Power Maths

White Rose Maths

White Rose Maths Edition

Year 6 Textbook 6B

Pearson

Series Editor: Tony Staneff

Year 6 Textbook 6B

Ash

Ash is curious.

He loves to explore new concepts.

helpful

Sparks

brave

Astrid

curious

Flo

determined

Dexter

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Pearson

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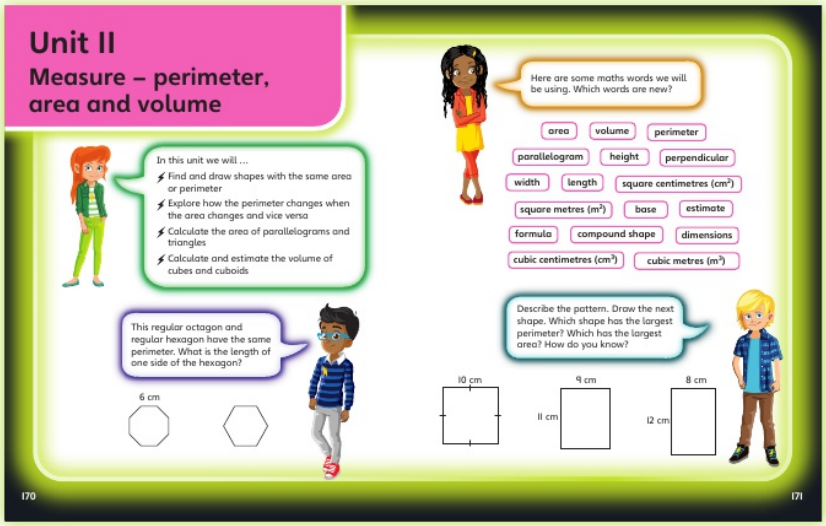
What have we learnt? 220

How to use this book

These pages make sure we're ready for the unit ahead. Find out what we'll be learning and brush up on your skills!

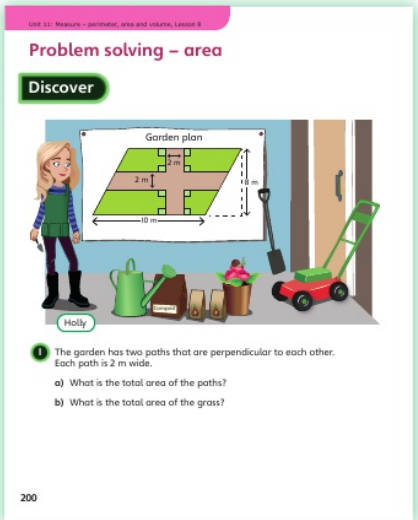


Discover

Lessons start with **Discover**.

Here, we explore new maths problems.

Can you work out how to find the answer?

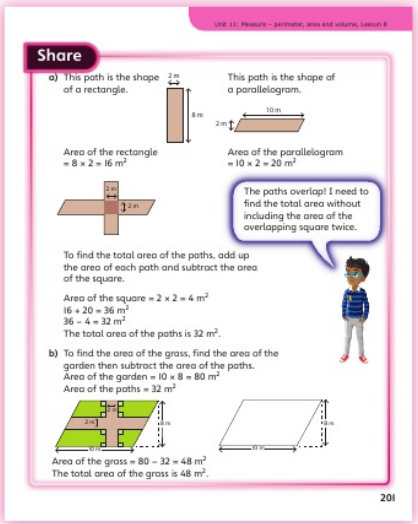


Don't be afraid to make mistakes. Learn from them and try again!

Share

Next, we share our ideas with the class.

