Unit 1 – Place value – 4-digit numbers (1)

1 Represent and partition numbers to 1,000

➜ pages 8–11

Discover

1. a) Base 10 equipment showing 3 hundreds, 6 tens and 5 ones.
b) A part-whole model to show 366 = 300 + 60 + 6; Place value counters showing 3 hundreds, 6 tens, and 6 ones.

Think together

1. 200 + 30 + 4

2. a) 684
700 + 90 + 4
b) **684** = 600 + 80 + 4
794 = **700** + **90** + **4**
c) The parts in the part-whole models are the same as the numbers in the additions, and the wholes are the same as the addition totals.

3. a) A: 244, B: 240, C: 204, D: 420
b) C: 204
c) Children's sketches should show the hundreds as squares, the tens as sticks and the ones as small dots as follows:
305: 3 hundreds, 5 ones
350: 3 hundreds, 5 tens
353: 3 hundreds, 5 tens, 3 ones
503: 5 hundreds, 3 ones

2 Number line to 1,000

➜ pages 12–15

Discover

1. a) 600 g
b) Butter: half-way between 3rd and 4th markers.
Sugar: half-way between 0 and next marker.

Think together

1. a) 100 600 800
b) 272 274 278

2. a) Half-way between 500 and previous marker (400).
b) Just before the 450 marker.
c) On marker to the left of 450.

3. a) Approximately 750 ml [740–760 acceptable]
b) Approximately 270 [260–280 acceptable]
c) Approximately 850 [820–880 acceptable]
Approximately 550 [520–580 acceptable]

3 Multiples of 1,000

➜ pages 16–19

Discover

1. a) There are 4,000 lemon sweets.
There are 6,000 strawberry sweets.
b) There are 10,000 sweets altogether, 4,000 + 6,000.

Think together

1. a) 3,000 strawberry
b) 5,000 lemon
c) 3,000 + 5,000 = 8,000 altogether

2. a) 0 1,000 2,000 **3,000** **4,000** 5,000 **6,000** 7,000
b) **1,000** 2,000 **3,000** 4,000 **5,000**
c) 6,000 **7,000** 8,000 **9,000** **10,000**
d) 8,000 **7,000** 6,000 **5,000** **4,000** 3,000

3. a) 10 hundreds = 1,000
b) 100 tens = 1,000
c) 1000 ones = 1,000
d) 20 hundreds = 2,000
e) 200 tens = 2,000
f) 2000 ones = 2,000

4 4-digit numbers

➜ pages 20–23

Discover

1. a) Various answers are possible, such as 124, 245, 521. Any combination of three digits. Children should show their number using base 10 equipment in the correct order of 100s, 10s and 1s.
b) Various combinations are possible, with children adding the relevant number of 1,000s to their base 10 equipment.

Think together

1. Three thousand, four hundred and sixty-two
3,462
Four thousand, two hundred and fifty-six
4,256

2. Three thousand, two hundred and fifty
3 thousands, 2 hundreds, 5 tens
Three thousand, two hundred and five
3 thousands, 2 hundreds, 5 ones
Three thousand and twenty-five
3 thousands, 2 tens, 5 ones

3. All number must be four digits, so 0 cannot be in the thousands place. There are nine possible solutions: 1,022; 1,202; 1,220; 2,012; 2,021; 2,102; 2,120; 2,201; 2,210.

5 Partition 4-digit numbers

➜ pages 24–27

Discover

1. a) 4 Thods = 4,000 legs; 5 Hods = 500 legs; 3 Tods = 30 legs; 1 Od = 1 leg
b) 4,000 + 500 + 30 + 1 = 4,531 legs altogether

Think together

1. a) 2 thousands, 5 hundreds, 4 tens, 2 ones = 2,000 + 500 + 40 + 2

2. a) 100, 5
b) 3,275
c) 2,651
d) 200

3. a) **5**,000 **2**00 **1**0
5,000 **2**00 **1**
5,000 **7**0

b) 3,033
3,303
9,009
9,090
7,000 + 0 + 70 + 0
7,000 + 700 + 0 + 7

6 Partition 4-digit numbers flexibly

➜ pages 28–31

Discover

1. a) There are several ways to divide the parcels and letter into three sacks.
2 × 1,000 g + 200 g + (50 g + 5 g)
1,000 g + (1,000 g + 200 g) + (50 g + 5 g)
1,000 g + 1,000 g + (200 g + 50 g + 5 g)
b) The total mass is 2,255 g.

Think together

1. There are multiple ways to partition 3,225, including partitioning each digit. Examples:
3,000 + 225 2,100 + 1,125
3200 + 20 + 5 3,000 + 210 + 15

2. a) 1,435
b) 2,575
c) 2,236
d) 85
e) 14
f) 2,500

3. a) 5,075 5
5,705 5,000

b) 5,760
5,715
1,710
4,060

7 1, 10, 100, 1,000 more or less

➜ pages 32–35

Discover

1. a) Children should have 8 thousands, 9 hundreds, 8 tens and 0 ones.
b) One thousand more than 8,980 is 9,980: 9 thousands, 9 hundreds, 8 tens and 0 ones.

Think together

1 a) Children should now have 6 hundreds counters.
b) The grid should be back to the starting number.
c) Adding 100 then subtracting 100 returns it to the starting number.

2. a) 6,892
b) 7,792
c) 7,882
d) 7,891
e) 8,892
f) 7,992
g) 7,902
h) 7,893

3. a) 6,785
b) 8,103
c) 6,540

8 1,000s, 100s, 10s and 1s

➜ pages 36–39

Discover

1. a) Children should show 15 hundreds.
b) Children should show 1 thousands block and 5 hundreds.

Think together

1. 13 hundreds are equal to **1,300**.
29 hundreds are equal to **2,900**.

