Unit 11
Decimals 2

Mastery Expert tip! "It is essential that children have an understanding of what a decimal looks like visually. I find it best to avoid using base 10 blocks for representing decimals, as this often leads to confusion. A hundredths grid offers a more successful representation."

Don't forget to watch the Unit 11 video!

WHY THIS UNIT IS IMPORTANT

In the previous unit, children were introduced to decimals. This unit builds on the last by exploring decimals in more depth. Children first find number bonds of tenths and hundredths to 1 and show how this links to their bonds to 10 and 100. They start to represent decimals on place value grids and use these grids to help them compare decimals. At this stage, children focus on comparing decimals with the same number of digits. Children begin to use diagrams to understand the decimal equivalents of simple fractions, such as a half and a quarter. Children then progress to rounding decimals to the nearest whole number by considering their position on a number line. Along with the previous unit, these lessons should provide children with a solid introduction to decimals and their link to place value and fractions. This unit is fundamental to further work in Years 5 and 6 on decimals.

WHERE THIS UNIT FITS

- Unit 10: Decimals (1)
- **Unit 11: Decimals (2)**
- Unit 12: Money

This unit builds on children's work in Year 4 on decimals and links closely to all their work on place value and fractions so far.

Before they start this unit, it is expected that children:

- know the decimal equivalent of $\frac{1}{10}$ and $\frac{1}{100}$
- can draw, model and write any number of tenths and hundredths using a hundredths grid, ten frame or bead string
- understand that a tenth arises from dividing 1 by 10 and a hundredth arises from dividing 1 by 100
- understand the use of the decimal point and where it should be placed.

ASSESSING MASTERY

By the end of the unit, children will be able to find the number bond to 1 of a decimal with up to two decimal places. They should be able to round numbers to the nearest whole number and order decimals with the same number of decimal places by comparing digits. Finally, children will know and understand decimal equivalents of simple fractions such as a half and a quarter.

COMMON MISCONCEPTIONS	STRENGTHENING UNDERSTANDING	GOING DEEPER
When finding a number bond to 1, children may add on too much. For example, children may write 0·47 in 0·63 + _ = 1.	Remind children of their bonds to 100 and draw the link to number bonds to 1. In addition, children should be able to use a hundredths grid or bead string to help them visually identify these number bonds.	Using 10 blank place value counters and a place value grid from 10s to hundredths, how many different numbers can children make? What is the greatest number? What is the smallest number?
When comparing decimals, children may compare digits that do not have the same place value. For example, when comparing 23·6 and 9·7 they may compare the 2 (tens) and 9 (ones) as opposed to 2 tens and 0 tens.	Use a number line to help children locate decimals.	Encourage children to explore missing digits in numbers that are in order, such as: 2·_5 < 2·4_ How many different solutions can children find? Now try: 2·_5 < 2·4_ < _·45

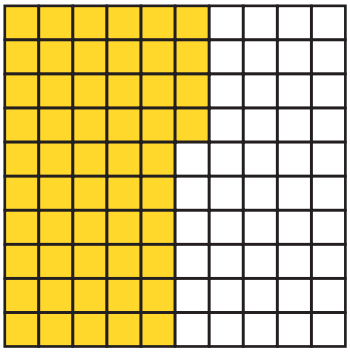
Unit II: Decimals (2)

WAYS OF WORKING

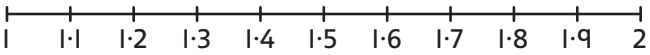
Use these pages to introduce the unit focus to children as part of a whole-class discussion. You can use the characters to explore different ways of thinking and working, too.

STRUCTURES AND REPRESENTATIONS

Hundredths grid: This is an important representation when children are learning to identify hundredths. Children can use a hundredths grid to work out the missing number.



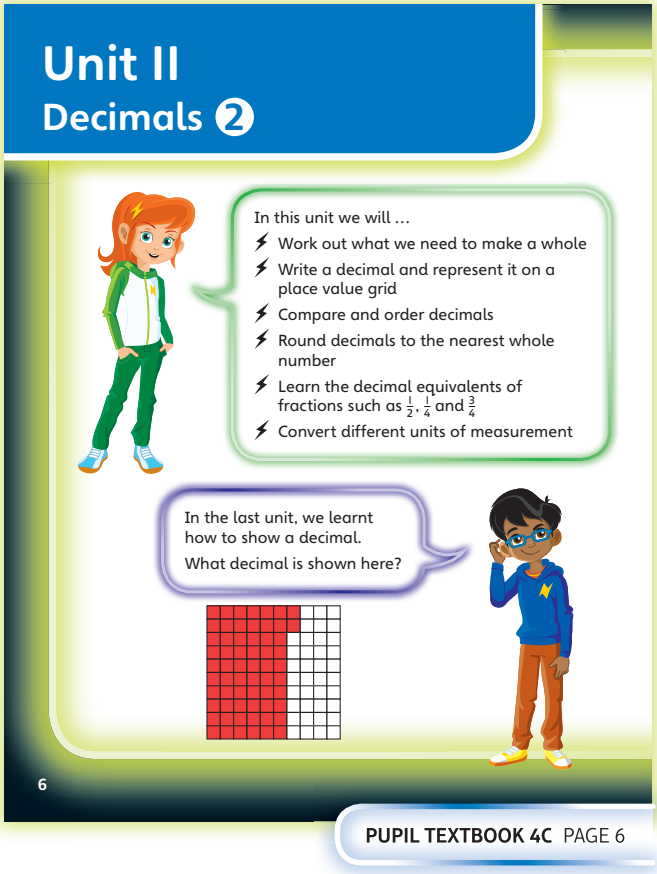
Number line: It is important for children to learn to position a number with one decimal place on a number line. They will learn that, to round a number to the nearest whole number, they need to look at the tenths digit.



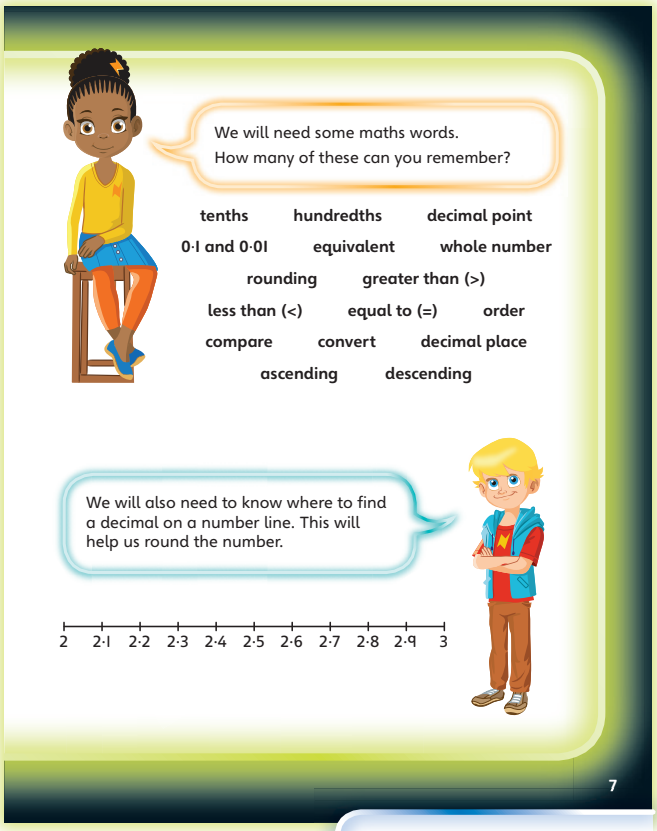
KEY LANGUAGE

There is some key language that children will need to know as part of the learning in this unit.

- tens (10s), ones (1s), tenths, hundredths, fraction
- decimal point, decimal place, 0·1, 0·01
- equivalent, number bond, equivalent fraction
- whole number, digit
- rounding, round up, round down, multiply (×), divide (÷)
- greater than (>), less than (<), equal to (=), smallest, lightest, greatest, heaviest, capacity
- order, compare, statement, ascending, convert
- part-whole, place value, bar model



PUPIL TEXTBOOK 4C PAGE 6



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Making a whole

Learning focus

In this lesson, children will understand that given a number of tenths or hundredths they can make the number bond up to 1.

Small steps

- Previous step: Dividing by 10 and 100
- **This step: Making a whole**
- Next step: Writing decimals

NATIONAL CURRICULUM LINKS

Year 4 Number – Fractions (Including Decimals)

- Recognise and write decimal equivalents of any number of tenths or hundredths.
- Add and subtract fractions with the same denominator.

ASSESSING MASTERY

Children can find the number bond to 1 using a ten frame and hundredths grid and can write them onto a part-whole model.

COMMON MISCONCEPTIONS

Children may not be secure with their number bonds to 10 and 100 and may miscalculate the number that makes the number bond to 1. For example, they may think that, if they had 0·36, they would need 0·74 to make the number bond to 1.
Ask:

- *What number do you need to add to make [1/10/100]? How do you know?*

STRENGTHENING UNDERSTANDING

Provide children with a ten frame and hundredths grid. When dealing with tenths and hundredths, encourage children to say them aloud to highlight the value of the digits and to count in tenths or hundredths when making a whole. For example, 0·8 is '8 tenths' or 0·45 is '45 hundredths'.

GOING DEEPER

Ask children to make a whole using three numbers instead of two. Give them one number and ask how many different ways they can make a whole. For example, 0·2 + __ + __ = 1. This could be represented on a part-whole model. Also encourage children to link making a whole to subtraction, such as 1 – 0·72 = __.

KEY LANGUAGE

In lesson: tenths, hundredths, whole, part-whole, statement, number bond

STRUCTURES AND REPRESENTATIONS

hundredths grid, part-whole model, bar model and ten frame

RESOURCES

Mandatory: hundredths grid, blank ten frames, number cards, 1s and tenths (0·1) place value counters

Optional: large laminated part-whole model

In the eTextbook of this lesson, you will find interactive links to a selection of teaching tools.

Before you teach

- Do children know their number bonds to 10 and 100?
- Can children represent tenths on a ten frame and hundredths on a hundredths grid?
- Can children represent tenths and hundredths on a part-whole model?

Discover

WAYS OF WORKING Pair work

ASK

- Question 1 a): *What is the value of the 7 in 0·7 kg?*
- Question 1 a): *How could you represent 0·7?*
- Question 1 b): *What number is shown here?*
- Question 1 b): *How could you represent 0·46?*

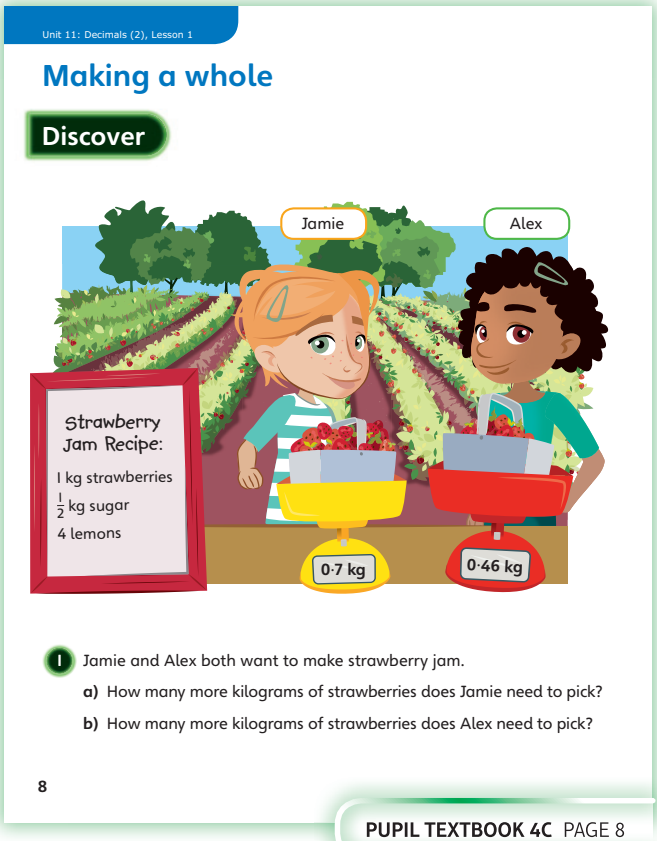
IN FOCUS Encourage children to use resources and model each question in a concrete way. Children may use a hundredths grid or a ten frame to work out the missing number. Some children may need to count up in tenths or hundredths. For example, to get the number bond to 1 for 0·46, some children may individually count 54 squares on a hundredths grid. Encourage children to use a more efficient method, such as identifying that there are 5 columns of ten and then 4 ones.

PRACTICAL TIPS Ensure children have tenths counters and ten frames. Since Jamie has 0·7 kilograms of strawberries, ask them to show the value of the 7 using their counters on the ten frame.