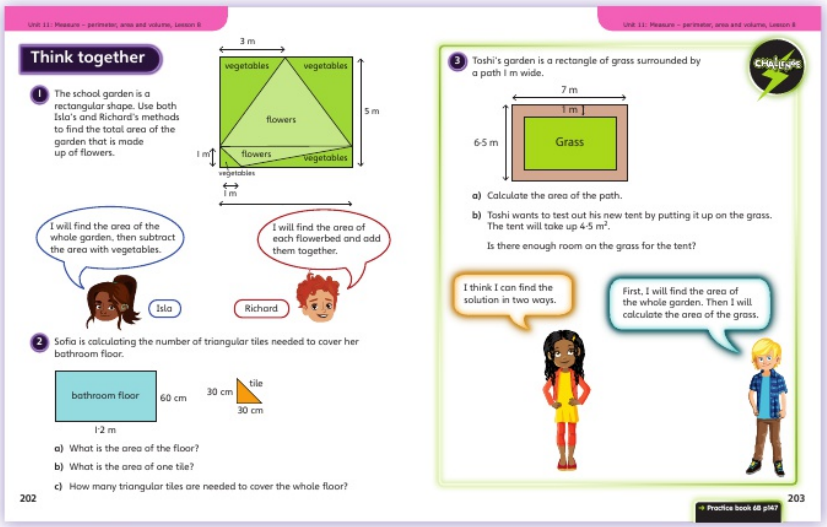
Did we all solve the problems the same way?
What ideas can you try?



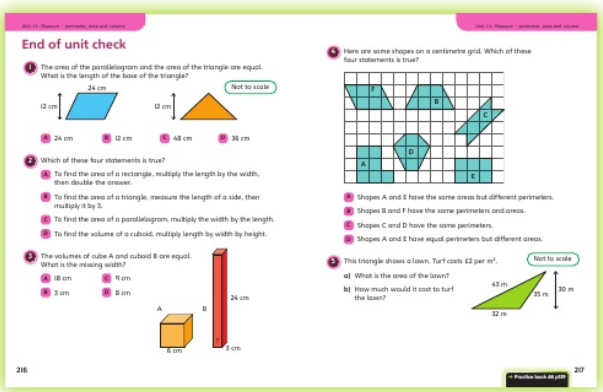
Think together

Then we have a go at some more problems together. Use what you have just learnt to help you.

We'll try a challenge too!



This tells you which page to go to in your **Practice Book**.



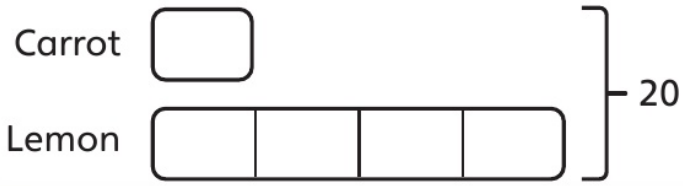
At the end of each unit there's an **End of unit check**. This is our chance to show how much we have learnt.

Unit 7
Ratio and proportion

In this unit we will …

- Calculate ratios
- Use ratios to work out amounts
- Enlarge shapes by a scale factor
- Identify similar shapes
- Solve problems involving ratio

We will use bar models to represent ratio problems. For every 1 slice of carrot cake there are 4 slices of lemon cake. If there are 20 slices in total, how many slices are carrot?



We will need some maths words. We will use the phrase, 'For every … there are …'. What do you think it might mean?

ratio **proportion** **part**

whole **scale** **scale factor**

similar **notation**

We will need to know our multiplication and division facts. Write three multiplication or division facts that match this one.

$8 \times 9 = \square$

Use ratio language

Discover

1 **a)** Sort the children and adults into equal groups.

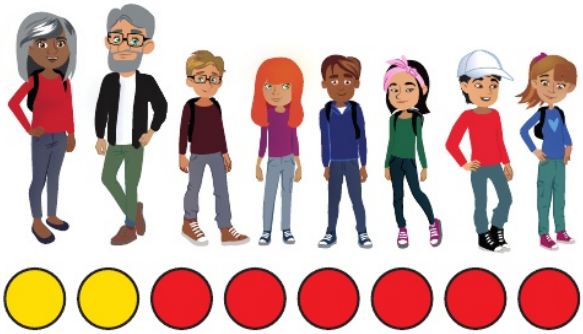
Use the groups you have made to complete the sentence.