2. a) 25 hundreds = 2,500 2 thousands, 5 hundreds
b) 14 hundreds = 1,400 1 thousand, 4 hundreds

3. **25** × 100 g = 2,500 g
250 × 10 g = 2,500 g

End of unit check

➜ pages 40–41

1. D: 3,432

2. C: 5,050

3. B: 5,068

4. D 5,016

5. C: 1,600

6. 5,250

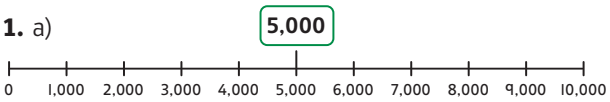
Unit 2 – Place value – 4-digit numbers (2)

1 Number line to 10,000

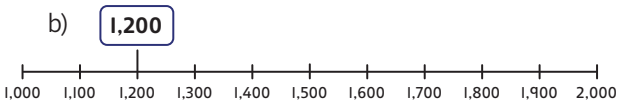
➜ pages 44–47

Discover

1. a)



b)



Think together

1. 3,500; 3,510; **3,520**; **3,530**; **3,540**; **3,550**; 3,560; **3,570**; 3,580; **3,590**; **3,600**

2. a) A: 2,490; B: 2,540; C: 2,610
b) D: 2,559; E: 2,561; F: 2,569

3. Danny will say: 2,000, 5,000, 10,000.

Reena will say: 1,200, 2,000, 2,100, 3,900, 4,500, 5,000, 10,000.

Max will say: 1,010, 1,200, 2,000, 2,010, 2,100, 3,290, 3,900, 4,500, 5,000, 9,990, 10,000.

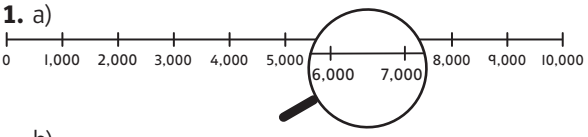
All three children will say Danny's numbers: 2,000, 5,000, 10,000.

2 Between two multiples

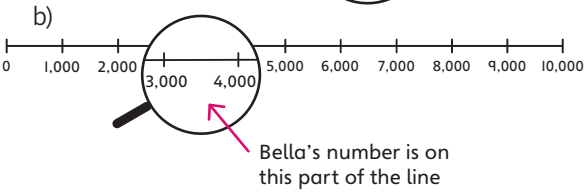
➜ pages 48–51

Discover

1. a)



b)



Think together

1. a) Any number from 7,001 to 7,999
b) Any number from 2,201 to 2,299
c) Any number from 1,781 to 1,789

2. a) Multiples of 100

Previous	Number	Next
1,500	1,511	**1,600**
2,700	2,778	**2,800**
3,900	3,964	**4,000**
0	26	**100**
800	889	**900**
2,500	2,501	**2,600**

b) Multiples of 10

Previous	Number	Next
1,510	1,511	**1,520**
2,770	2,778	**2,780**
3,960	3,964	**3,970**
20	26	**30**
880	889	**890**
2,500	2,501	**2,510**

3. a) 4,000 and 5,000
b) 4,900 and 5,000
c) 4,990 and 5,000

3 Estimate on a number line to 10,000

➜ pages 52–55

Discover

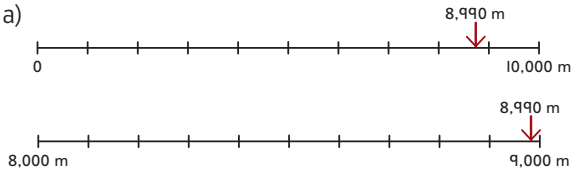
1. a) Sofia has run between **1,000** m and **1,100** m.
b) Approximately 1,070 m

Think together

1. a) 5,500
A: Any number from 5,001 to 5,549.
B: Any number from 5,501 to 5,599.
b) 6,450
A: Any number from 6,401 to 6,449.
B: Any number from 6,451 to 6,499.
c) 2,585
B: Any number from 2,581 to 2,584.
B: Any number from 2,586 to 2,589.

2. Approximately 3,200 m

3. a)



b) Answers will vary depending on the starting and ending values of the number lines, and the scale. However, it should be the case that:

3,001 is very close to 3,000.
5,900 is close to and before 6,000.
7,500 is half-way between 7,000 and 8,000.

4 Compare and order numbers to 10,000

➜ pages 56–59

Discover

1. a) Mo has scored the fewest points.
b) 8,645 > 8,632 > 8,052

Think together

1. **8,624** is greater than **8,426**.
8,624 > 8,426

2. a) 240 < 1,028 < 1,220 < 1,250
b) 1,250 > 1,220 > 1,028 > 240

3. Children should refer to the characters comments, so may suggest using a number line to compare the numbers. They may say that 3-digit numbers are always less than 4-digit numbers.

When comparing 4-digit numbers, compare the thousands digits first. If these are the same value, then compare the hundreds, then the tens digits and finally the ones digits.

When comparing numbers with the same number of digits, compare the first (highest value) digits first. The masses are simply 3- and 4-digit numbers so can be compared in the same way.

5 Round to the nearest 1,000

➜ pages 60–63

Discover

1. a) 5,275 is between **5**,000 and **6**,000.
b) On the number line 5,275 is closer to 5,000 than to 6,000.

Think together

1. 2,891 > 2,850 so rounds to 3,000.

2. a) 6,200 rounds to 6,000 to the nearest thousand.
6,000 7,000
b) 3,760 rounds to 4,000 to the nearest thousand.
3,000 4,000
c) 862 rounds to 1,000 to the nearest thousand.
0 1,000

3. 2,470 rounds down to 2,000.
2,883 rounds up to 3,000.
7,500 rounds up to 8,000.
3,782 rounds up to 4,000.
9,501 rounds up to 10,000.

6 Round to the nearest 100

➜ pages 64–67

Discover

1. a) 568 is between **5**00 and **6**00.
b) 568 rounds to 600.

Think together

1. 812 rounds down to 800.
880 rounds up to 900.
857 rounds up to 900.
808 rounds down to 800.
850 rounds up to 900.

2. a) Ends of number line are 4,500 and 4,600. 4,595 rounds up to 4,600.
b) Ends of number line are 2,300 and 2,400. 2,360 rounds up to 2,400.
c) Ends of number line are 1,000 and 1,100. 1,050 rounds up to 1,100.

