Unit 8: Subtraction within 20

Subtracting ones

➜ pages 26–28

1. 15 – 4 = 11. There are 11 glasses left.

2. 18 – 5 = 13. There are 13 bananas left.

3. a) 17 – 3 = 14
b) 18 – 8 = 10
c) 15 – 3 = 12
d) 20 – 7 = 13

4. a) 9 – 5 = 4, 19 – 5 = 14
b) 6 – 4 = 2, 16 – 4 = 12
c) 5 – 0 = 5, 15 – 0 = 15
d) 17 – 5 = 12, 18 – 7 = 11

5. triangle = 17, heart = 7, rhombus = 10

Reflect

There are 4 possible answers:

9 – 3 = 6 and 19 – 3 = 16

8 – 2 = 6 and 18 – 2 = 16

7 – 1 = 6 and 17 – 1 = 16

6 – 0 = 6 and 16 – 0 = 16

Children could have explained how they used the first number sentence to work out the second one in different ways, e.g.

I added 10 to the first number so the answer is 10 greater.

16 is 10 + 6. The digit 1 has already been written into the box to show 1 ten, so the ones digits have to have a difference of 6. This means I can use the same digits that are in the first number sentence.

Subtracting tens and ones

➜ pages 29–31

1. 16 – 10 = 6, 6 – 4 = 2. So 16 – 14 = 2. There are 2 sticks left.

2. a) 17 – 10 = 7, 7 – 2 = 5 (alternatively, some children might have subtracted 2 then 10). So 17 – 12 = 5.
b) Part-whole diagram: 10, 1 (parts)
19 – 10 = 9, 9 – 1 = 8 (alternatively, some children might have subtracted 1 then 10). So 19 – 11 = 8.

3. a) 7 – 6 = 1, 17 – 6 = 11, 17 – 16 = 1
b) 9 – 5 = 4, 19 – 15 = 4, 19 – 5 = 14

4. Children should have completed the number facts and matched them as follows:
18 – 3 ➜ 15
18 – 13 ➜ 5
19 – 14 ➜ 5
16 – 1 ➜ 15

5. There are two possible answers. The card could be 18 or 12.

Reflect

17 – 13 = 4

Children could have described different methods, e.g.

I subtracted 10 to give 7 and then another 4 to give 3.

17 – 3 = 14, 14 – 10 = 4 so 17 – 13 = 4.

I used a number line to find the difference.

Subtraction – crossing the 10 (I)

➜ pages 32–34

1. 13 – 3 = 10, 10 – 2 = 8. So 13 – 5 = 8.

2. 12 – 2 = 10, 10 – 6 = 4. So 12 – 8 = 4.

3. a) 15 – 5 = 10, 10 – 4 = 6. So 15 – 9 = 6.
b) Part-whole diagram: 1 and 5 (parts)
11 – 1 = 10, 10 – 5 = 5. So 11 – 6 = 5.
c) 17 – 8 = 9
d) 13 – 6 = 7

4. Raz gave away 9 balls.

5. a) 14 – 8 = 6
b) 17 – 8 = 9

Reflect

Children might have given different advice to Harry, e.g.

It will be quicker if you start by subtracting 3 to get an answer of 10. You need to subtract 3 more so the answer will be 7.

Try to use number bonds you know. If you partition 6 into 3 and 3, this gives 13 – 3 = 10. You can then use bonds to 10 to work out the next step (10 – 3 = 7).

Use a number line to help.

Subtraction – crossing the 10 (2)

➜ pages 35–37

1. 15 – 5 = 10, 10 – 2 = 8. So 15 – 7 = 8.

2. Part-whole diagram: 4 and 1 (parts)

14 – 4 = 10, 10 – 1 = 9. So 14 – 5 = 9.

3. a) Part-whole diagram: 9 (whole), 7 and 2 (parts)
Number line: jump back 7 from 17 to 10, and then jump back 2 from 10 to 8.
17 – 7 = 10, 10 – 2 = 8. So 17 – 9 = 8.
b) Part-whole diagram: 8 (whole), 1 and 7 (parts)
Number line: jump back 1 from 11 to 10, and then jump back 7 from 10 to 3.
11 – 1 = 10, 10 – 7 = 3. So 11 – 8 = 3.
c) 16 – 8 = 8
d) 11 – 7 = 4

4. 13 – 8

5. a) 20 – 6 = 14
b) 20 – 2 = 18
c) 20 – 12 = 8
d) 10 = 20 – 10
e) 20 – 0 = 20
f) 20 – 7 = 13

Reflect

Children should have worked out the answers to the four calculations and then matched calculations that give the same answer, i.e.

15 – 2 = 13 matched to 20 – 7 = 13

17 – 12 = 5 matched to 12 – 7 = 5

Children could have used different strategies to work out the subtractions, e.g.

For 15 – 2: counted back in ones or used known fact 5 – 2 = 3 to derive 15 – 2 is 13.

For 20 – 7: counted back in ones or used known fact 10 – 7 = 3 to derive 20 – 7 is 13.

For 17 – 12: subtracted 10 then 2 or subtracted 7 then 5.

For 12 – 7: subtracted 2 then 5 or counted back in ones.

Some children could have started to see relationships between matched calculations such as 15 – 2 and 20 – 7: 20 is 5 greater than 15 and 7 is 5 greater than 2; this means that the difference between 15 and 2 is the same as the difference between 20 and 7.