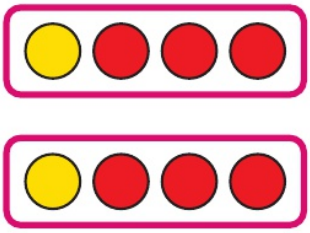
For every ☐ adult there are ☐ children.

b) Write a sentence to compare how many bananas and how many apples there are.

Share

a) There are 2 adults and 6 children.



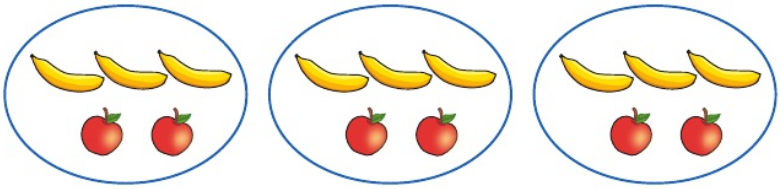


For every 1 adult there are 3 children.

I sorted the people into equal groups. Each group has 1 adult and 3 children.

This statement is an example of a **ratio.** A ratio compares two or more parts of the whole.

b) In each group there are 3 bananas and 2 apples.



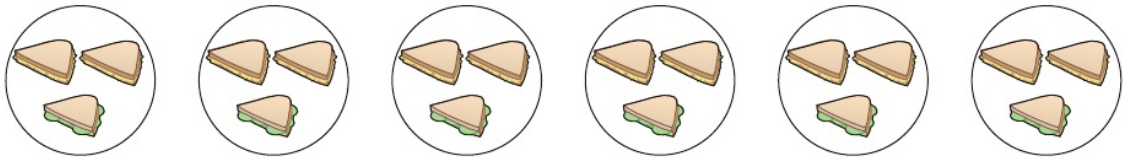
So, for every 3 bananas there are 2 apples.

Or for every 2 apples there are 3 bananas.

I tried to sort the fruit so there was 1 apple in each group, but I did not have enough bananas.

Think together

1 A camping group take some sandwiches on a walk. Some sandwiches are cheese and some are cucumber.



Complete the ratio sentences to compare the number of sandwiches.

For every ☐ cheese sandwiches there is ☐ cucumber sandwich.

For every ☐ cucumber sandwich there are ☐ cheese sandwiches.

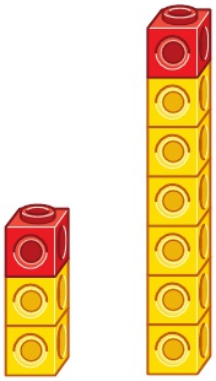
2 Danny has these coins.

Lexi has these coins.

Is Danny correct?

CHALLENGE

3 **a)** Josh is making towers of cubes.



What is the same about the two towers?

What is different?

b) Josh makes another tower.

For every 3 red cubes there are 2 yellow cubes.

What fraction of the tower is red?

What fraction of the tower is yellow?

I think if I work out what fraction of each tower is red, I will notice something about the answers.

I wrote some ratio sentences. I wonder if there is a link between these and the fraction answers.

→ Practice book 6B p6

Introduce the ratio symbol

Discover

1 **a)** Complete the ratio sentence.

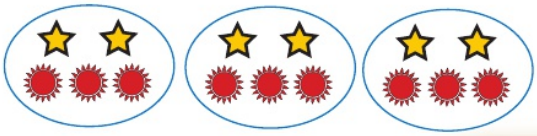
On the t-shirt, for every ☐ stars there are ☐ suns.

b) Emma makes her next t-shirt.

What could the t-shirt look like?

Share

a) There are 6 stars and 9 suns.



÷ 3 (6 stars : 9 suns → 2 stars : 3 suns) ÷ 3

I wrote my answer in its simplest form. I noticed that 6 and 9 both divide by 3.

On the t-shirt, for every 2 stars there are 3 suns.

We can say and write this differently. The ratio of stars to suns is 2 to 3. We write this as 2 : 3.

b) On Emma's next t-shirt, for every 1 star there are 3 suns.