3. List A

503 rounds down to 500
513 rounds down to 500
523 rounds down to 500
533 rounds down to 500
543 rounds down to 500
553 rounds up to 600
563 rounds up to 600
573 rounds up to 600
583 rounds up to 600
593 rounds up to 600

List B

2,402 rounds down to 2,400
2,412 rounds down to 2,400
2,422 rounds down to 2,400
2,432 rounds down to 2,400
2,442 rounds down to 2,400
2,452 rounds up to 2,500
2,462 rounds up to 2,500
2,472 rounds up to 2,500
2,482 rounds up to 2,500
2,492 rounds up to 2,500

List C

547 rounds down to 500
1,547 rounds down to 1,500
2,547 rounds down to 2,500
3,547 rounds down to 3,500
4,547 rounds down to 4,500
5,547 rounds down to 5,500
6,547 rounds down to 6,500
7,547 rounds down to 7,500
8,547 rounds down to 8,500
9,547 rounds down to 9,500

Lists A and B depend on the tens digits: 1, 2, 3 and 4 tens make the number round down and a tens digit 5 or above makes the number round up.

List C has the same hundreds, tens and ones (547), so they all round down to __,500 with only the thousand changed to match the original number.

7 Round to the nearest 10

➜ pages 68–71

Discover

1. a) 21, 22, 23 and 24 are closer to 20.
26, 27, 28 and 29 are closer to 30.
25 is midway between 20 and 30.
b) 21, 22, 23 and 24 round down to 20.
25, 26, 27, 28 and 29 round up to 30.

Think together

1. a) Ends of the number line are 30 and 40.
32 rounds down to 30.
b) Ends of the number line are 160 and 170.
167 rounds up to 170.
c) Ends of the number line are 1,270 and 1,280.
1,278 rounds up to 1,280.

2. 48 rounds up to **50**.
131 rounds down to **130**.
40 stays at **40**.
55, **56**, **57**, **58**, **59**, **60**, **61**, **62**, **63** and **64** round to 60.

3. Answers will vary. There are 12 two-digit number answers:
13 rounds down to 10, 15 and 17 round up to 20.
31 rounds down to 30, 35 and 37 round up to 400.
51 and 53 round down to 50, 57 rounds up to 60.
71 and 73 round down to 70, 75 rounds up to 80.

Answers will vary. There are 24 three-digit numbers:

Numbers with a ones digit of 1 or 3 round down, those with a ones digit of 5 or 7 round up.

Here are some possible answers:

135 and 137 round up to 140.
153 rounds down to 150.
157 rounds up to 160.
173 rounds down to 170.
175 round up to 180.

315 and 317 round up to 320.
351 rounds down to 350.
357 rounds up to 360.
371 rounds down to 370.
375 rounds up to 380.

513 rounds down to 510.
517 rounds up to 520.
531 rounds down to 530.
537 rounds up to 540.
571 and 573 round down to 570.

713 rounds down to 710.
715 rounds up to 720.
731 rounds down to 730.
735 rounds up to 740.
751 and 753 round down to 750.

Answers will vary. There are 24 four-digit numbers:

Numbers with a ones digit of 1 or 3 round down, those with a ones digit of 5 or 7 round up.

Here are some possible answers:

1,357 rounds up to 1,360.
1,375 rounds up to 1,380.
1,537 rounds up to 1,540.
1,573 rounds down to 1,570.
1,735 rounds up to 1,740.
1,753 rounds down to 1,750.

3,157 rounds up to 3,160.
3,175 rounds up to 3,180.
3,517 rounds up to 3,520.
3,571 rounds down to 3,570.
3,715 rounds up to 3,720.
3,751 rounds down to 3,750.

5,137 rounds up to 5,140.
5,173 rounds down to 5,170.
5,317 rounds up to 5,320.
5,371 rounds down to 5,370.
5,713 rounds down to 5,710.
5,731 rounds down to 5,730.

7,135 rounds up to 7,140.
7,153 rounds down to 7,150.
7,315 rounds up to 7,320.
7,351 rounds down to 7,350.
7,513 rounds down to 7,510.
7,531 rounds down to 7,530.

8 Round to the nearest 1,000, 100 or 10

➜ pages 72–75

Discover

1. a) The arrow should be half-way between 5,000 g and the previous interval marker.
b) 4,949 rounds up to 5,000.
4,949 rounds down to 4,900.
4,949 rounds up to 4,950.

Think together

1. 3,511 rounds to 3,510 (nearest 10), 3,500 (nearest 100) and 4,000 (nearest 1,000).

2. **1,500** is the smallest number to round (up) to 2,000.
2,499 is the largest number to round (down) to 2,000.

3. Drawing a number line can be helpful but is time consuming and a different line is needed, depending on what the number is being rounded to.

The previous and next multiples is a good method for all rounding, as long as children can work out which previous and next multiples are appropriate for the rounding required.

Looking at the digits is a good method for all rounding as long as children know which digit to look at. Looking at the hundreds digit is only appropriate for rounding to the nearest 1,000. For rounding to the nearest 100, look at the tens digit and for rounding to the nearest 10, look at the ones digit.

End of unit check

➜ pages 76–77

1. D

2. D

3. D

4. A: (6,433) < (6,533)

5. B: 98 g

6. 858 rounds to 860 (nearest 10); 900 (nearest 100); 1,000 (nearest 1,000).

2,605 rounds to 2,610 (nearest 10); 2,600 (nearest 100); 3,000 (nearest 1,000).

Unit 3 – Addition and subtraction

1 Add and subtract 1s, 10s, 100s, 1,000s

➜ pages 80–83

Discover

1. a) 4 × 1,000; 2 × 100; 5 × 10; 6 × 1 place value counters
b) 4,256 + 3 = 4,259
4,256 + 30 = 4,286
4,256 + 300 = 4,556
4,256 + 3,000 = 7,256

Think together

1. a) 7,646 – 4 = **7,642**
b) 7,646 – 40 = **7,606**
c) 7,646 – 400 = **7,246**
d) 7,646 – 4,000 = **3,646**

2. a) 8,888 – 500 = **8,388**
b) 8,888 – **5** = 8,883
c) **3,888** = 8,888 – 5,000
d) 8,838 = 8,888 – **50**

3. a) Max's new score will be 6,869.
b) There are many solutions for this question, as long as the star and the bubble lead to a score increase of 10. Examples include: a –10 star, then a +20 bubble, a –20 star, then a +30 bubble, and so on.