ANSWERS

Question 1 a): Jamie needs to pick another 0·3 kilograms of strawberries.

Question 1 b): Alex needs to pick another 0·54 kilograms of strawberries.



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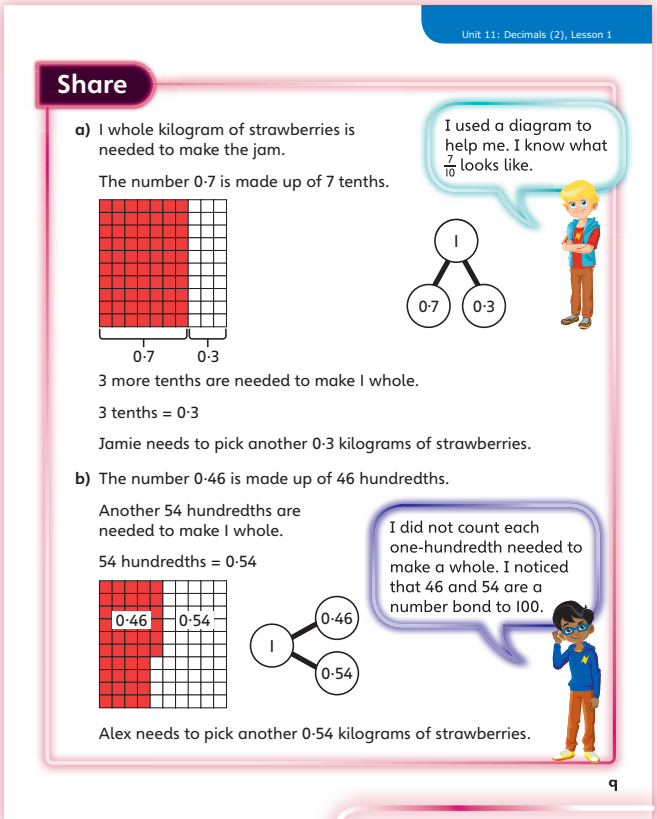
Share

WAYS OF WORKING Whole class teacher led

ASK

- Question a): *What number are you starting with? How can you use a hundredths grid to show this? What do you need to look at to help you make a whole?*
- Question b): *Can you see how this works on a part-whole model?*

IN FOCUS Show children the hundredths grid of 0·7 (7 tenths) and count aloud as a class so that they know it is 0·7. Can children explain why the number bond to 1 is 0·3? Similarly, show children the hundredths grid of 0·46. Explain a more efficient way of identifying this as 0·46 without counting each individual hundredth. For example, show children that there are 4 columns of ten and 6 ones. Can children explain why the number bond to 1 is 0·54 without having to count each hundredth? Encourage children to see the link to the number bonds to 100.



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Think together

WAYS OF WORKING Whole class teacher led (I do, We do, You do)

ASK

- Question 2: *What numbers are shown here? Can you represent these on a hundredths grid? What number is needed to make a whole?*
- Question 3 a): *What amounts of water does Jamilla have? What do they add up to? What number is needed to make the whole 1 litre?*

IN FOCUS Questions 1 and 2 look at making a whole from tenths and hundredths, which are represented using ten frames, hundredths grid and part-whole models. Encourage children to make their own representations for each question. Ensure children are aware that they are dealing with tenths and hundredths and not whole numbers when calculating the number bond to 1. Count up in tenths and say the numbers aloud to reinforce this.

STRENGTHEN To support understanding, represent question 3 using an actual jug and cups, counters or a hundredths grid. Children could also use three different colours to represent the three different cups and help them calculate the number bond to 1.

DEEPEN Ask children to give more than one answer for question 3 c). Ask children if it is possible to give an answer that has tenths and hundredths in it. Can they give examples?

ASSESSMENT CHECKPOINT Can children successfully represent their answers on a hundredths grid and on part-whole models?

ANSWERS

Question 1 a): 0·6 + 0·4 = 1

Question 1 b): 0·8 + 0·2 = 1

Question 1 c): 0·83 + 0·17 = 1

Question 2 a): Missing whole is 1

Question 2 b): Missing part is 0·5

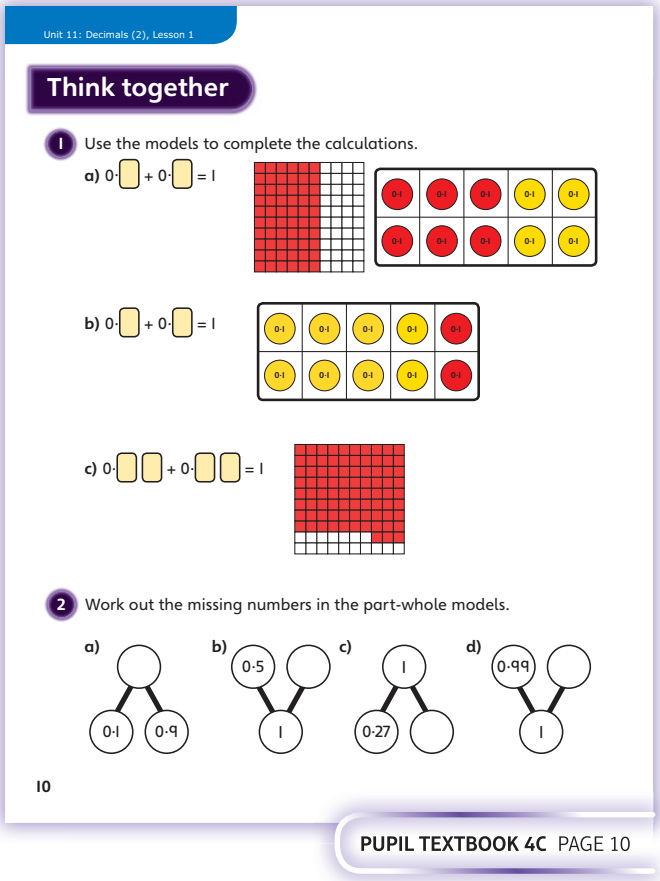
Question 2 c): Missing part is 0·73

Question 2 d): Missing part is 0·01

Question 3 a): Jamilla needs another 0·2 litres.

Question 3 b): Luis needs another 0·37 litres.

Question 3 c): Numerous answers are possible, as long as the three numbers add to 1.



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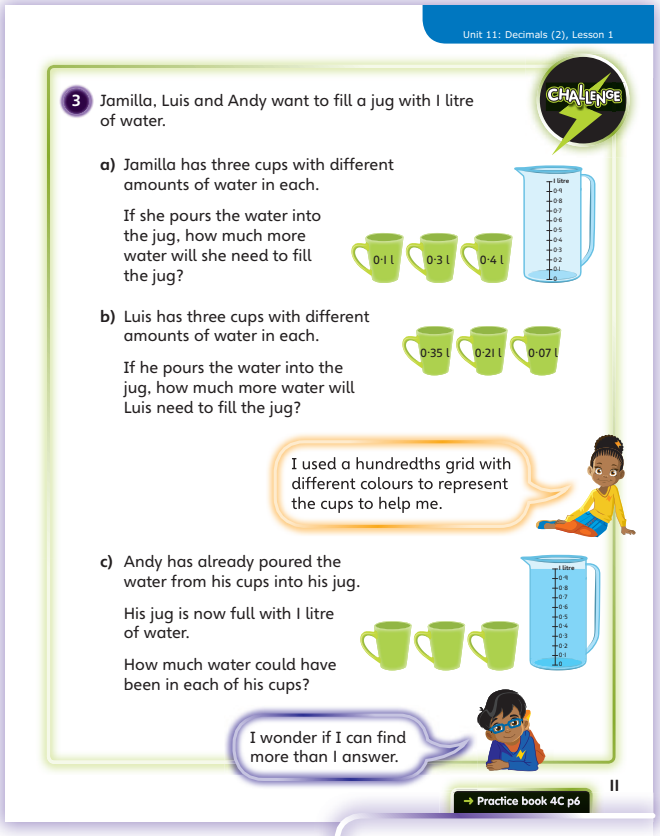


PUPIL TEXTBOOK 4C PAGE 11

Practice

WAYS OF WORKING Independent thinking

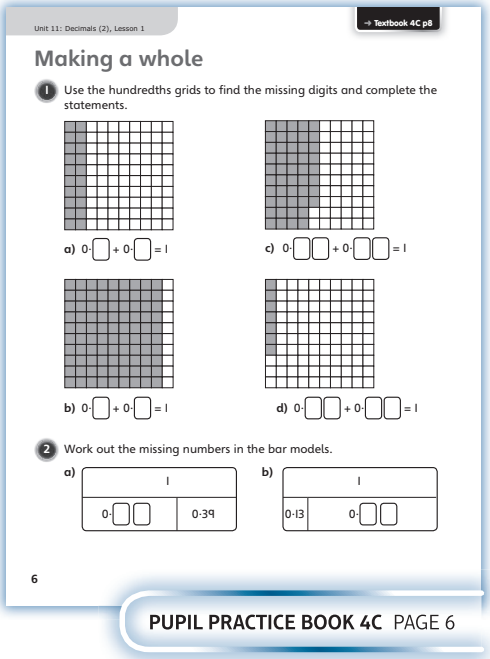
IN FOCUS Question 3 consolidates the representations on part-whole models. Children should use 1s and tenths counters to physically replicate the same part-whole models as in the questions. They should then manipulate the counters to make the number bonds to 1.

STRENGTHEN In question 2, children can use a hundredths grid to replace the bar models. This may help them to more readily see how to make a whole. When diagrams are not given, encourage children to use concrete resources to make their own representations.

DEEPEN Explore question 5 further by asking children if there are any different digits they could use that would still make the number sentences correct. Can they explain why? Question 6 can also be explored further. Ask children to identify different ways to complete the cross diagrams. Challenge children to create their own version of this question and share it with a partner.

ASSESSMENT CHECKPOINT Children should now be confident in using a ten frame, hundredths grid or a part-whole model to make a whole if they are given a number of tenths or hundredths. Ask children to model one of the parts of question 3, explaining why they would place certain counters in certain sections of the part-whole model. Do they use sound reasoning and demonstrate a deep understanding when explaining their thinking?

ANSWERS Answers for the **Practice** part of the lesson appear in the separate **Practice and Reflect answer guide**.



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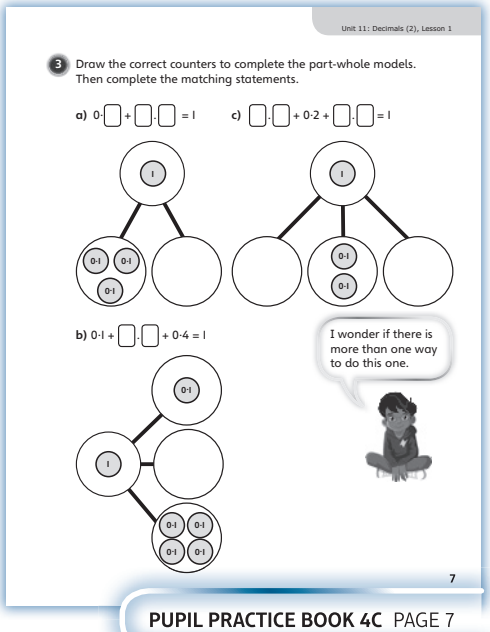

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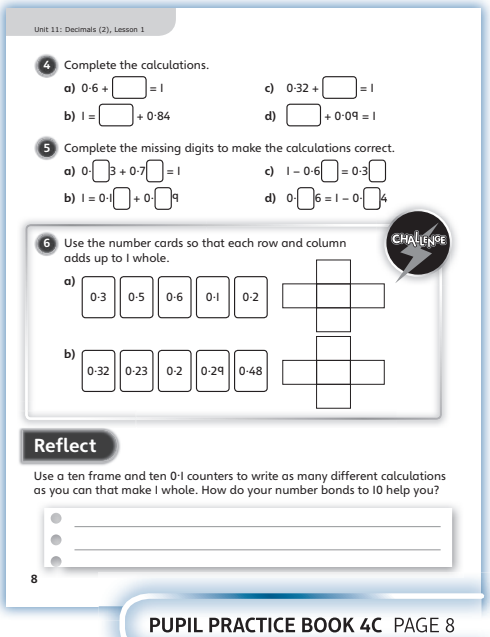
Reflect

WAYS OF WORKING Independent thinking

IN FOCUS This activity checks children's understanding of how to make a whole from different numbers of tenths. Children should see links with the number bonds to 10 and 100.

ASSESSMENT CHECKPOINT Children can make a selection of number bonds to 1 and confidently explain their decisions using the correct vocabulary and sound reasoning.

ANSWERS Answers for the **Reflect** part of the lesson appear in the separate **Practice and Reflect answer guide**.