Emma's t-shirt could look like this:

Stars	1	2	3
Suns	3	6	9

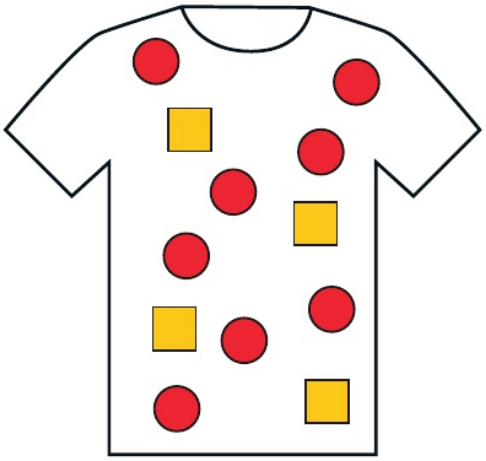
We can say the ratio of stars to suns is 1 : 3.

For every 1 star I drew, I had to draw 3 suns. The t-shirt has three times as many suns as stars on it.

Think together

1 What is the ratio of squares to circles on each of these t-shirts?

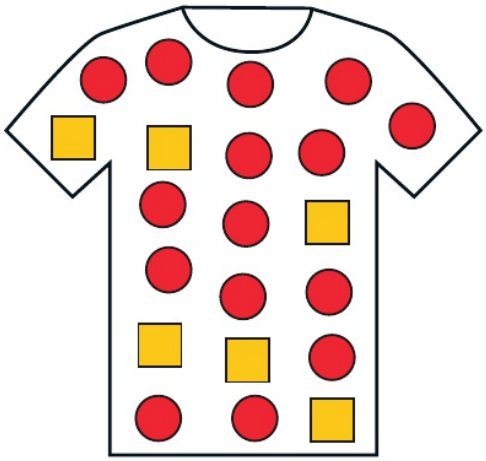
a)



For every ☐ square there are ☐ circles.

Or, the ratio of squares to circles is ☐ : ☐ .

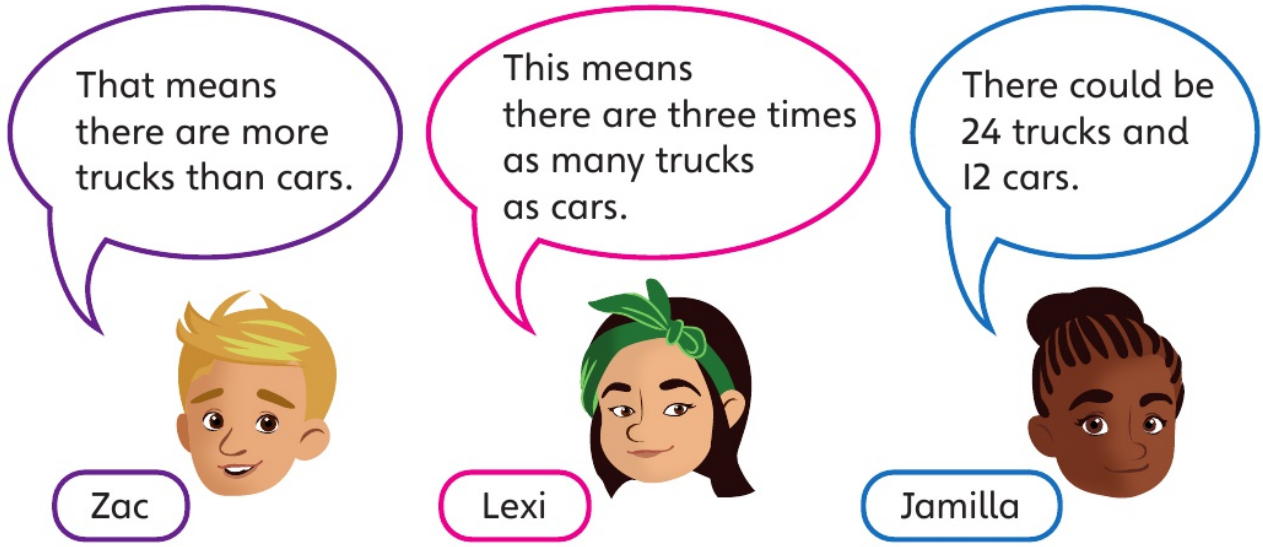
b)



For every ☐ squares there are ☐ circles.