Solving word and picture problems – subtraction

➜ pages 38–40

1. 17 – 4 = 13. Fred has 13 packets of crisps left.

2. Children could have partitioned the 14 in different ways to subtract it, e.g.
18 – 10 = 8, 8 – 4 = 4. So 18 – 14 = 4.
18 – 8 = 10, 10 – 6 = 4. So 18 – 14 = 4.
There are 4 red counters.

3. 12 – 5 = 7. Max does not read 7 books.

4. a) 19 – 12 = 7. Abe runs 7 more laps than Tom.
b) 19 – 8 = 11. Lea runs 11 fewer laps than Abe.

5. 14 – 6 = 8. There are 8 more hearts than balloons.

6. 20 – 13 = 7

Reflect

Children could have made up different stories based on the picture, e.g.

There are 11 cats and 5 mice. How many more cats are there than mice? 11 – 5 = 6

Each cat catches a mouse. How many mice are left? 11 – 5 = 6

Addition and subtraction facts to 20

➜ pages 41–43

1. a) 16 + 4 = 20, 4 + 16 = 20
b) 8 + 12 = 20, 12 + 8 = 20
c) 10 + 10 = 20

2. Children should have written the following facts:

15 + 5 = 20, 5 + 15 = 20, 20 – 5 = 15, 20 – 15 = 5

3. Children should have written the following facts:

20 = 11 + 9, 20 = 9 + 11, 11 = 20 – 9, 9 = 20 – 11

4. a) The rabbit has to jump 9.
b) The frog was on 9.

5. a) 20 – 7 = 13
b) 5 + 15 = 20
c) 10 + 10 = 20
d) 20 = 12 + 8
e) 20 – 14 = 6

Reflect

Children could have chosen any number family for 20. They should have written at least two addition number facts and two subtraction number facts but may have included more if they used different formats, e.g.

3 + 17 = 20, 17 + 3 = 20, 20 – 3 = 17, 20 – 17 = 3

18 + 2 = 20, 2 + 18 = 20, 20 = 18 + 2, 20 = 2 + 18, 20 – 18 = 2, 20 – 2 = 18, 18 = 20 – 2, 2 = 20 – 18

If children chose to shade 10 squares, this gives fewer facts:

10 + 10 = 20 (and 20 = 10 + 10), 20 – 10 = 10 (and 10 = 20 – 10)

Comparing additions and subtractions

➜ pages 44–46

1. a) Children should have matched the diagrams and sentences as follows:
1st diagram ➜ 10 + 3
2nd diagram ➜ 11 + 1
3rd diagram ➜ 11 + 3
4th diagram ➜ 11 + 2

b) 11 + 3 > 12 11 + 3 > 11 + 1
11 + 1 < 11 + 2 11 + 2 = 10 + 3

2. 12 + 6 > 17 11 + 5 < 17
13 + 4 = 17 12 + 4 < 17

3. a) 7 + 8 = 8 + 7
7 + 8 > 7 + 5
7 + 8 > 5 + 7
7 + 8 < 11 + 8

b) 15 – 4 >15 – 7
15 – 4 < 15 – 2
15 – 4 = 16 – 5
15 – 4 >14 – 4

4. a) any number greater than 11
b) any number less than 13
c) any number less than 5

5. any number greater than 17
any number less than 17

6. 12 + 4 = 13 + 3
12 + 4 = 14 + 2
12 + 4 = 18 – 2

Reflect

Children could have given different explanations, either through showing the answer to each calculation or using other reasoning, e.g.

6 + 5 = 11, 6 + 8 = 14 and 11 < 14

8 is greater than 5, so if you add 8 to 6 your answer will be greater than if you add 5 to 6.

Solving word and picture problems – addition and subtraction

➜ pages 47–49

1. 12 + 6 = 18 or 6 + 12 = 18. Ellie has 18 pieces of fruit in total.

2. 8 + 5 = 13. There are 13 bees.

3. 14 – 6 = 8. There are 8 cakes.

4. 11 – 7 = 4. 4 seeds do not grow.

5. Gino has more balloons.

Children might have explained their reasoning differently, e.g.

6 + 9 = 15 and 15 < 16

Jane has 15 balloons but Gino has 16.

Reflect

7 + 8 = 15, 15 – 3 = 12

Children could have written or drawn many different stories for the calculations, e.g.

Sam is 7. His sister Megan is 8 years older. How old is Megan?

My aunt gave me £15 for my birthday. I spent £3. How much do I have left?

I am doing a sponsored walk of 15 laps around the school field. I have completed 3 laps. How many laps do I still have to walk?

End of unit check

➜ pages 50–51

My journal

Sample answers include:

I notice that when there are 10 more, the 1s do not change. This would be the case for any number from 0 to 10.

I notice that when I subtract the same number from 10 and 20, the 1s in the answers are the same. This is always the case for any number from 0 to 10.

Power puzzle

Red: 12 – 6 = 6, 13 – 8 = 5, 14 – 8 = 6, 20 – 14 = 6, 11 – 10 = 1, 19 – 12 = 7, 20 – 13 = 7

Yellow: 18 – 3 = 15, 19 – 7 = 12, 17 – 2 = 15, 15 – 6 = 9, 14 – 2 = 12, 16 – 7 = 9

Red makes a path from start to finish.