2 Add two 4-digit numbers

➜ pages 84–87

Discover

1. a) 4,523: 4 × 1,000; 5 × 100; 2 × 10; 3 × 1 place value counters
3,431: 3 × 1,000; 4 × 100; 3 × 10; 1 × 1 place value counters
b) 4,523 + 3,431 = 7,954
The total mass is 7,954 g.

Think together

1. 5,548 kg

2. Kate has lined up the 3 hundreds under the thousands column, then the tens and ones under the hundreds and tens columns.
4,521 + 346 = 4,867

3. The mass of the second suitcase is **4,325 kg**.

3 Add two 4-digit numbers – one exchange

➜ pages 80–91

Discover

1. a) 1,554: 1 × 1,000; 5 × 100; 5 × 10; 4 × 1 place value counters
4,237: 4 × 1,000; 2 × 100; 3 × 10; 7 × 1 place value counters
b) The plane will fly 5,791 miles in total.

Think together

1. 6,945 miles

2. Various totals are possible, depending on the number chosen. To affect a change only in the hundreds column, the thousands digit must be < 7, the hundreds digit can be 8 or 9, the tens digit can be any digit 0–9 and the ones digit must be < 9. So an example is 3,828 giving a total of 7,029.

3. a) 2,341 + 1,593 = 3,934 exchange 10 tens
1,010 + 2,549 = 3,559 no exchange needed
7,699 = 6,917 + 782 exchange 10 hundreds
2,010 = 2,001 + 9 exchange 10 ones
b) Check that the children's story problems are appropriate and correct.

4 Add with more than one exchange

➜ pages 92–95

Discover

1. a) The total cost of the sports car and the vintage car is £5,574.
b) The total cost of the motorbike, the van and the vintage car is £3,783.

Think together

1. £2,684 in total.

2. The caravan costs £2,874.
The caravan and motorbike cost £3,973.

3. a) 1,259 + 741 = 2,000
633 + 2,367 = 3,000
4,061 + 939 = 5,000
188 + 8,812 = 9,000
b) 2,716 + **284** = 3,000
9,528 + **472** = 10,000
2,104 + **7,896** = 10,000

5 Subtract two 4-digit numbers

➜ pages 96–99

Discover

1. a) Bar model as in **Share** showing 5,432 as the whole and 1,312 and unknown number as the parts.
b) 5,432 – 1,312 = **4,120**
The Decimal Pointers got **4,120** votes.

Think together

1. Scissor Squares got 2,204 votes.

2. 5,465 – **264** = 5,201

3. 9,876 – 5,432 = **4,444**
9,999 – 7,654 = 2,345
7,890 – 450 = 7,440
7,654 – 4,321 = 3,333 could be drawn as a bar model, a number line or a part-whole model.

6 Subtract two 4-digit numbers – one exchange

➜ pages 100–103

Discover

1. a) Aki has subtracted 2 from 3 instead of 3 from 2 in the hundreds column.
b) 1,250 – 320 = 930. Aki will have 930 ml of orange juice left.

Think together

1. Aki spilled 1,125 ml of mango juice.

2. Lee scored 550 more points than Mo.

3. 3,253 – 2,1**2**6 = 1,12**7**
6,729 – **3,396** = 3,333
4,236 – 2,**7**2**3** = 1,5**1**3
8,565 – 2,127 = 6,438

7 Subtract two 4-digit numbers – more than one exchange

➜ pages 104–107

Discover

1. a) Jen needs to make two exchanges (in the hundreds and ones columns).
b) 1,450 – 849 = 601
Jen has £601 left.

Think together

1. £2,450 – £1,295 = £1,155

2. £2,450 – £1,880 = £570

3. a) £1,295 – £199 = £1,096
Astrid is not correct. Astrid will also have to exchange the tens after one of the tens has been exchanged for 10 ones.
b) Answers will vary. Calculations should involve at least two of: an exchange of a 10 for 1s, an exchange of a 100 for 10s or an exchange of 1,000 for 100s.

8 Exchange across two columns

➜ pages 108–111

Discover

1. a) Bella wants to exchange a ten for 10 ones, but she cannot because 2,502 doesn't have any 10s. She will need to exchange a hundred for 10 tens first.
b) 2,502 – 243 = 2,259
See **Share** for the column method using exchanging.

Think together

1. a) 2,032 – 512 = **1,520**
b) 5,403 – 505 = **4,898**

2. 3,304 – 1,269 = **2,035**
Zac has forgotten to replace the 3 in the hundreds column with a 2 to show that he has exchanged 1 hundred for 10 tens.

3. Children may only predict the obvious exchanges each time but some may be hidden until the subtractions are completed.
1 thousand for 10 hundreds and 1 ten for 10 ones: 2,126 = 5,055 – 2,929
1 thousand for 10 hundreds, 1 hundred for 10 tens and 1 ten for 10 ones: 2,576 = 5,505 – 2,929
1 thousand for 10 hundreds, 1 hundred for 10 tens and 1 ten for 10 ones: 2,076 = 5,005 – 2,929
1 thousand for 10 hundreds and 1 hundred for 10 tens: 2,480 = 5,005 – 2,525

9 Efficient methods

➜ pages 112–115

Discover

1. a) 1,999 + 575 = 2,516
1,517 – 999 = 518
b) 999 is very near to 1,000, so adding or subtracting 1,000 and adjusting by the extra 1 is an efficient mental method.

Think together

1. a) 1,999 + 575 = 2,574

Methods could include the column method or the compensation method, i.e. 1,999 + 575 = 2,000 + 575 – 1 = 2,575 – 1 = 2,574.

Alternatively, children may reason that since 575 = 1 + 574, so 1,999 + 575 = 1,999 + 1 + 574 = 2,574.

b) Various answers are possible but the calculations should involve numbers one less than a multiple of a hundred or a thousand, such as 3,999 or 299.