PUPIL PRACTICE BOOK 4C PAGE 8

After the lesson

- Are children confident with tenths and hundredths?
- Can children make the number bonds to 1 using a ten frame, hundredths grid or part-whole model?

Writing decimals

Learning focus

In this lesson, children will learn that a number with up to two decimal places can be made up of some 10s, 1s, tenths and hundredths.

Small steps

- Previous step: Making a whole
- **This step: Writing decimals**
- Next step: Comparing decimals

NATIONAL CURRICULUM LINKS

Year 4 Number – Fractions (Including Decimals)

Find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths.

ASSESSING MASTERY

Children can represent numbers with up to two decimal places using counters and a place value grid and, given a pictorial representation, can write a number with up to two decimal places. Children recognise that a number up to two decimal places can be made up of some 10s, 1s, tenths and hundredths.

COMMON MISCONCEPTIONS

Children may confuse the place value and size of a number. They may, for example, see 2 ones and 7 hundredths as 2·7, missing that the value of the tenth is 0. Ask:

- *How would you write 2 tenths and 7 hundredths? Are there any 0s in this number? What does the 0 represent?*

STRENGTHENING UNDERSTANDING

Children who need support with representing numbers up to two decimal places should recap representing 1-digit numbers. Ask children to show a 1-digit number on a place value grid. Explain that we can now add some tenths and this will give us a number with one decimal place. Next, explain that we can also add some hundredths and this will create a number with two decimal places. Encourage children to write out the numbers, for example 7·23 as 7 ones, 2 tenths and 3 hundredths. They can then represent each part on a place value grid.

GOING DEEPER

Ask children to represent the number 5·63 in different ways. For example, do they represent this as 5 ones, 6 tenths and 3 hundredths or 5 ones and 63 hundredths? Ask children to explain why these are equal.

KEY LANGUAGE

In lesson: hundreds, tens (10s), ones (1s), tenths (0·1), hundredths (0·01), decimal place

STRUCTURES AND REPRESENTATIONS

place value grid, bar model, hundredths grid, part-whole model

RESOURCES

Mandatory: place value counters

In the eTextbook of this lesson, you will find interactive links to a selection of teaching tools.

Before you teach

- Can children represent 1-, 2- and 3-digit numbers using a place value grid?
- Do children know the place value of each digit in whole numbers?

Discover

WAYS OF WORKING Pair work

ASK

- Question 1 a): *What is the value of the 2? What is the value of the 3? What is the value of the 7?*
- Question 1 a): *How can you tell how many 1s, tenths and hundredths Lexi has used?*
- Question 1 a): *What number has Lexi made?*
- Question 1 b): *How can you partition your number? How can you tell how many 10s and how many 1s there are? What about how many tenths and how many hundredths?*

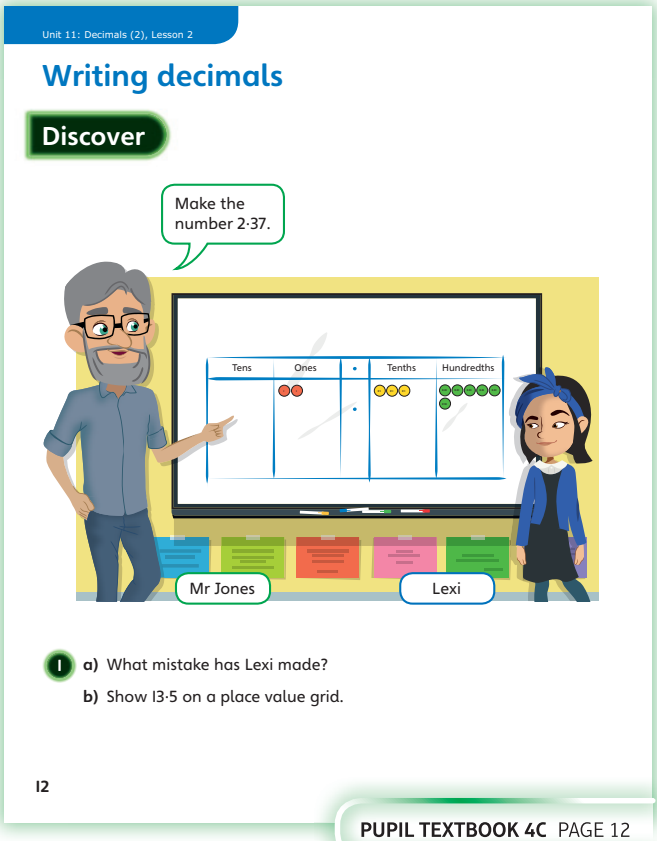
IN FOCUS Question 1 b) provides children with a number and asks them to make a representation of it. Encourage children to partition the number and discuss the place value headings that will be needed in their place value grid. Will they need a hundredths column?

PRACTICAL TIPS Encourage children to use counters and a place value grid or a hundredths grid to represent Lexi's number from question 1. Encourage children to partition the number into 1s, tenths and hundredths until they see that Lexi has made a mistake.

ANSWERS

Question 1 a): Lexi has 6 hundredths instead of 7 hundredths.

Question 1 b): 13·5 can be represented on a place value grid with 1 ten, 3 ones and 5 tenths.



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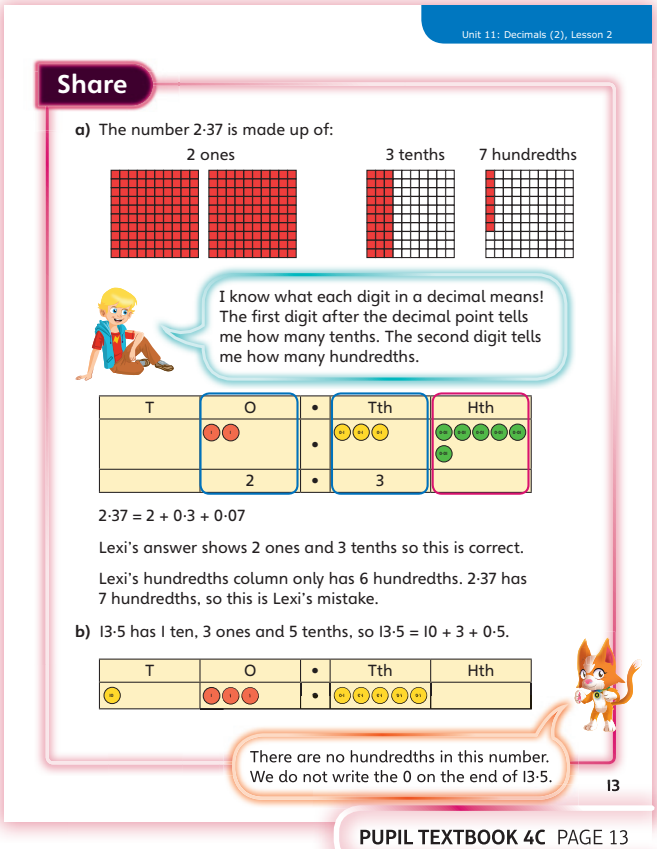
Share

WAYS OF WORKING Whole class teacher led

ASK

- Question a): *What is the number 2·37 made up of? Which parts of the number has Lexi got correct? What is Lexi's mistake?*
- Question b): *What is the number 13·5 made up of? Why do you not have any hundredths?*

IN FOCUS Show children the diagram of 2·37 represented by the hundredths grids. Can children explain why the value of the 3 is 3 tenths and why the value of the 7 is 7 hundredths? Explain that the first number after the decimal point tells us how many tenths there are and the second number after the decimal point tells us how many hundredths there are.



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Think together

WAYS OF WORKING Whole class teacher led (I do, We do, You do)

ASK

- Question 1 a): *What is the value of the 5, the 4 and the 9?*
- Question 1 b): *What is the value of the 0, the 2 and the 6?*
- Question 2: *What is the value of each column in the place value grids? Can you write the value under each column of your own place value grids?*
- Question 3: *What is $\frac{1}{10}$ the same as? What is $\frac{1}{100}$ the same as? What number has Ebo shown? How many different numbers can you make using five counters?*

IN FOCUS In question 3, children write decimals from numbers they have created themselves, using a place value grid and five counters. It highlights the importance of 0 and when we do and do not need to include it. Can children explain why 12·2 and 12·20 have the same value?

STRENGTHEN To support understanding, represent all the numbers on a place value grid and ask children to write the value at the bottom of each place value heading. Separate the 10s, the 1s, the tenths and the hundredths. Clearly associate each digit with the particular place value and say this aloud. For example, 0·7 is 7 tenths. This will help children understand the numbers.

DEEPEN Give children numbers using place value counters (but not a grid). Provide the numbers out of order, not arranged as 10s, 1s, tenths and hundredths, and ask them to write down what number is shown. This will help them understand that the order the parts are presented in does not matter, but the value does.

ASSESSMENT CHECKPOINT Can children represent numbers up to two decimal places on a place value grid? Do children understand that a number up to two decimal places is made up of some 10s, 1s, tenths and hundredths?

ANSWERS

Question 1 a): 5·49 is equal to 5 ones, 4 tenths and 9 hundredths. 5·49 = 5 + 0·4 + 0·09

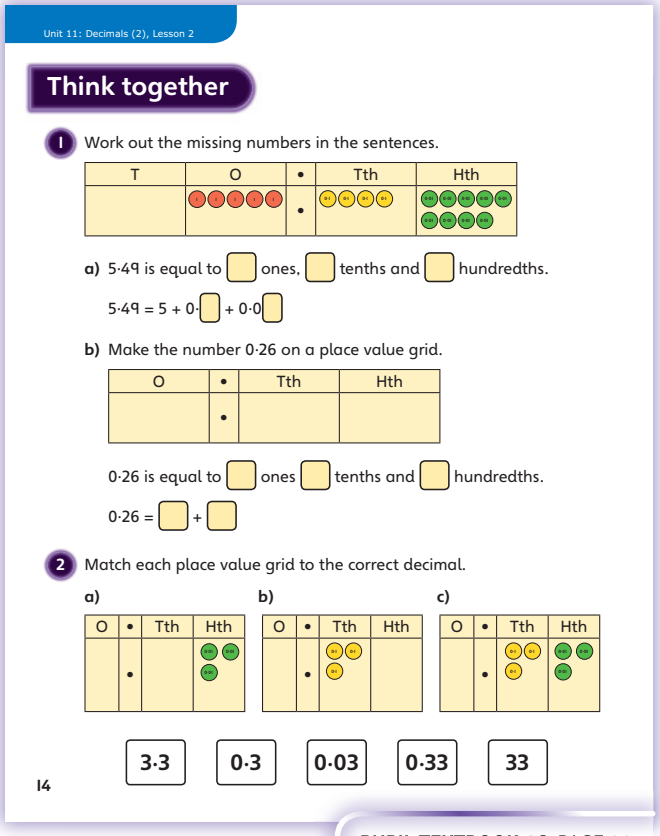
Question 1 b): 0·26 is equal to 0 ones, 2 tenths and 6 hundredths. 0·26 = 0·2 + 0·06

Question 2 a): 0·03

Question 2 b): 0·3

Question 2 c): 0·33

Question 3: Various answers, such as 20·21, 21·02, 21·2, 22·01, 22·1, 1·22, 10·22, 12·02, 12·2, etc.


Unit 11: Decimals (2), Lesson 2

Think together

1 Work out the missing numbers in the sentences.

T	O	•	Tth	Hth
		•		

a) 5·49 is equal to ☐ ones, ☐ tenths and ☐ hundredths.

5·49 = 5 + 0·☐ + 0·0☐

b) Make the number 0·26 on a place value grid.

O	•	Tth	Hth
	•		

0·26 is equal to ☐ ones ☐ tenths and ☐ hundredths.

0·26 = ☐ + ☐

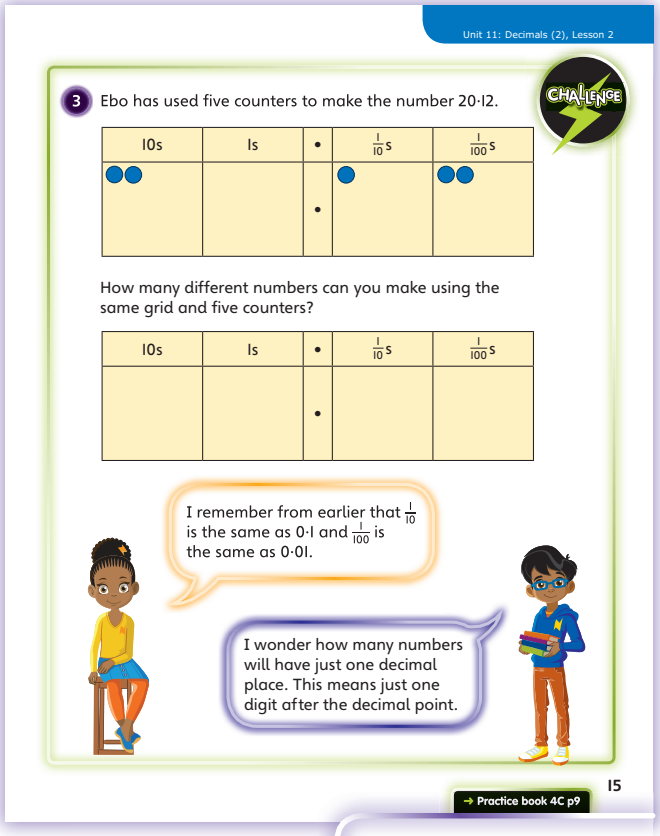
2 Match each place value grid to the correct decimal.

a) b) c)

3·3 0·3 0·03 0·33 33

14

PUPIL TEXTBOOK 4C PAGE 14


Unit 11: Decimals (2), Lesson 2

3 Ebo has used five counters to make the number 20·12.

CHALLENGE

10s	1s	•	$\frac{1}{10}$s	$\frac{1}{100}$s
		•		

How many different numbers can you make using the same grid and five counters?