Or, the ratio of squares to circles is ☐ : ☐ .

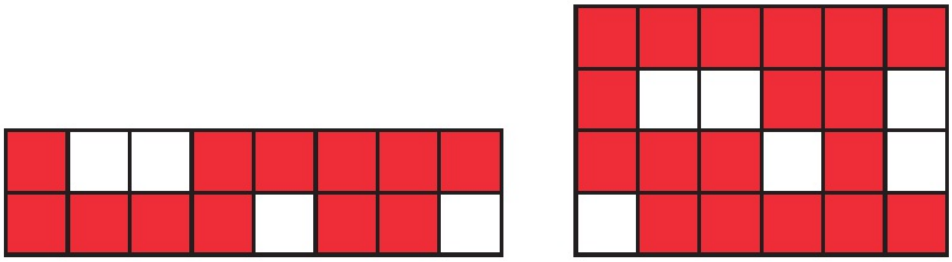
2 The ratio of trucks to cars in a car park is 2 : 1.



Who is correct? Explain your answer.

3 What is the same about the rectangles? What is different about them?

CHALLENGE



→ Practice book 6B p9

Use ratio

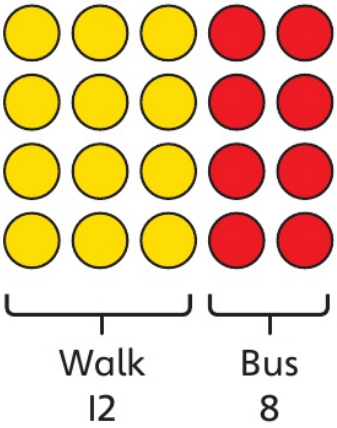
Discover

1 **a)** There are 12 children who walk to school in class today. Use counters to show how many children catch the school bus.

b) Find another method to work out the number of children who catch the school bus.

Share

a) There are 3 children who walk to school for every 2 children who catch the school bus.



I used counters to represent the children. I placed the counters in rows until I had 12 children who walk to school.

b) **Method 1**

Add 3 children who walk each time.

Stop when you get to 12 children.

Walk	Bus
3	2
6	4
9	6
12	8

Add 2 children who catch the school bus each time.

I tried two ways. I drew a table and added on 3 children who walk to school and 2 children who catch the school bus each time. I stopped when I got to 12 children who walk and then saw there were 8 children who catch the bus.

Method 2

$3 \times 4 = 12$

To calculate the number of children who catch the bus, work out
$2 \times 4 = 8$
There are 8 children who catch the school bus.

I also tried it this way: I worked out what I needed to multiply 3 (number of children who walk) by to make 12. I then multiplied this by 2 to tell me how many children catch the school bus.

Think together

1 For every 2 children wearing a bib, 1 child is not wearing a bib.

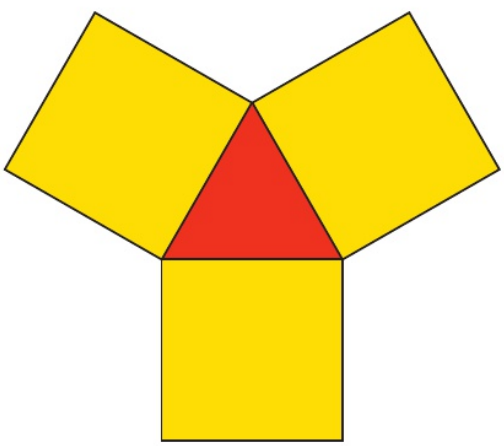
If 10 children are wearing a bib, how many children are not wearing one?

Explain your method to a partner.