2. 5,207 + 9 = 5,216
5,207 + 99 = 5,306
5,207 + 999 = 6,206
5,207 – 9 = 5,198
5,207 – 99 = 5,108
5,207 – 999 = 4,208

3. a) 2,001 – 1,998 = 3
2,001 – 5 = 1,996

b) 2,991 – 2 = 2,989
2,001 – 9 = 1,992
1,001 – 999 = 2

I0 Equivalent difference

➜ pages 116–119

Discover

1. a) The difference between their ages will always be the same.

b) The difference between their ages will always be 88 years.

Think together

1. 198 – 79 = 119
199 – 80 = 119
200 – 81 = 119

The difference is 119 years.

2. 125 – 97 = 28
126 – 98 = 28
127 – 99 = 28
128 – 100 = 28
129 – 101 = 28

The whale is 28 years younger than the giant tortoise.

3. a) 1,000 – 245 = 755
Adjusting the numbers could be more efficient as it involves no exchanges in the column subtraction, but using number bonds is even more efficient.

b) 1,000 – 542 = 458 using number bonds or 999 – 541 = 458.
2,692 – 836 = 1,856 column method
2,001 – 265 = 1,736 or 2,000 – 264 = 1,736
1,897 – 999 = 898 or 1,897 – 1,000 + 1 = 898

I1 Estimate answers

➜ pages 120–123

Discover

1. a) 1,898 is closer to 2,000 than 1,000. A better estimate would be 2,000 + 3,000 = 5,000.

b) The exact answer is 4,914 tickets. 4,914 rounds to 5,000. 5,000 is a better estimate than 4,000.

Think together

1. 6,149 rounds to **6**,000 to the nearest 1,000.
912 rounds to **1**,000 to the nearest 1,000.
Approximately **6,000** – **1,000** = **5,000** people stayed.

2. a) 3,000 + 4,000 = 7,000 10,000 + 3,000 = 13,000
b) 2,800 + 3,900 = 6,700 9,800 + 2,800 = 12,600
c) 2,794 + 3,911 = 6,705 9,811 + 2,788 = 12,599

Rounding to the nearest 100 is much more accurate but more difficult to work out mentally.

3. a) and b) 5,602 – 2,975 = 2,627
Children should notice that Isla's method is more accurate because it is nearer to the actual answer. Although Isla has only rounded one of the numbers, her estimate is better because when you round 5,602 to the nearest thousand, you lose quite a lot of accuracy.

c) An estimate (such as the one Isla made) would have helped Max to find out whether his answer was close to the correct one.

I2 Check strategies

➜ pages 124–127

Discover

1. a) A subtraction can be checked by using the inverse operation, addition. 799 + 574 = 1,373, so her calculation is incorrect.

b) There are 426 km left to travel.
1,225 – 799 or 1,226 – 800.

Think together

1. 3,288 + 3,707 = 6,995

The parts do match the whole.
The calculation is correct.

2. a) 5,391 – 3,401 = 1,990
5,391 – 199 = 5,192 so not correct.
3,401 + 199 = 3,600 is correct.

b) 8,569 + 440 = 9,009 or 9,009 – 8,569 = 440.
The calculation 9,009 – 440 = 8,569 is correct.

3. Look for accurately drawn part-whole models or bar models showing:
1,090 + 1,910 = 3,000 4,000 – 2,750 = 1,250
2,550 = 700 + 1,850 2,750 – 750 = 2,000

I3 Problem solving – one step

➜ pages 128–131

Discover

1. a) This can be shown by a part-whole model or a bar model.

b) You need to subtract to find the missing part and calculate the answer: 5,762 – 2,899 = 2,863.

There were **2,863** Yes votes. No got more votes because 2,899 > 2,863.

Think together

1. 4,782 people voted.

2. The calculation needs to be the subtraction 9,923 – 7,812.

Jamilla's bar model shows an addition.
Max's bar model is correct, showing the required subtraction, but the bars should not be of equal length. Estimating shows that the 'too young' part should represent about 2,000 so should be considerably shorter.
9,923 – 7,812 = 2,111
2,111 people are too young to vote.

3. 6,000 – 2,999 = 3,001
6,000 – 3,001 = 2,999
2,999 + 3,001 = 6,000
3,001 + 2,999 = 6,000

4. Look for accurately drawn bar models, with parts and whole of appropriate sizes. Children should notice that only two models are needed, showing:

2,674 – 199 = 2,475 and 199 + 2,475 = 2,674
2,475 – 199 = 2,276 and 199 = 2,475 – 2,276

I4 Problem solving – comparison

➜ pages 132–135

Discover

1. a) A single bar model or comparison bar model where the part representing 1,005 (Luis) is noticeably longer than the part representing 899 (Danny).

Look for children who identify that the comparison bar model is a better way to represent this problem.

b) 1,005 – 899 = 106
Luis has **106** more points than Danny.

Think together

1. Amelia has 372 more points than Jack.

2. Isla has 1,850 points.

3. a) Single bar model showing 5,250 + 100 = **5,350**.

b) Single bar model showing 5,250 + 750 = **6,000**.

c) Comparison bar model showing 5,250 – 750 = 4,500.

d) Comparison bar model showing any two numbers with a difference of 2,000.

I5 Problem solving – two steps

➜ pages 136–139

Discover

1. a) Olivia will need to run 550 m to complete the race.
2,500 – 1,200 = 1,300, 1,300 – 750 = 550 or
2,500 – 1,950 = 550

b) Check by adding:
1,200 + 750 = 1,950
1,950 + 550 = 2,500

Think together

1. a) 2,000 m

b) 2,475 m in total.

2. 1,450 people watched the long jump.

3. Alex ran 250 m, so Emma ran 250 + 1,000 = 1,250 m.
Check by adding: 250 + 1,250 = 1,500.

I6 Problem solving – multi-step problems

➜ pages 140–143

Discover

1. a) Jen could draw a bar model, a number line or a part-whole model.

b) 2,450 + 1,500 = 3,950
5,275 – 3,950 = 1,325
1,500 > 1,325
So Jen is closer to Camp 2.