10s	1s	•	$\frac{1}{10}$s	$\frac{1}{100}$s
		•		

I remember from earlier that $\frac{1}{10}$ is the same as 0·1 and $\frac{1}{100}$ is the same as 0·01.

I wonder how many numbers will have just one decimal place. This means just one digit after the decimal point.

15

→ Practice book 4C p9

PUPIL TEXTBOOK 4C PAGE 15

Practice

WAYS OF WORKING Independent thinking

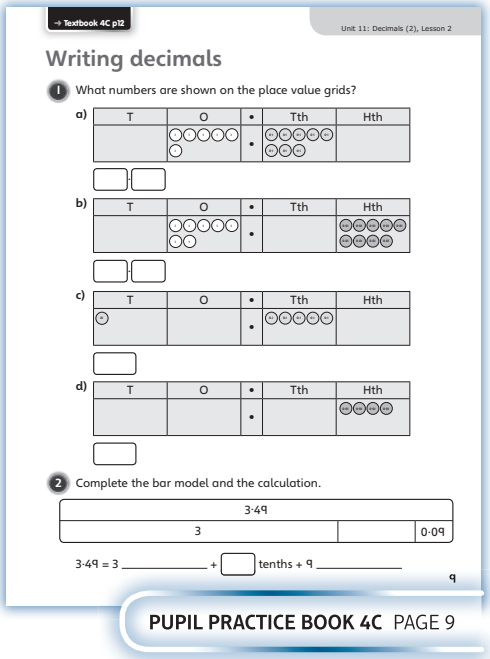
IN FOCUS Questions 1 to 4 aim to consolidate children's understanding of representations of numbers up to two decimal places. Children can make their own representations and should understand that a number is made up of 10s, 1s, tenths and hundredths and that these can be shown and written in different ways.

STRENGTHEN Children can use place value grids and counters to represent the numbers. When numbers are not given in the order of 10s, 1s, tenths and hundredths, encourage children to reorder them.

DEEPEN Question 6 can be explored further by asking children how many different ways they can write the same number. Ask children if there are other ways they can represent a number such as 13·45. For example, they could represent this as 1 ten, 3 ones and 45 hundredths or as 1 ten, 3 ones, 4 tenths and 5 hundredths. Can they explain why these are equal?

ASSESSMENT CHECKPOINT Children should be confident in representing numbers up to two decimal places using a place value grid. They should also be able to write the number when presented with a representation of it.

ANSWERS Answers for the **Practice** part of the lesson appear in the separate **Practice and Reflect answer guide**.



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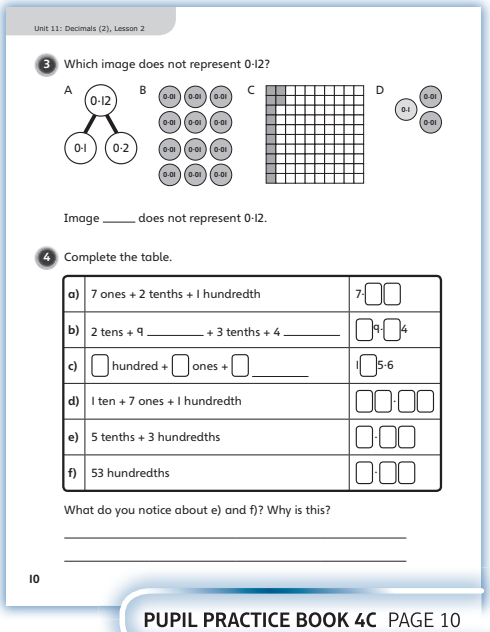


PUPIL PRACTICE BOOK 4C PAGE 10

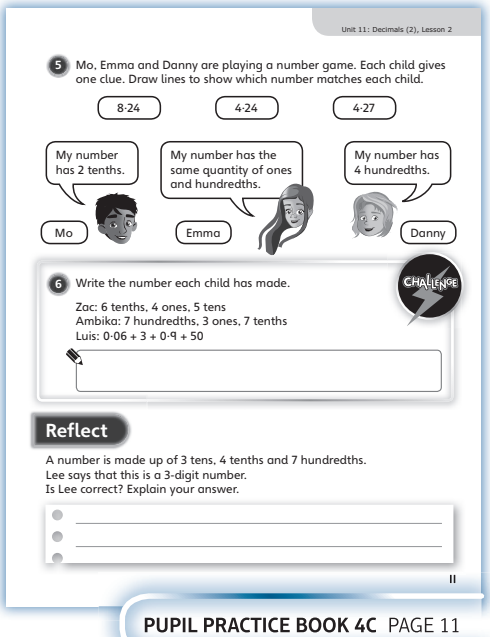
Reflect

WAYS OF WORKING Independent thinking

IN FOCUS This question checks for understanding of place value. The number given has three parts, so children may assume it is a 3-digit number. Children need to realise this is not always the case. Children should be able to explain what a 3-digit number is.

ASSESSMENT CHECKPOINT Children explain that the number is 30·47. They need to realise that even though 1s are not mentioned, we do not ignore that part when writing the decimal.

ANSWERS Answers for the **Reflect** part of the lesson appear in the separate **Practice and Reflect answer guide**.



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After the lesson

- Can children represent a number up to two decimal places on a place value grid?
- Can children work out what numbers are represented by given representations?

Comparing decimals

Learning focus

In this lesson, children will compare decimal numbers by looking at the largest place value and then moving to the next largest place value.

Small steps

- Previous step: Writing decimals
- **This step: Comparing decimals**
- Next step: Ordering decimals

NATIONAL CURRICULUM LINKS

Year 4 Number – Fractions (Including Decimals)

Compare numbers with the same number of decimal places up to two decimal places.

ASSESSING MASTERY

Children can compare decimal numbers using a place value grid and place value counters. They compare decimal numbers by looking at which number has the largest place value.

COMMON MISCONCEPTIONS

Children may not look at the largest place value first when comparing decimal numbers. Ask:

- *Which number has the higher value, 2·17 or 2·71? My number is 5·15. Can you think of a number that is larger than this?*

STRENGTHENING UNDERSTANDING

Recap comparing 2- or 3-digit numbers. Ask children to show a selection of these numbers on a place value grid. Explain that we need to look at the largest place value to help us compare the numbers. If the largest place value does not help us, then we must look at the next largest place value. Encourage children to write the numbers underneath the place value grid.

GOING DEEPER

Ask children to compare decimal numbers that are represented in different ways or that do not have the same number of decimal places. For example, ask: *Which is bigger, 5 ones and 2 tenths or 3 tenths and 5 ones? or Which is bigger, 4·5 or 4·25?*

KEY LANGUAGE

In lesson: tens (10s), ones (1s), tenths, hundredths, statement, compare, less than, greater than, decimal, place value

STRUCTURES AND REPRESENTATIONS

place value grid, hundredths grid

RESOURCES

Mandatory: place value counters, metre ruler

Optional: plastic coins

In the eTextbook of this lesson, you will find interactive links to a selection of teaching tools.

Before you teach

- Can children represent decimal numbers in a place value grid?
- Can children compare 2- and 3-digit numbers?
- Are children confident using the inequality signs < and >?

Discover

WAYS OF WORKING Pair work

ASK

- Question 1 a): *How can you represent Bella and Zac's numbers on a place value grid? How can you tell how many 1s, how many tenths and how many hundredths each number has? How can you decide which number is larger?*
- Question 1 b): *What numbers are you comparing in this question? Why does it not help to compare the 1s and tenths? Which place value do you need to look at?*

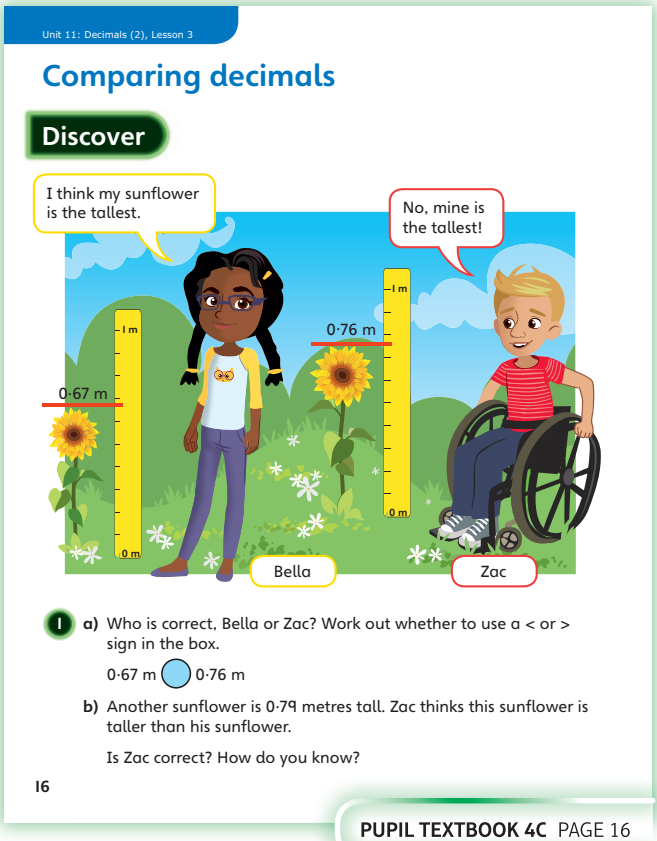
IN FOCUS For each question, encourage children to make the numbers with counters on a place value grid. Ask them to partition the numbers into 1s, tenths and hundredths. They should start to see that, to compare the numbers, they first need to look at the largest place value, then the next place value, and so on.

PRACTICAL TIPS Recreate a similar activity in the classroom. Measure two items of similar height and give children the measurements in the same format. For example: *Isabelle's chair is 0·43 metres tall. My chair is 0·49 metres tall.* Ask children to model the heights using a place value grid and counters.

ANSWERS

Question 1 a): 0·67 m < 0·76 m, so Zac is correct.

Question 1 b): Zac is correct as 0·79 is greater than 0·76.



PUPIL TEXTBOOK 4C PAGE 16

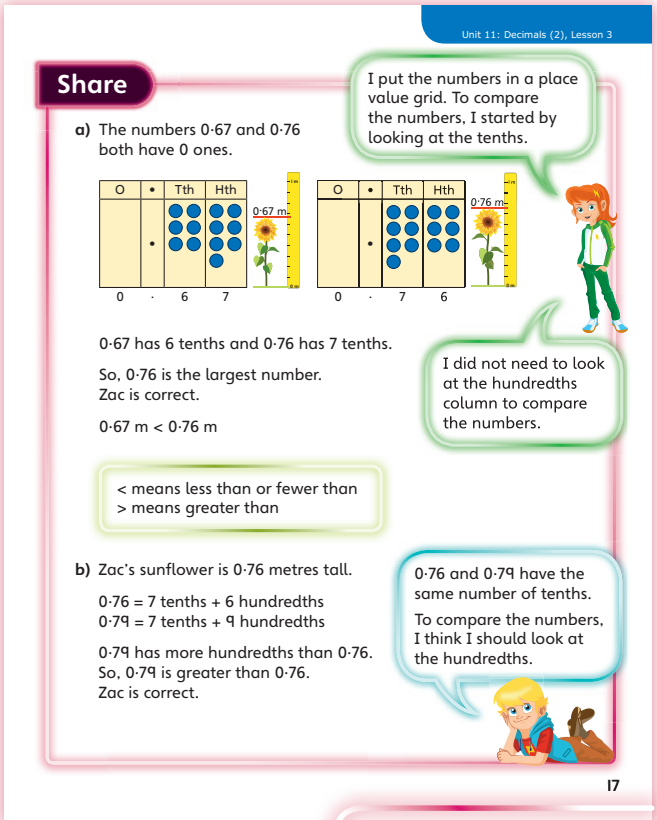
Share

WAYS OF WORKING Whole class teacher led

ASK

- Question 1 a): *How can you represent these numbers on place value grids? When comparing the numbers, why do you need to start by looking at the largest place value? How many 1s do the numbers have? Why does this not help you to compare the numbers? Why do you not need to look at the hundredths to compare the numbers?*
- Question 1 a): *What do the < and > signs mean?*
- Question 1 b): *What numbers are you comparing now? Why do you need to look at the hundredths to compare the numbers? Which number is bigger?*

IN FOCUS For question 1 a), model the numbers on a place value grid. Say how many 1s each number has. Can children explain why this does not help them find the answer? Say how many tenths each number has. Can children explain which number is bigger/smaller now? Can children explain why it is not necessary to look at how many hundredths each number has? Discuss the inequality sign and ensure children are able to use it correctly.



