 \overline{)97} \rightarrow \text{r } 6$ $2 \overline{)99} \rightarrow \text{r } 1$
 $9 \overline{)76} \rightarrow \text{r } 4$ $3 \overline{)93} \rightarrow \text{r } 0$ $4 \overline{)86} \rightarrow \text{r } 2$
6. The mints will last for **66** days.
7. a)
$$\begin{array}{r} 0 \quad 3 \quad 3 \quad \text{r } 4 \\ 7 \overline{)235} \end{array}$$

$$\begin{array}{r} 2 \quad 4 \quad 2 \quad 9 \quad \text{r } 2 \\ 4 \overline{)817138} \end{array}$$

b) There are 3 possible answers:
 $511 \div 3 = 170 \text{ r } 1$
 $514 \div 3 = 171 \text{ r } 1$
 $517 \div 3 = 172 \text{ r } 1$

Reflect

Explanations will vary – this can never be correct – if the ‘remainder’ is bigger than the divisor, then it can be further divided.

Lesson 10: Division with remainders (2)

→ pages 33–35

1. a) Circled: 300 95 6,045
Numbers that end in 0 or 5 are divisible by 5, so these numbers are divisible exactly by 5.
b) Circled: 1,252 390 788
These numbers are all even. Even numbers are divisible by 2.
c) Circled: 156 384 72
The digit sum of these numbers are multiples of 3. So, these numbers are all divisible by 3.
2. Methods may vary. Children may use short division or halving and halving again to show $756 \div 4 = 189$. Since 100 is divisible by 4, it is sufficient to show that 56 is divisible by 4.
3. a) Circled: 78 342 726 2,412
b) $\square 46$ possible digits are: 2, 5 or 8
 $3,1\square 2$ possible digits are: 0, 3, 6 or 9
 $28\square$ possible digits are: 2 or 8
4. a) remainder = 1
b) remainder = 2
c) remainder = 5
d) remainder = 0
Explanations will vary. Children may say they found the difference between the number and 712 to see if it was possible to make another group of 8 or whether there would be a remainder.
5. Circled: $516 \div 4$ $1,748 \div 4$ $704 \div 4$

6. a) Possible digits: 3 or 8
b) Possible digits: 1, 4 or 7
c) Possible digits: 3 or 9

Reflect

No. Explanations may vary, for example, if you get a remainder of 9, 10, 11... when dividing by any single-digit number then you can divide further.

Lesson 11: Problem solving – division with remainders

→ pages 36–38

1. a) $602 \div 3 = 200 \text{ r } 2$
b) $3,862 \div 8 = 482 \text{ r } 6$
2. $365 \div 7 = 52 \text{ r } 1$
Max is incorrect as there are 52 weeks and one extra day each year.
3. a) $5 \times 32 + 3 = 163$
163 stickers were shared out altogether.
b) $163 \div 6 = 27 \text{ r } 1$
Each child gets 27 stickers. There is 1 sticker left over.
4. $(2,050 - 187) \div 9 = 207$
One box is 207 mm wide.
5. $6 \times 416 = 2,496$
 $5,000 - 2,496 = 2,504$
 $2,504 \div 8 = 313$
There is 313 ml of water in each short glass.

Reflect

Methods may vary. Children may check using short multiplication. Children could multiply 1,143 by 10 and then halve the answer. Children might use a pictorial method such as the grid method. Children might divide 5,715 by 5 to check the answer is 1,143.

End of unit check

→ pages 39–41

My journal

1. Mo is trying to do the long multiplication method, but he has not found 9×235 and then 30×235 . The correct answer is 9,165.
Reena thinks that there are only 8 lots of 3 in 28, when in fact there are 9 lots of 3 with 1 left to be exchanged. The correct answer is 295.
Danny has worked out the remainders incorrectly as 2 lots of 4 are 8, which means 3 are left over from 11. Correct answer is $1,762 \text{ r } 3$.



2. Methods may vary. Here are some possible answers:

- | | |
|-------------------|--|
| 99×764 | First do 100×764 and then subtract 764 from the answer. |
| $5,917 \times 1$ | When multiplying any number by 1, the answer is the number itself. |
| $723 \div 1$ | When dividing any number by 1, the answer is the number itself. |
| $7,000 \times 30$ | Work out 7×3 and then multiply it by 10,000. |

Power play

- a) $27 \times 37 \times 47$
- b) $28 \times 38 \times 48 = 51,072$
- c) $27 \times 28 \times 29$

Sparks's statement is true. When you multiply any three consecutive numbers ending in:

- 0, 1 and 2; 3, 4 and 5; 4, 5 and 6; 5, 6 and 7; 8, 9 and 0 make 0
- 2, 3 and 4; 7, 8 and 9 make 4
- 1, 2 and 3; 6, 7 and 8 make 6.