Think together

1. Bar model A shows the problem.
1,245 – 385 = 860
1,245 + 860 = 2,105

Amal has climbed 2,105 m in total.

2. A bar model or part-whole with 4 parts to show 6,895 – 1,812 – 1,259 – 2,248 = 1,576.
Jen climbed down **1,576 m** on day 3.

3. Mount Fuji is **3,780 m** tall.

Work out the height of Mont Blanc first.
Mont Blanc is 4,810 m (1,344 + 3,466).
Mount Fuji is 4,810 – 1,030 = 3,780 m.

End of unit check

➜ pages 144–145

1. C

2. D

3. B

4. B

5. A or D

6. £3,800 in total.
2,500 – 1,200 = 1,300
2,500 + 1,300 = 3,800

Unit 4 – Measure – area

I What is area?

➜ pages 148–151

Discover

1. a) The mat on the right has more space for the cats, because it has a bigger area.
b) Ensure children have used counters to fill up the two mats. There should be more counters on the mat on the right-hand side.

Think together

1. The answer will depend on the size of the counters used.

2. The answer will depend on the size of the counters used.

3. The plastic squares are smaller than the counters. Areas cannot be compared if the unit of measure is not the same.

2 Measure area using squares

➜ pages 152–155

Discover

1. a) The area of Shape A is 9 squares (units).
The area of Shape B is 2 squares (units).
b) Children should draw a shape with an area of between 2 and 9 squares.

Think together

1. The area of shape A is 5 squares.
The area of shape B is 4 squares.
The area of shape C is 6 squares.

2. A: 4 squares; B: 5 squares; C: 7 squares

3. Various answers are possible. Explanations might mention that the paper squares have not been lined up correctly, there are gaps between them and they do not cover all of the space inside the shape.

3 Count squares

➜ pages 156–159

Discover

1. a) The area of Kate's bed is 10 squares.
The area of Aki's bed is 12 squares.
b) Kate has 26 squares of empty space.
Aki has 23 squares of empty space.

Think together

1. A = 20 squares; B = 18 squares; C = 18 squares

2. A = 30 squares; B = 30 squares

3. The area of this shape is 40 squares.

4 Make shapes

➜ pages 160–163

Discover

1. a) Various shapes are possible. Ensure children have drawn a rectilinear shape with 4 squares.
b) Various shapes are possible. Ensure children have drawn a rectilinear shape with 5 squares.

Think together

1. Various shapes are possible. Ensure children have drawn a shape with an area of 8 squares.

2. The square is 5 × 5 squares. A rectangle of 24 squares can have dimensions: 12 × 2, 8 × 3, 6 × 4 or 1 × 24.

3. C is the only shape that is both rectilinear and has an area of 8 squares.

5 Compare area

➜ pages 164–1671

Discover

1. a) 17 > 16, so Olivia is winning the game.
b) The total area of the board is:
10 × 10 = 100 squares.
100 – (17 + 16) = 100 – 33 = 67
The area of the board that is not covered is larger because 67 > 33.

Think together

1. A = 18 squares and B = 19 squares, so B has the larger area.

2. a) g = 22 squares; s = 21 squares; t = 17 squares.
c) Smallest to largest area is: t, s, g.

3. Astrid's shape has 18 squares and Flo's shape has 20 squares, so Flo is the winner. Children should mention that the only way to compare areas is to count the number of squares and then compare these numbers.

End of unit check

➜ pages 168–169

1. C: Area is the space inside a shape.

2. D: 14 squares

3. B: Area is 5 × 7 = 35 squares.

4. B: 14 squares is the largest area.

5. B: 2 × 4 = 8

6. The area of the shaded shape is 36 squares.
Total area = 9 × 5 = 45 squares. White centre area is 3 × 3 = 9 squares, 45 – 9 = 36.

Unit 5 – Multiplication and division (I)

1 Multiples of 3

➜ pages 172–175

Discover

1. a) 12 is 4 groups of 3, or 3 groups of 4.
b) 3 × 4 = 12
4 × 3 = 12
12 ÷ 3 = 4
12 ÷ 4 = 3

Think together

1. Children use the arrowed number line to count in 3s: 0, 3, 6, 9, 12, 15, 18, 21, 24, 27.

2. 3 × 7 = 21 7 × 3 = 21 21 ÷ 3 = 7 21 ÷ 7 = 3

3. a) There are 20 cubes. The children can make 6 towers with 2 cubes left over; they cannot use all the cubes to make towers of 3.
b) 13 and 23 are not multiples of 3.

2 Multiply and divide by 6

➜ pages 176–179

Discover

1. a) 7 × 6 = 42
There are 42 eggs in total in the boxes.
b) 30 ÷ 6 = 5
The eggs in the tray will fill 5 egg boxes.

Think together

1. 6 + 6 + 6 + 6 + 6 + 6 + 6 + 6 = 48
8 × 6 = 48
There are 48 eggs in total.

2. a) 4 × 6 = 24
b) 36 ÷ 6 = 6

3. a) 3 baskets of 18 apples.
Each basket has 18 apples arranged as a 3 × 6 array.
3 lots of 3 × 6 arrays is the same as a 9 × 6 array.
So the answer is: 9 × 6 = 54.
b) There would be 72 apples in 4 baskets of apples.

3 6 times-table and division facts

➜ pages 180–183

Discover

1. a) 0 × 6 = 0
1 × 6 = 6
2 × 6 = 12
3 × 6 = 18
4 × 6 = 24
5 × 6 = 30
6 × 6 = 36
7 × 6 = 42
8 × 6 = 48
9 × 6 = 54
10 × 6 = 60
11 × 6 = 66
12 × 6 = 72
b) The division fact is 42 ÷ 6 = 7.

Think together

1. 10 × 6 = 60, 6 × 10 = 60
There are 60 pencil in total.