PUPIL TEXTBOOK 4C PAGE 17

Think together

WAYS OF WORKING Whole class teacher led (I do, We do, You do)

ASK

- Question 1: *Which numbers do you need to represent in the place value grid? How many 1s and tenths are there in 2·4 and 2·7? Who has jumped the farthest?*
- Question 2: *Can you represent £1·43 and £1·41 on a place value grid? Which place value is going to help you compare the numbers this time?*

IN FOCUS Question 3 looks at comparing decimal numbers that are represented in different ways. It also deals with comparing numbers that do not have the same number of decimal places. Encourage children to make the numbers in a place value grid and write each number as a decimal. Children need to understand that to compare the numbers they need to look at the largest place value first.

STRENGTHEN To support understanding, represent the numbers on a place value grid. Separate the 10s from the 1s from the tenths from the hundredths. Clearly associate each digit with the particular place value. Instead of just displaying the counters in the place value grids, make sure you write the numbers under each place value column; this will help children understand the size of the numbers and help them to compare the numbers.

DEEPEN Provide numbers represented by place value counters that are not given in the order of 10s, 1s, tenths and hundredths. This will help deepen their understanding that the order does not matter but that it is important to always compare the largest place value first.

Ask children to compare numbers that have a different number of decimal places, as in question 3.

ASSESSMENT CHECKPOINT Children should be able to evaluate decimals by comparing the 1s, tenths and hundredths. Are they able to compare decimal numbers using a place value grid and place value counters? Children need to understand that to compare decimal numbers they need to start by looking at the largest place value.

ANSWERS

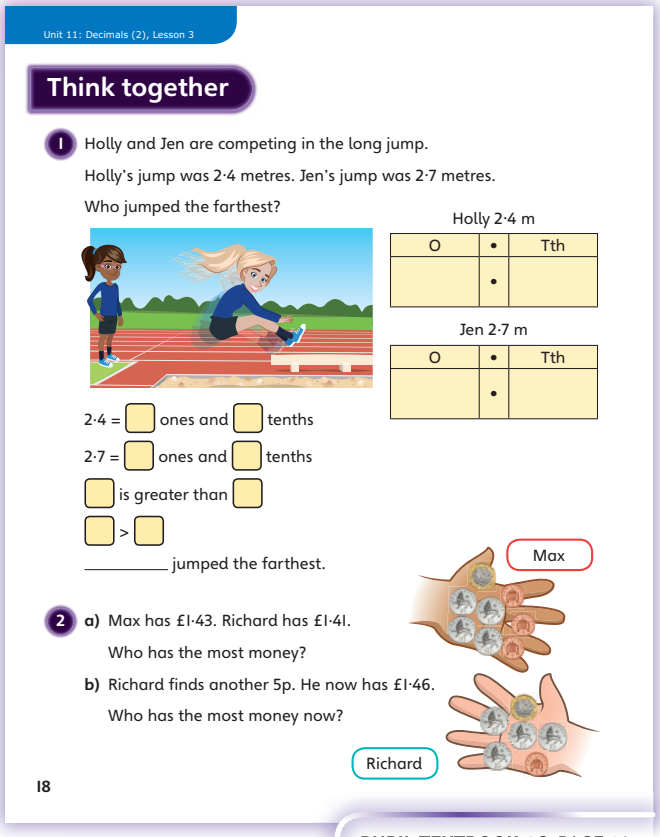
Question 1: 2·4 = 2 ones and 4 tenths
2·7 = 2 ones and 7 tenths
7 is greater than 4
2·7 > 2·4
Jen jumped the farthest.

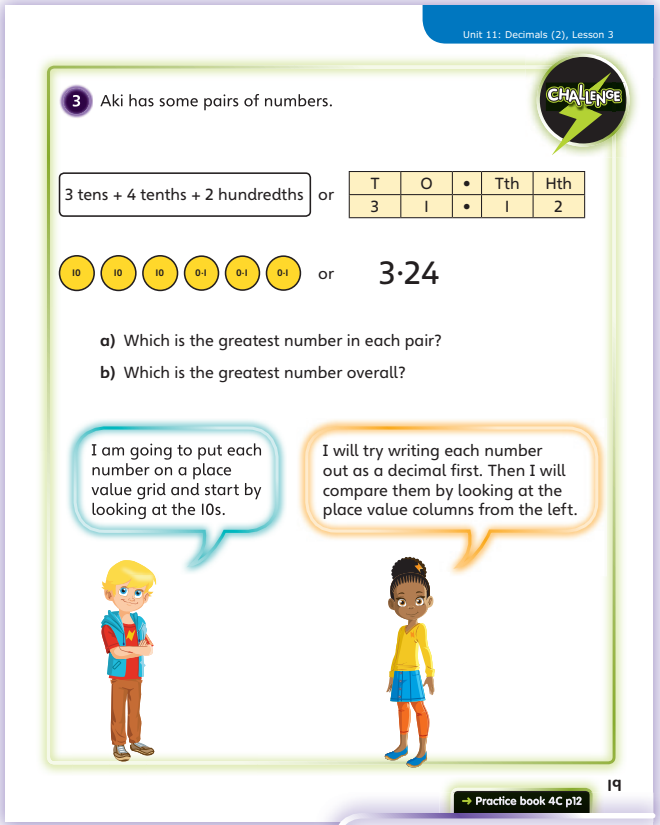
Question 2 a): £1·43 is greater than £1·41, so Max has the most money.

Question 2 b): £1·46 is greater than £1·43, so Richard now has the most money.

Question 3 a): 31·12 is greater than 30·42.
30·3 is greater than 3·24.

Question 3 b): 31·12 is the greatest number overall.





Practice

WAYS OF WORKING Independent thinking

IN FOCUS

- Question 2 highlights the misconception that more counters mean a bigger number. Encourage children to explain what the numbers are made up of and which place value helps them compare the numbers.
- Questions 4 to 6 are more abstract with no pictorial representations given. Ensure concrete resources are available to children as they may need to make their own representations of the number sentences.

STRENGTHEN In question 1, children can use a place value grid with the headings clearly labelled. Encourage children to write question 1 d) in order of place value size. This may help them understand which number is larger.

Assist children in writing out the numbers as decimals when they are not presented in this way.

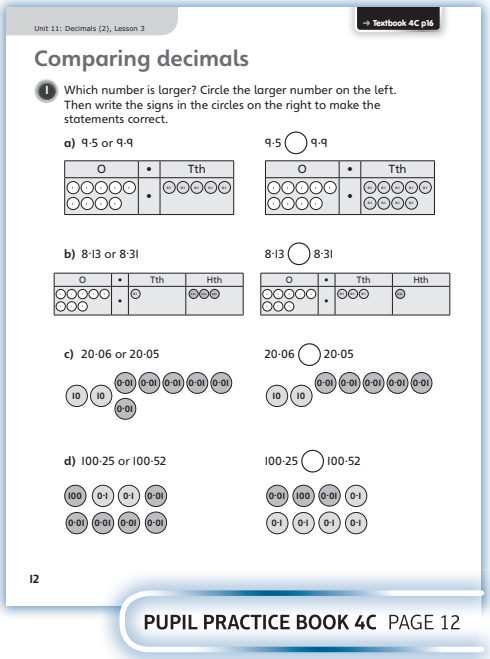
DEEPEN Comparing decimals can be further explored by giving children numbers that have a different number of decimal places.

Give children two numbers and ask them to give examples of numbers that are in between these values. For instance, which numbers are between 3·1 and 3 ones, 1 tenths and 9 hundredths? Are they able to explain how they know?

THINK DIFFERENTLY Question 5 asks children to consider more deeply the place value of digits within decimal numbers. Finding multiple potential answers will cement this learning.

ASSESSMENT CHECKPOINT Children should now be confident comparing decimals that have the same number of decimal places using a place value grid.

ANSWERS Answers for the **Practice** part of the lesson appear in the separate **Practice and Reflect answer guide**.



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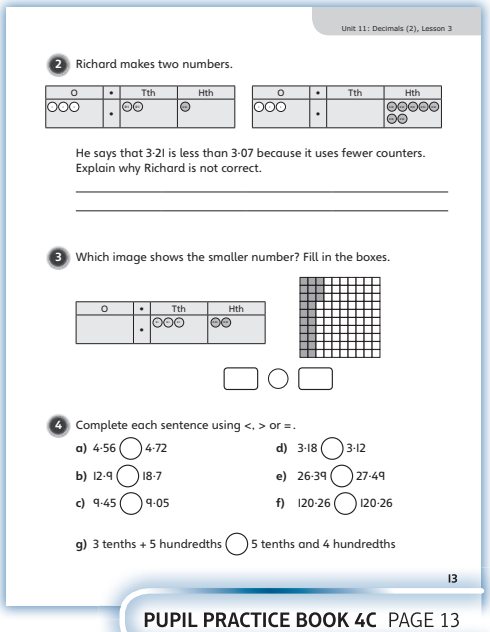


PUPIL PRACTICE BOOK 4C PAGE 13

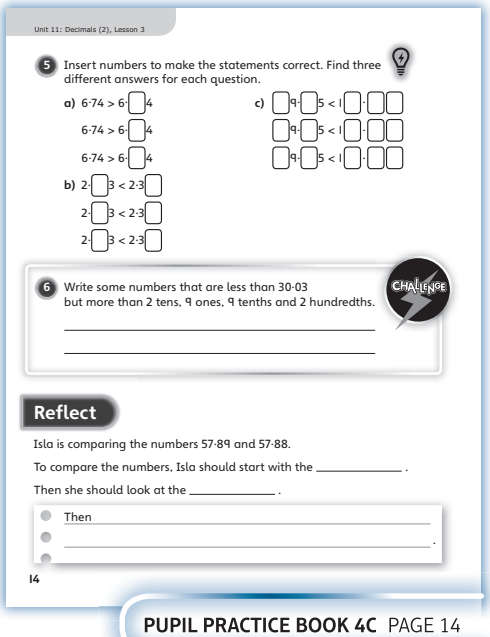
Reflect

WAYS OF WORKING Independent thinking

IN FOCUS This **Reflect** question checks children's understanding of comparing decimal numbers. It encourages them to explain the process in their own words. Children may need to use a place value grid to help them compare the numbers.

ASSESSMENT CHECKPOINT Children can explain how to compare decimal numbers. They should realise that they need to start by looking at the largest place value, then the next largest place value, and so on.

ANSWERS Answers for the **Reflect** part of the lesson appear in the separate **Practice and Reflect answer guide**.



PUPIL PRACTICE BOOK 4C PAGE 14

After the lesson

- Can children compare decimal numbers that have the same number of decimal places?
- Can children work out what numbers are represented by the diagrams in the questions?
- Do children understand that to compare numbers they need to start by looking at the largest place value?

Ordering decimals

Learning focus

In this lesson, children will order numbers with up to two decimal places.

Small steps

- Previous step: Comparing decimals
- **This step: Ordering decimals**
- Next step: Rounding decimals

NATIONAL CURRICULUM LINKS

Year 4 Number – Fractions (Including Decimals)

Compare numbers with the same number of decimal places up to two decimal places.

ASSESSING MASTERY

Children can order decimal numbers using a place value grid and place value counters. They start by looking at the largest place value.

COMMON MISCONCEPTIONS

When comparing decimals, children may not start by looking at the largest place value and then the next largest place value and so on. For example, to order 6·16, 5·09 and 6·12, children must focus on the 1s and then the hundredths. Ask:

- *Will focusing on the tenths help you in comparing these numbers?*
- *Which place value should you look at first when comparing numbers?*

STRENGTHENING UNDERSTANDING

Children who need support ordering decimal numbers should first recap ordering whole numbers. Ask children to show these numbers on a place value grid. Explain that they need to look at the largest place value to help them order the numbers. If this does not help, then they must look at the next largest place value and so on. Encourage children to write out the numbers underneath the place value grid.