2 For every 1 triangle there are 3 squares.

a) If there are 5 triangles, how many squares are there?

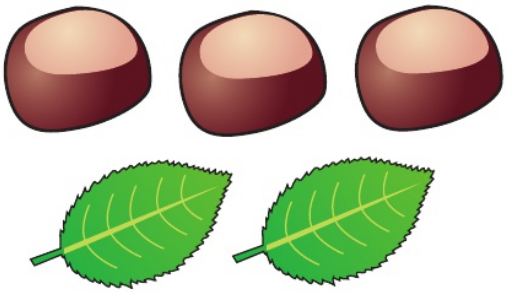
b) If there are 18 squares, how many triangles are there?



CHALLENGE

3 At the park, some children are making patterns.

They make a pattern with conkers and leaves.

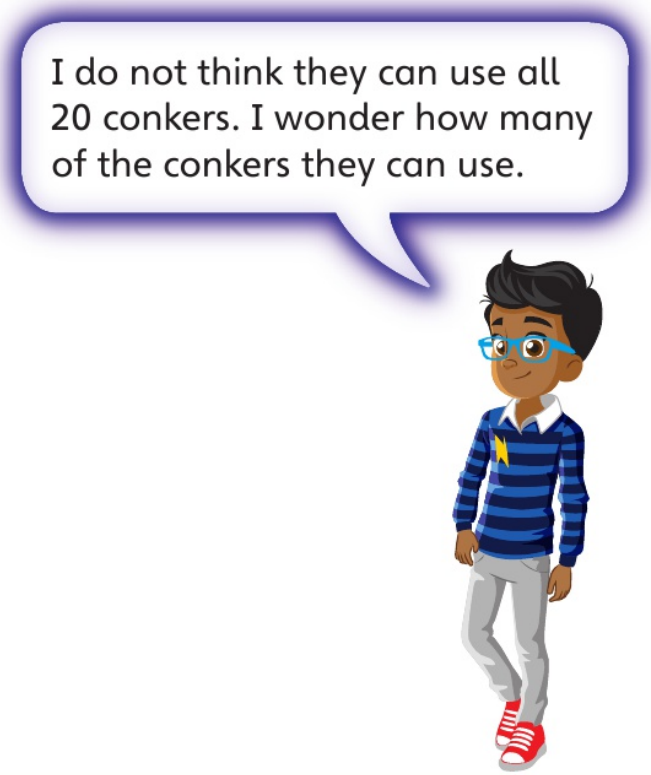


They want to continue the pattern.

a) If they have 15 conkers, how many leaves do they need?

Explain your method to your partner.