2. a) 2 × 6 = 12, 6 × 2 = 12; 12 ÷ 2 = 6, 12 ÷ 6 = 2
b) 4 × 6 = 24, 6 × 4 = 24; 24 ÷ 4 = 6, 24 ÷ 6 = 4

3. a) 3 × 5 = 15, 3 × 6 = 18
The red counters show 5 columns of 3 (5 × 3 = 15) plus an extra 3 blue counters, so 15 + 3 = 18.
b) You can multiply by 5 and then add on one more lot of the number you are multiplying by. For example, **4** × 5 = 20, **4** × 5 + **4** = 24 = **4** × 6.

4 Multiply and divide by 9

➜ pages 184–187

Discover

1. a) A cube has 6 faces. There are 9 squares on each face (3 × 3).
b) 9 + 9 + 9 + 9 + 9 + 9 = 54
6 × 9 = 54
There are 54 coloured squares in total.

Think together

1. Count in multiples of 9: 0, 9, 18, 27, 36, 45, 54, 63, 72, 81, 90, 99, 108

2. a) Aki spends £45.
b) Ambika can buy 3 boxes with £27.

3. a) 3 × 10 = 30; 3 × 9 = 27
b) 5 × 10 = 50; 5 × 9 = 45
7 × 10 = 70; 7 × 9 = 63
c) The answer to the second part of each question is one lot of the number (3, 5 or 7) less than the answer to the first part of each question.
3 × 9 is **3** less than **3** × 10
5 × 9 is **5** less than **5** × 10
7 × 9 is **7** less than **7** × 10

4. a) 144, 279 and 522 can be divided by 9.
b) Any 3-digit number where the digits add to 9 or a multiple of 9. For example 999, 360 or 459.

5 9 times-table and division facts

→ pages 188–191

Discover

1. a) Each game has 9 turns. There are 4 games.
4 × 9 = 36. They have had 36 turns in total.
b) 63 ÷ 9 = 7. They have played 7 games.

Think together

1. 5 × 9 = 45 and 9 × 5 = 45
45 ÷ 9 = 5 and 45 ÷ 5 = 9

2. a) 0 × 0 = 0
b) 11 × 9 = 99
c) 63 ÷ 9 = 7
d) 1 × 9 = 9
e) 12 × 9 = 108
f) 54 ÷ 9 = 6
g) 5 × 9 = 45
h) 36 ÷ 9 = 4
i) 8 × 9 = 72
j) 18 ÷ 9 = 2

3. a) 6 × 9 = 54; 7 × 9 = 63; 8 × 9 = 72

b)
1 × 10 = 10
10 – 1 = 9
1 × 9 = 9

2 × 10 = 20
20 – 2 = 18
2 × 9 =18

3 × 10 = 30
30 – 3 = 27
3 × 9 = 27

4 × 10 = 40
40 – 4 = 36
4 × 9 = 36

5 × 10 = 50
50 – 5 = 45
5 × 9 = 45

6 × 10 = 60
60 – 6 = 54
6 × 9 = 54

7 × 10 = 70
70 – 7 = 63
7 × 9 = 63

8 × 10 = 80
80 – 8 = 72
8 × 9 = 72

9 × 10 = 90
90 – 9 = 81
9 × 9 = 81

10 × 10 = 100
100 – 10 = 90
10 × 9 = 90

11 × 10 = 110
110 – 11 = 99
11 × 9 = 99

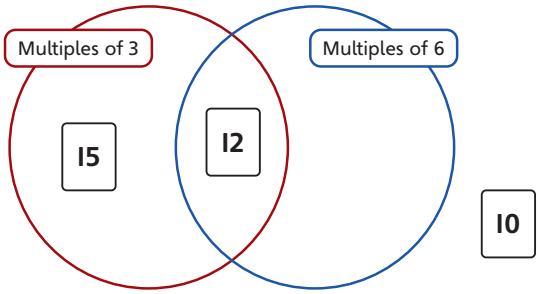
12 × 10 = 120
120 – 12 = 108
12 × 9 = 108

6 The 3, 6 and 9 times-tables

→ pages 192–195

Discover

1. a) 15 is a multiple of 3, but not of 6.
12 is a multiple of both 3 and 6.
10 is not a multiple of 3 or 6.



b) The large section of the blue circle remains empty.
All multiples of 6 are also multiples of 3.

Think together

1.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Multiples of 3 are shaded. All the multiples of 6 are also multiples of 3.

All the multiples of 9 are also multiples of 3. The even multiples of 9 are also multiples of 6

2. A multiple of 3 is odd: sometimes true.
A multiple of 3 is a multiple of 6: sometimes true.
A multiple of 6 is a multiple of 9: sometimes true.
All statements are sometimes true.

3. a) A multiple of 3 is any square where at least one of the digits is 3, 6 or 9. A multiple of 6 is a square where one of the digits is 6. A multiple of 9 is a square where one of the digits is 9.
b) Answers will vary from child to child.

7 Multiply and divide by 7

→ pages 196–199

Discover

1. a) The painting is called 7s because the circles are in groups of 7s. There are also 7 groups of 7 circles.
There are 35 dotted circles. There are 14 black circles. There are 49 circles in total.
b) 28 ÷ 7 = 4
There are 4 groups of 7 circles.

Think together

1. Children count in multiples of 7: 0, 7, 14, 21, 28, 35, 42, 49, 56, 63, 70.

2. a) 6 × 7 days = 42; Alex spends £42.
b) 56 ÷ 7 = 8; Zac can buy 8 hats.

3. Lexi: 6 weeks = 6 × 7 days = 42 days
6 weeks is longer than 40 days.
Mr Jones: 4 weeks = 4 × 7 days = 28 days
5 weeks = 5 × 7 days = 35 days
There are more than 4 weeks in September, but fewer than 5 weeks.

8 7 times-table and division facts

→ pages 200–203

Discover

1. a) 0 × 7 = 0. The 0 × 7 key opens the 0 chest.
4 × 7 = 28. The 4 × 7 key opens the 28 chest.
8 × 7 = 56. The 8 × 7 key opens the 56 chest.

b) The other keys needed are:
11 × 7, 1 × 7, 6 × 7, 2 × 7, 10 × 7 and 9 × 7.