GOING DEEPER

Give children some decimal numbers that are in order and ask them to place a number that would fit in the sequence. For example, ask children which numbers would replace the question mark in the sequence 5·67, 5·72, ?, 5·81. Is it possible to give an answer that has only one decimal place? Ask children to represent their answers on a place value grid. Alternatively, ask children to order numbers that do not have the same number of decimal places.

KEY LANGUAGE

In lesson: tens (10s), ones (1s), tenths, hundredths, smallest, largest, greatest, lightest, heaviest, compare, ascending

STRUCTURES AND REPRESENTATIONS

place value grid, number line

RESOURCES

Mandatory: place value counters, weighing scales

In the eTextbook of this lesson, you will find interactive links to a selection of teaching tools.

Before you teach

- Can children represent decimal numbers in a place value grid?
- Can children order whole numbers?
- Could children identify the number if given a number of 10s, 1s, tenths and hundredths?

Discover

WAYS OF WORKING Pair work

ASK

- Question 1 a): *How can you represent the rabbits' masses on a place value grid? How can you tell how many 1s, how many tenths and how many hundredths there are?*
- Question 1 a): *How can you decide which of the three numbers is the smallest? Why does it not help to compare the tenths?*
- Question 1 b): *Where would the second heaviest rabbit be in the order from lightest to heaviest? What numbers is this position in between? Which place values need to be the same when working out Flopsy's mass? Is there more than one answer?*

IN FOCUS For each question, encourage children to make the numbers on a place value grid and ask children to partition the numbers into 1s, tenths and hundredths. Children should start to see that to order the numbers they need to look at the largest place value, then the next place value and so on.

PRACTICAL TIPS Recreate the scene in the classroom using classroom objects and scales, or ask children to bring in stuffed animals from home.

ANSWERS

Question 1 a): Lily is the lightest, Bob is second lightest and Molly is the heaviest.

Question 1 b): Flopsy's mass could be 2·12 kg, 2·13 kg or 2·14 kg.

(Note: it is also possible to have an infinite number of answers that go into thousandths and ten thousandths, etc. For example, Flopsy's mass could be 2·121 kg. Here though, we are focusing on two decimal places.)


Unit 11: Decimals (2), Lesson 4

Ordering decimals

Discover

Which rabbit weighs the most?

Heaviest Rabbit Competition

Molly

Lily

Bob

2·15 kg

1·25 kg

2·11 kg

1 a) Order the rabbits from the lightest to the heaviest.

b) A fourth rabbit, Flopsy, is weighed.

Flopsy is the second heaviest out of the four rabbits.

What might Flopsy's mass be?

20

PUPIL TEXTBOOK 4C PAGE 20

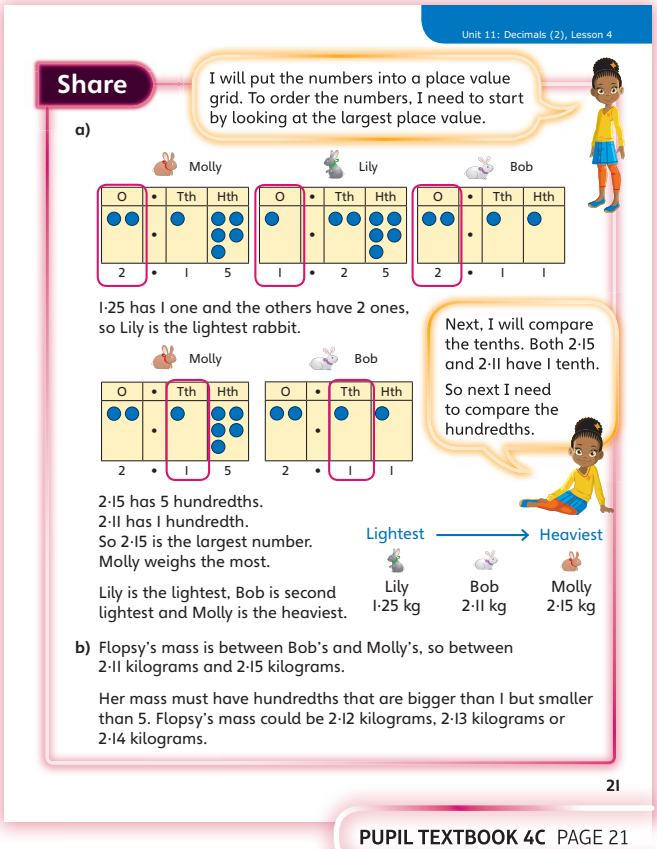
Share

WAYS OF WORKING Whole class teacher led

ASK

- Question 1 a): *How have the numbers been represented on the place value grids? What does each blue counter represent? Why do you need to follow Flo's example and start by looking at the largest place value? How many 1s do the numbers have?*
- Question 1 a): *How do you know that Lily is the lightest rabbit without looking at the tenths or hundredths? Why does it not help to compare the tenths? How many hundredths do the numbers have? How do you know which number is the biggest?*
- Question 1 b): *Which two rabbits is Flopsy's mass between? Why do you need to look at the hundredths to decide on Flopsy's mass? What could Flopsy's mass be? Is there more than one answer?*

IN FOCUS For question 1 a), show children the numbers on a place value grid. Can children explain why this means Lily is the lightest rabbit without having to compare the tenths or hundredths? For 2·15 and 2·11, say aloud how many tenths each number has. Can children explain why comparing the 1s and tenths for these numbers does not help? Say how many hundredths each number has. Can children explain which number is bigger/smaller now?


Unit 11: Decimals (2), Lesson 4

Share

I will put the numbers into a place value grid. To order the numbers, I need to start by looking at the largest place value.

a)

Molly Lily Bob

	O	•	Tth	Hth
Molly	2	•	1	5
Lily	1	•	2	5
Bob	2	•	1	1

1·25 has 1 one and the others have 2 ones, so Lily is the lightest rabbit.

Next, I will compare the tenths. Both 2·15 and 2·11 have 1 tenth.

So next I need to compare the hundredths.

Molly Bob

	O	•	Tth	Hth
Molly	2	•	1	5
Bob	2	•	1	1

2·15 has 5 hundredths.
2·11 has 1 hundredth.
So 2·15 is the largest number.
Molly weighs the most.

Lily is the lightest, Bob is second lightest and Molly is the heaviest.

Lightest → Heaviest

Lily 1·25 kg | Bob 2·11 kg | Molly 2·15 kg

b) Flopsy's mass is between Bob's and Molly's, so between 2·11 kilograms and 2·15 kilograms.

Her mass must have hundredths that are bigger than 1 but smaller than 5. Flopsy's mass could be 2·12 kilograms, 2·13 kilograms or 2·14 kilograms.

21

PUPIL TEXTBOOK 4C PAGE 21

Think together

WAYS OF WORKING Whole class teacher led (I do, We do, You do)

ASK

- Question 1: *How many 1s and tenths does each number have?*
- Question 2: *How many 10s, 1s, tenths and hundredths does each number have? Which place value is going to help you order the numbers? Do you need to look at all the place values?*
- Question 4 a): *Can you make each number in a place value grid?*
- Question 4 b): *Is there more than one possible way to order the numbers? Discuss with a partner.*

IN FOCUS Question 4 gives children some decimal numbers that are in order and asks them to identify the mistake or fill in the missing digits. Encourage children to make the numbers in a place value grid and write each number as a decimal. For question 4 b), encourage children to give more than one answer.

STRENGTHEN To support understanding, represent the numbers on place value grids and separate the 10s from the 1s from the tenths from the hundredths. Clearly associate each digit with the particular place value. Instead of just displaying the counters in the place value grids, ensure you also put the numbers under each place value column. This will help children understand the size of the numbers and help them order the numbers.

DEEPEN Provide partitioned numbers where one of the place value columns has been left empty. For example, ask children to order 4 tens and 4 tenths; 4 tens, 4 ones and 4 hundredths; 4 ones, 4 tenths and 4 hundredths. Children may have the misconception that 4 tens and 4 tenths is the smallest as it only contains 2 parts, so this exercise will help them understand the importance of place value. Encourage children to make these numbers in a place value grid.

ASSESSMENT CHECKPOINT Can children order decimal numbers using a place value grid and place value counters? Children need to understand that to order decimal numbers they need to start by looking at the largest place value. Children should be able to order decimals by comparing the 1s, tenths and hundredths.

ANSWERS

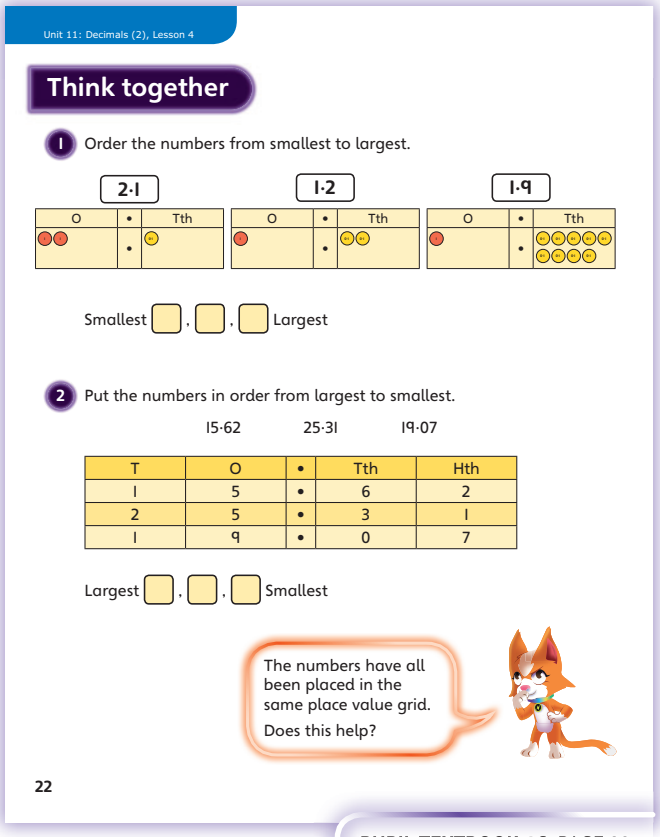
Question 1: Smallest 1·2, 1·9, 2·1 Largest

Question 2: Largest 25·31, 19·07, 15·62 Smallest

Question 3: Smallest 1·43, 1·53, 2·33 Largest

Question 4 a): 9·82 is in the wrong place

Question 4 b): Various possible answers, for example
5·31, 5·33, 5·54, 6·09, 6·12
5·32, 5·33, 5·54, 6·09, 6·13



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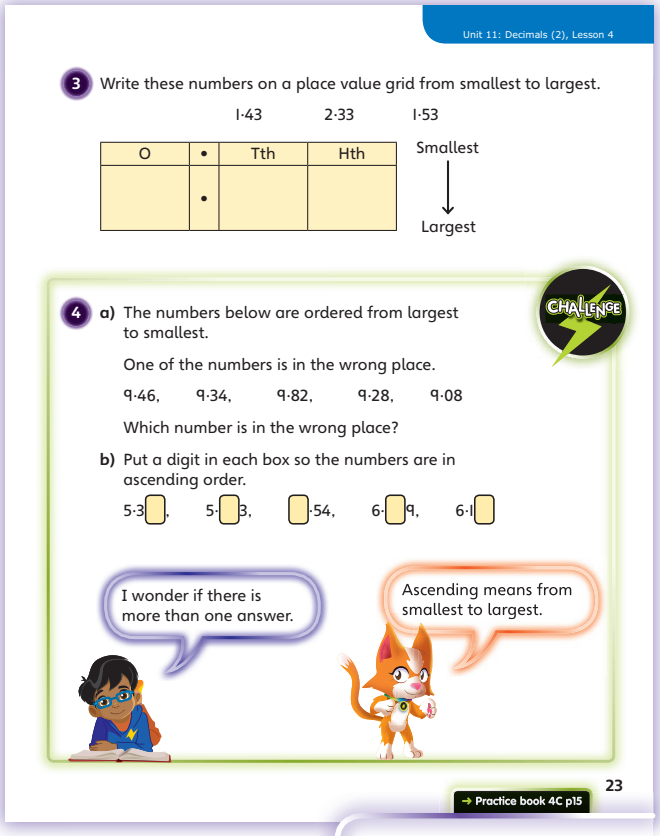


PUPIL TEXTBOOK 4C PAGE 23

Practice

WAYS OF WORKING Independent thinking

IN FOCUS Question 7 encourages children to problem solve and order decimal numbers. Encourage children to make the numbers on a place value grid and manipulate the counters until the numbers are in ascending order.