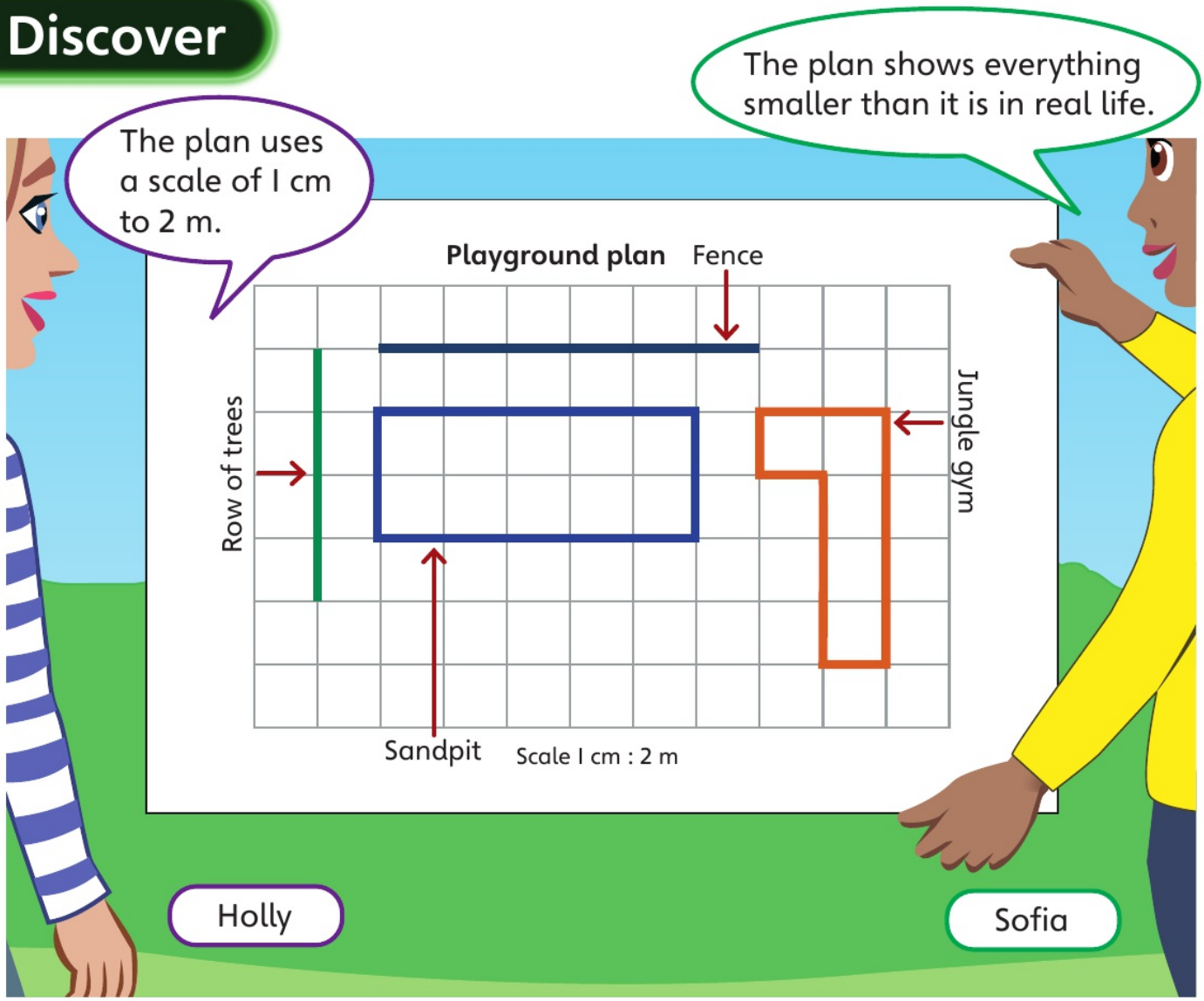
b) If they have 20 conkers, how many leaves do they need?



→ Practice book 6B p12

Scale drawing

Discover



1 A new playground is built.

a) What length is the row of trees in real life?

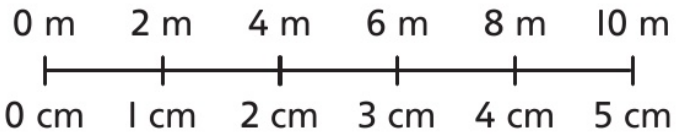
b) What is the perimeter of the sandpit in real life?

Share

Remember, the ratio **notation** tells you that 1 cm on the plan represents 2 m in real life.

a) On the plan, the row of trees is 4 cm long.

The plan uses the scale 1 cm : 2 m.



The row of trees is 8 m long in real life.

I can use a map scale like this to show how many metres each centimetre is in real life.

b) We need to work out length and width.

We know that every 1 cm on the plan is 2 m in real life.

1 cm
2 m

The width is 2 cm, which is 2 × 2 = 4 m in real life.

2 cm

1 cm	1 cm
2 m	2 m

2 × 2 = 4 m

The length is 5 cm, which is 5 × 2 = 10 m in real life.

To find the perimeter of the shape we add up all four sides.

5 cm

1 cm	1 cm	1 cm	1 cm	1 cm
2 m	2 m	2 m	2 m	2 m

5 × 2 = 10 m

Perimeter = 4 + 10 + 4 + 10 = 28 m

The perimeter of the sandpit is 28 m in real life.