Think together

1. 6 × 7 = 42, 7 × 6 = 42

2. a) 5 × 7 = 35, 7 × 5 = 35
35 ÷ 7 = 5, 35 ÷ 5 = 7

b) 12 × 7 = 84, 7 × 12 = 84
84 ÷ 7 = 12, 84 ÷ 12 = 7

3. a) 5 × 3 = 15
2 × 3 = 6
7 × 3 = 21

b)

1 × 7 = 7	5 × 7 = 35	9 × 7 = 63
2 × 7 =14	6 × 7 = 42	10 × 7 = 70
3 × 7 = 21	7 × 7 = 49	11 × 7 = 77
4 × 7= 28	8 × 7 = 56	12 × 7 = 84

9 11 and 12 times-tables and division facts

→ pages 204–207

Discover

1. a) Max made 3 × 11 = 33, as 3 lots of 10 + 3 lots of 1.
Alex made 3 × 12 = 36, as 3 lots of 10 + 3 lots of 2.

b) Children count in multiples of 11: 0, 11, 22, 33, 44, 55, 66, 77, 88, 99, 110, 121, 132.
Children count in multiples of 12: 0, 12, 24, 36, 48, 60, 72, 84, 96, 108, 120, 132, 144.

Think together

1. 7 × 11 = 77

2. 4 × 12 = 48, 12 × 4 = 48

3. a) Olivia multiplied 7 × 10 = 70, and 7 × 2 = 14.
She then added the two together: 70 + 14 = 84.
This is the same as 7 × 12 = 84.

b) Children may show their working in a variety of ways. They may just know the fact, or partition it to work it out, or look back at the number line in **Share**. One option for the solutions is as follows:

4 × 12 = 2 × 12 + 2 × 12 = 24 + 24 = 48
9 × 12 = 3 × 12 + 6 × 12 = 36 + 72 = 108
60 ÷ 12 = 5
11 × 12 = 10 × 12 + 1 × 12 = 120 + 12 = 132
84 ÷ 12 = 7
144 ÷ 12 = 12

10 Multiply by 1 and 0

→ pages 208–211

Discover

1. a) There are 3 groups of 2.
3 × 2 = 6
Jamilla has 6 tarts.

There are 3 groups of 1.
3 × 1 = 3
Mo has 3 tarts.

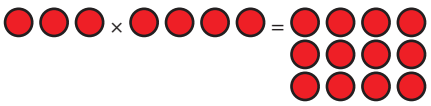
There are 3 groups of 0. 3
3 × 0 = 0
Emma has 0 tarts.

b) Mo said, '3 × 1 = 4.'
Mo added instead of multiplying.
3 × 1 = 3

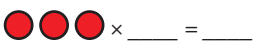
Emma said, '3 × 0 = 3.'
Emma thinks that multiplying by 0 is the same as multiplying by 1.
3 × 0 = 0

Think together

1. a) 5 × 1 = 5
b) 5 × 0 = 0

2. a) 

b): 

c):  × ____ = ____

d): 

3. a) 5 × 1 = **5**, **6** = 6 × 1, **10** = 10 × 1
1 × 15 = **15**, **17** × 1 = 17, 1 × **183** = 183

Mo notices that when you multiply a number by 1, it does not change in value.

b) 5 × 0 = **0** 6 × 0 = **0** **0** = 10 × 0
0 × 15 = **0** 17 × **0** = 0 **0** × 183 = 0

Emma notices that when you multiply a number by 0, the answer is always 0.

11 Divide by 1 and itself

→ pages 212–215

Discover

1. a) Ted: There are 5 bags of hay. There is 1 horse.
5 ÷ 1 = 5. Ted has 5 bags of hay.

Baz: There are 3 bags of hay. There is 1 horse.
3 ÷ 1 = 3. Baz has 3 bags of hay.

Rose: There are 8 bags of hay. There is 1 horse.
8 ÷ 1 = 8. Rose has 5 bags of hay.

b) Jo's horses: There are 4 bags of hay. There are 4 horses.
4 ÷ 4 = 1. Each horse will get 1 bag of hay.

Think together

1. 10 × 1 = **10** 10 ÷ 1 = **10**
1 × 10 = **10** 10 ÷ 10 = **1**

2. a) 5 × 1 = **5** 1 × 5 = **5**
5 ÷ 1 = **5** 5 ÷ 5 = **1**

b) 3 × 1 = **3** 1 × 3 = **3**
3 ÷ 1 = **3** 3 ÷ 3 = **1**

3. a) 4 ÷ 1 = 4 4 ÷ 4 = 1
5 ÷ 1 = 5 5 ÷ 5 = 1
7 ÷ 1 = 7 7 ÷ 7 = 1
10 ÷ 1 = 10 10 ÷ 10 = 1
15 ÷ 1 = 15 15 ÷ 15 = 1
32 ÷ 1 = 32 32 ÷ 32 = 1
142 ÷ 1 = 142 142 ÷ 142 = 1

b) When a number is divided by 1, its value stays the same.

When a number is divided by itself, the answer is always 1.

I2 Multiply three numbers

➜ pages 216–219

Discover

1. a) 5 × 2 = 10 or 2 × 5 = 10
There are 10 stickers on one sheet.
b) **5 × 2** × 3 = 30 or 2 × **5 × 3** = 30
There are 30 stickers, in total, on the teacher's desk.

Think together

1. 5 × **2** × **6** = **60** or **2** × **5** × 6 = 60
10 × 6 = 60
There are 60 stickers on 6 sheets.

2. a) 3 × 6 × 2 = 36
There are 36 doughnuts in 2 boxes.

b) 3 × 6 × 5 = 90
There are 90 doughnuts in 5 boxes.

3. a) Isla's method is more efficient as multiplying by 10 is easier than multiplying 18 by 5.
b) Answers may depend on children's knowledge of multiplication facts. Some children may realise that the first and third number can be multiplied together first

7 × 6 = 42, 42 × 2 = 84
4 × 5 = 20, 20 × 3 = 60
9 × 8 = 72, 72 × 2 = 144

End of unit check

➜ pages 220–221

1. D: 5

2. B: 1

3. A: 6 × 6

4. C: 84 km

5. D: 60

6. There are **8** marbles in each bag.

7. The mass of one of the bigger weights is **3** kg.