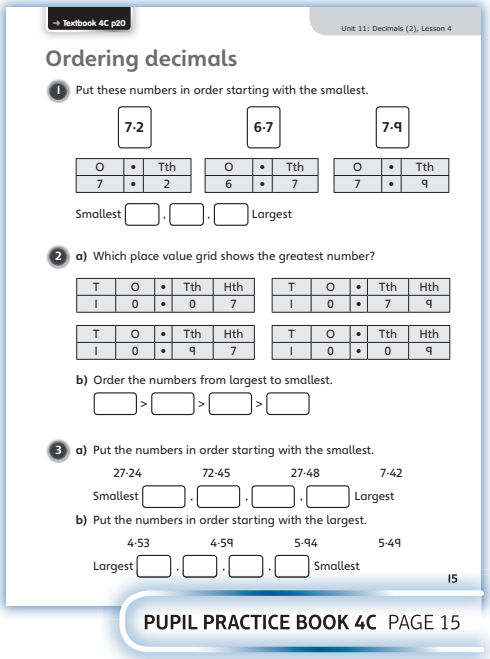
STRENGTHEN Encourage children to make each number on a place value grid. To start with, focus on numbers that only involve comparing the tenths, then progress to numbers that involve looking at other place value columns.

DEEPEN Ask children if they can come up with more than one answer for some of the numbers in question 7. They should discuss and compare their answers with a partner.

THINK DIFFERENTLY Question 6 aims to highlight the mistake that the largest number means the fastest time. Encourage children to think about this carefully. It may help them to relate the context to whole numbers in order to unpick this difficult misconception. For example, ask children if it is faster to complete a race in 30 seconds or 40 seconds. Does this mean the larger number is the faster time? Highlight that the context here shapes the answer.

ASSESSMENT CHECKPOINT By the end of the **Practice** section, children should be confident in using a place value grid to order decimals that have the same number of decimal places. Successful work in answering questions 3 and 4, including modelling the answers in a place value grid with counters and then writing the numbers, should indicate a sound understanding of the concept.

ANSWERS Answers for the **Practice** part of the lesson appear in the separate **Practice and Reflect answer guide**.



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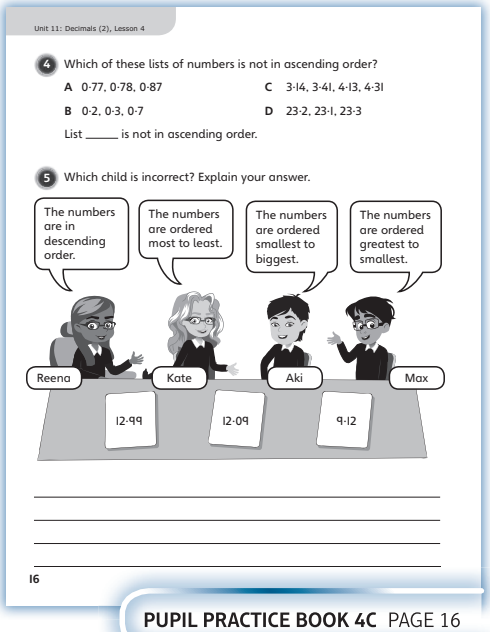


PUPIL PRACTICE BOOK 4C PAGE 16

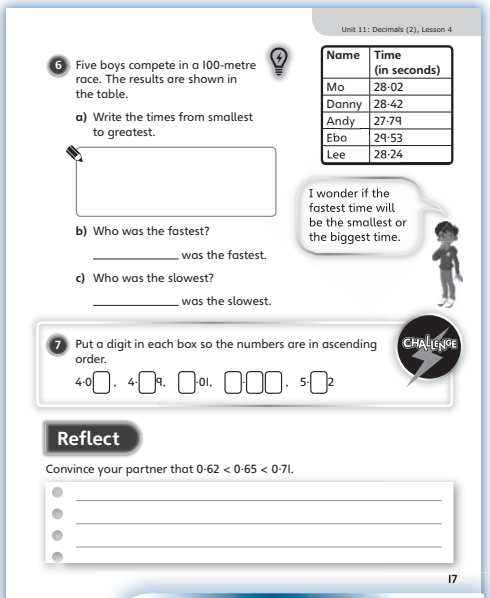
Reflect

WAYS OF WORKING Pair work

IN FOCUS This assesses a child's understanding of ordering decimal numbers and whether they can coherently describe their reasoning to a partner using mathematical language such as place value, greater than and less than.

ASSESSMENT CHECKPOINT Children can explain how to order decimal numbers. They need to realise that they need to start by looking at the largest place value and then the next largest place value and so on.

ANSWERS Answers for the **Reflect** part of the lesson appear in the separate **Practice and Reflect answer guide**.



PUPIL PRACTICE BOOK 4C PAGE 17

After the lesson

- Can children make numbers in a place value grid to help them order decimal numbers?
- Can children order decimal numbers that have the same number of decimal places?
- Do children understand that to order decimal numbers they need to start by looking at the largest place value?

Rounding decimals

Learning focus

In this lesson, children will round a decimal to the nearest whole number by looking at the tenths digit. They will place decimal numbers on a number line.

Small steps

- Previous step: Ordering decimals
- **This step: Rounding decimals**
- Next step: Halves and quarters

NATIONAL CURRICULUM LINKS

Year 4 Number – Fractions (Including Decimals)

Round decimals with one decimal place to the nearest whole number.

ASSESSING MASTERY

Children can round a number with one decimal place to the nearest whole number using a number line. They understand that to round a number to the nearest whole number they need to look at the tenths digit.

COMMON MISCONCEPTIONS

A common misconception occurs when children do not understand that within a number with one decimal place, the tenths digit determines what the number will round to. For example, they may see 8·2 and think it rounds to 9 because 8 is greater than 5. Children need to understand that the number in the tenths column determines the nearest whole number. Ask:

- *What would you round 8·2 to as the nearest whole number? Why? Which is the important place value here?*

Some children may also incorrectly round a number to the nearest 10. For example, some children may round 17·6 to 20. Ask:

- *What do we mean by a whole number? What is the closest whole number to 17·6?*

STRENGTHENING UNDERSTANDING

Children who need support with rounding to the nearest whole number should recap rounding to the nearest 10. For example, ask children to round 27 to the nearest ten and then explain how they did this (by looking at the 1s digit). Explain that we can round to the nearest whole number by looking at the tenths digit. Encourage children to place the number on a number line so they can clearly see the nearest whole number.

GOING DEEPER

Give children a whole number and ask if they can say what the number might have been before it was rounded to the nearest whole. Challenge them to find two or more answers.

KEY LANGUAGE

In lesson: tens (10s), ones (1s), tenths, number line, round up, round down, decimal place, whole number, digit

STRUCTURES AND REPRESENTATIONS

number line, place value grid, number cards

RESOURCES

Optional: place value counters

In the eTextbook of this lesson, you will find interactive links to a selection of teaching tools.

Before you teach

- Do children know that if the place value is 5 or more they round up to the next whole number, 10 or 100?
- Can children identify the tenth digit in a decimal number?
- Can children place decimals with one decimal place on a number line?

Discover

WAYS OF WORKING Pair work

ASK

- Question 1 a): *How many grams of sugar are in one serving of cereal?*
- Question 1 a): *Can you place 6·8 on a number line?*
- Question 1 b): *Can you place 1 on a number line? Which numbers would round to 1?*
- Question 1 b): *What does 'one decimal place' mean?*

IN FOCUS In question 1 a), encourage children to find or write the number on a number line. Some children may need support deciding which whole numbers 6·8 lies between. Encourage children to look at the tenths when rounding to the nearest whole number. They should see that Mo is correct.

PRACTICAL TIPS Recreate this activity by looking at the labels on various empty cereal packets or food wrappers and rounding some of the values to the nearest whole number.

ANSWERS

Question 1 a): Mo is correct. The amount of sugar is closer to 7 grams.

Question 1 b): The smallest possible amount of salt is 0·5 grams.

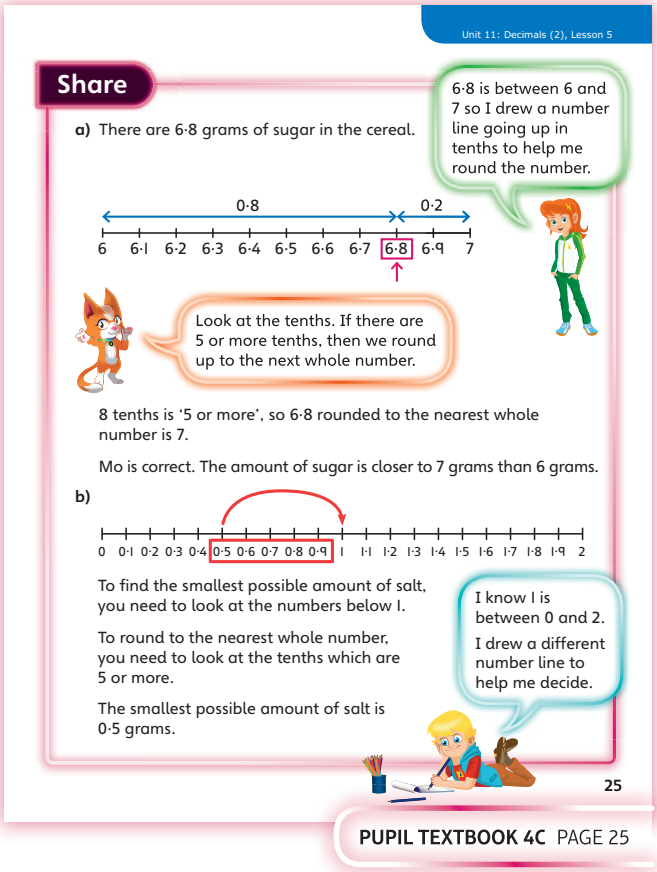
Share

WAYS OF WORKING Whole class teacher led

ASK

- Question 1 a): *Which whole number is 6·8 closer to: 6 or 7? Which part of the number helps you decide?*
- Question 1 b): *Do you need to look at the numbers below or above 1? How do you know?*

IN FOCUS For question 1 a), show children the number line from 6 to 7 and explain that we need to look at the tenths. If the number of tenths is 5 or more, then we round up to the next one. Remind children that a tenth is the first number after the decimal point.



Think together

WAYS OF WORKING Whole class teacher led (I do, We do, You do)

ASK

- Question 1 a): *What is the value of the tenths digit in the number 4·2? Is 4·2 closer to 4 or 5?*
- Question 1 b): *Which whole numbers does 12·5 lie between? What do you do when the tenths digit is 5 or more?*
- Question 2: *Can you place each of the numbers on a number line? Which numbers round to 8?*
- Question 3: *Which place value do you need to look at when rounding to the nearest whole number/10/100?*

IN FOCUS Question 3 challenges children to round to different values. Remind children that to round to the nearest 10 they need to look at the ones column and to round to the nearest 100 they need to look at the tens column. Encourage children to use a number line to help them.

STRENGTHEN To support understanding, represent each number on a number line and ask children to decide which whole number it is closer to. Encourage children to always identify the tenths digit and decide if it is 5 or more.

DEEPEN Give children a decimal number that rounds to the same number whether it is rounded to the nearest whole number, nearest 10 or nearest 100. For example, 199·7, rounded to the nearest whole number is 200. It is also 200 when rounded to the nearest 10 or the nearest 100. Ask children to explore other numbers that follow this pattern. Extend this to see if children can think of a number that rounds to the same number when rounded to the nearest whole and 10 but a different number when rounded to the nearest 100. For example, 19·6 rounds to 20 when rounded to the nearest whole number or nearest 10, but when rounded to the nearest 100 it is 0. Can they explain why this is? What are the smallest and largest numbers they can think of that this would work for?

ASSESSMENT CHECKPOINT Can children round numbers to the nearest whole number using a number line? Children need to understand that to round a number with one decimal place to the nearest whole number, they need to look at the tenths digit.

ANSWERS

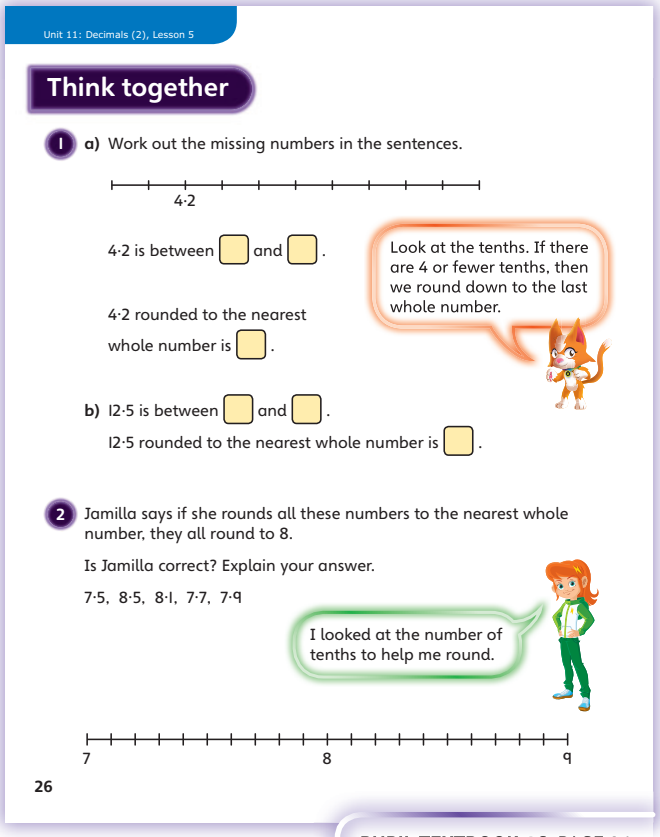
Question 1 a): 4·2 is between 4 and 5.
4·2 rounded to the nearest whole number is 4.

Question 1 b): 12·5 is between 12 and 13.
12·5 rounded to the nearest whole number is 13.

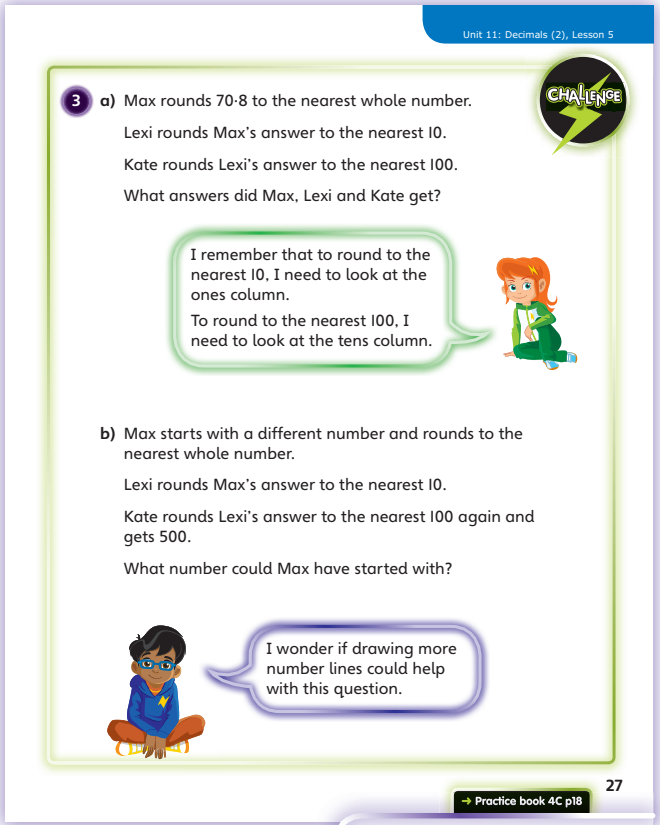
Question 2: Jamilla is incorrect. 8·5 rounds to 9.

Question 3 a): Max gets 71; Lexi gets 70; Kate gets 100.

Question 3 b): Various possible answers, between 444·5 and 544·4. Working backwards, 500 could have been 450 before Kate rounded to the nearest 100. 450 could have been 445 before Lexi rounded to the nearest 10. 445 could have been 444·5 before Max rounded it to the nearest whole number.



PUPIL TEXTBOOK 4C PAGE 26



PUPIL TEXTBOOK 4C PAGE 27

Practice

WAYS OF WORKING Independent thinking

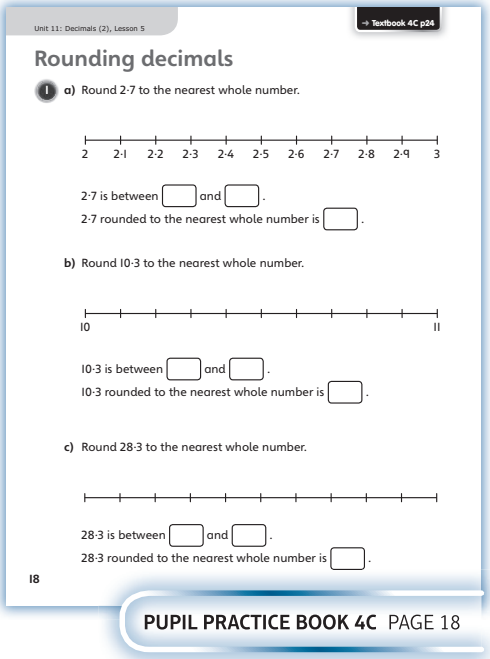
IN FOCUS Question 6 reinforces the value of the tenths and that they need to be 5 or more to round up to the next whole number and 4 or less to round down to the previous one. Encourage children to explain why their answers round to 80.

STRENGTHEN Children can place the numbers on a number line before writing their answers. When number lines are not given, persuade them to draw one of their own and label it going up in tenths.

DEEPEN Explore question 5 further by asking children to come up with more than one answer. Ask children what the smallest and largest value would be to go in each blank box. Can they explain their answers?

ASSESSMENT CHECKPOINT Children should now be confident in rounding a decimal number to the nearest whole number. They should also be able to write the numbers on a number line. Successful responses to questions 1 a) to 1 c) will demonstrate their confidence in these skills.

ANSWERS Answers for the **Practice** part of the lesson appear in the separate **Practice and Reflect answer guide**.


Unit 11: Decimals (2), Lesson 5

→ Textbook 4C p24

Rounding decimals

1 a) Round 2·7 to the nearest whole number.

2 2·1 2·2 2·3 2·4 2·5 2·6 2·7 2·8 2·9 3

2·7 is between ☐ and ☐.
2·7 rounded to the nearest whole number is ☐.

b) Round 10·3 to the nearest whole number.

10 11

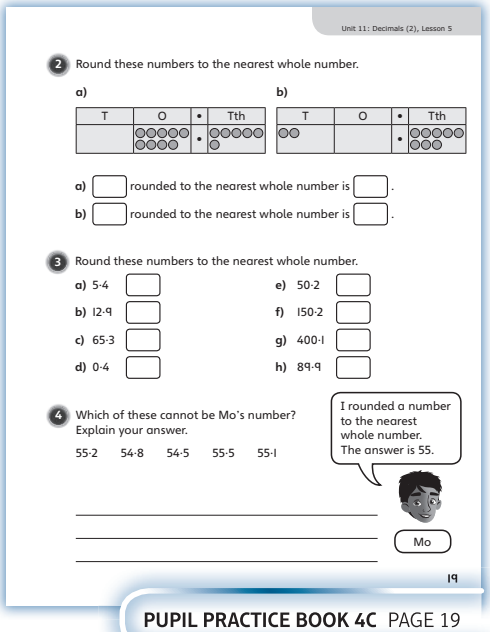
10·3 is between ☐ and ☐.
10·3 rounded to the nearest whole number is ☐.

c) Round 28·3 to the nearest whole number.

28·3 is between ☐ and ☐.
28·3 rounded to the nearest whole number is ☐.

18

PUPIL PRACTICE BOOK 4C PAGE 18


Unit 11: Decimals (2), Lesson 5

2 Round these numbers to the nearest whole number.

a) b)

	T	O	•	Tth
a)		●●●●● ●●●●	•	●●●●● ●
b)	●●		•	●●●●● ●●●

a) ☐ rounded to the nearest whole number is ☐.
b) ☐ rounded to the nearest whole number is ☐.

3 Round these numbers to the nearest whole number.

a) 5·4 ☐
b) 12·9 ☐
c) 65·3 ☐
d) 0·4 ☐
e) 50·2 ☐
f) 150·2 ☐
g) 400·1 ☐
h) 89·9 ☐

4 Which of these cannot be Mo's number? Explain your answer.

55·2 54·8 54·5 55·5 55·1

I rounded a number to the nearest whole number. The answer is 55.

Mo

19

PUPIL PRACTICE BOOK 4C PAGE 19

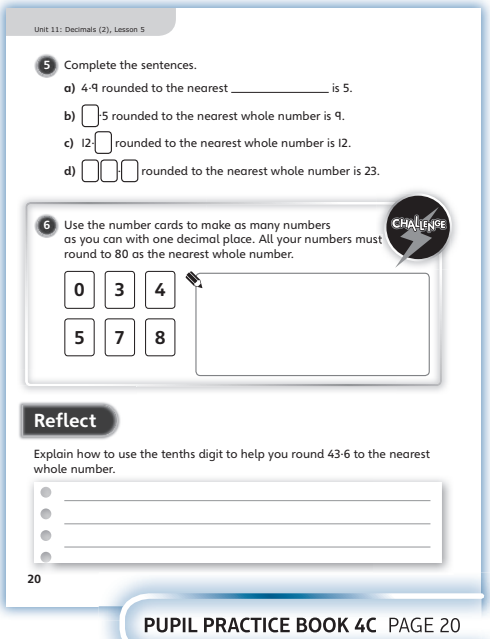
Reflect

WAYS OF WORKING Independent thinking

IN FOCUS This activity checks children's understanding of rounding to the nearest whole number. Children may need to use a number line to help them formulate their response. They should be confident in their explanation that if the tenths digit is 5 or more, they round up to the next whole number.

ASSESSMENT CHECKPOINT Children should answer that the number 43·6 rounds to 44 as the nearest whole number. As part of their explanation, they should describe how the tenths are used to determine this, as 6 tenths is '5 or more'.

ANSWERS Answers for the **Reflect** part of the lesson appear in the separate **Practice and Reflect answer guide**.


Unit 11: Decimals (2), Lesson 5

5 Complete the sentences.

a) 4·9 rounded to the nearest _____ is 5.
b) ☐·5 rounded to the nearest whole number is 9.
c) 12·☐ rounded to the nearest whole number is 12.
d) ☐☐☐ rounded to the nearest whole number is 23.

6 Use the number cards to make as many numbers as you can with one decimal place. All your numbers must round to 80 as the nearest whole number.

CHALLENGE

0 3 4
5 7 8

Reflect

Explain how to use the tenths digit to help you round 43·6 to the nearest whole number.

20

PUPIL PRACTICE BOOK 4C PAGE 20

After the lesson

- Can children represent a number with one decimal place on a number line?
- Can children round a number with one decimal place to the nearest whole number?

Halves and quarters

Learning focus

In this lesson, children will represent fractions and decimals using a number line and a hundredths grid. They will learn the decimal equivalents for $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{3}{4}$.

Small steps

- Previous step: Rounding decimals
- **This step: Halves and quarters**
- Next step: Problem solving – decimals

NATIONAL CURRICULUM LINKS

Year 4 Number – Fractions (Including Decimals)

Recognise and write decimal equivalents to $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$.

ASSESSING MASTERY

Children can write the decimal equivalents for $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{3}{4}$ and can accurately represent them on a number line and hundredths grid.

COMMON MISCONCEPTIONS

Some children will make the mistake of taking the numbers in the fraction and changing them into a decimal. They may, for example, think that $\frac{1}{4}$ = 1·4. Children need to understand what the fraction is telling them in order to find its decimal equivalent. Show children representations on a hundredths grid and number line in order to secure this understanding and avoid the misconception. Ask:

- *What does this fraction mean? How many hundredths does this fraction have? How do you know?*

STRENGTHENING UNDERSTANDING

Strengthen understanding of the decimal equivalents of $\frac{1}{4}$ and $\frac{3}{4}$ by showing them on a hundredths grid. First, have children practise colouring in $\frac{1}{4}$ and $\frac{3}{4}$, then talk about the decimal equivalents. It may be necessary to use a place value grid to show, for example, 25 hundredths as a decimal.

GOING DEEPER

Ask children to make decimal equivalents for fractions that are equivalent to $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{3}{4}$. For example, ask children to find the decimal equivalent of $\frac{2}{4}$. Ask questions such as: *What fraction is equivalent to 5 tenths?*

KEY LANGUAGE

In lesson: fraction, decimal, tenths, hundredths, part, equivalent, equivalent fraction

Other language to be used by the teacher: whole, whole number

STRUCTURES AND REPRESENTATIONS

hundredths grid, number line, bar model

RESOURCES

Mandatory: hundredths grid, number line from 0 to 1, multilink cubes, blank place value counters

Optional: place value grid

In the eTextbook of this lesson, you will find interactive links to a selection of teaching tools.

Before you teach

- Can children represent a fraction on a number line and on a hundredths grid?
- Can children represent hundredths on a hundredths grid?
- Do children know what equivalent means?

Discover

WAYS OF WORKING Pair work

ASK

- Question 1 a): *Ebo says that 0·5 is the same as $\frac{1}{2}$. What does $\frac{1}{2}$ mean?*
- Question 1 a): *How can you represent $\frac{1}{2}$?*
- Question 1 b): *What fraction full is Amelia's jug?*
- Question 1 b): *How can you represent $\frac{3}{4}$?*

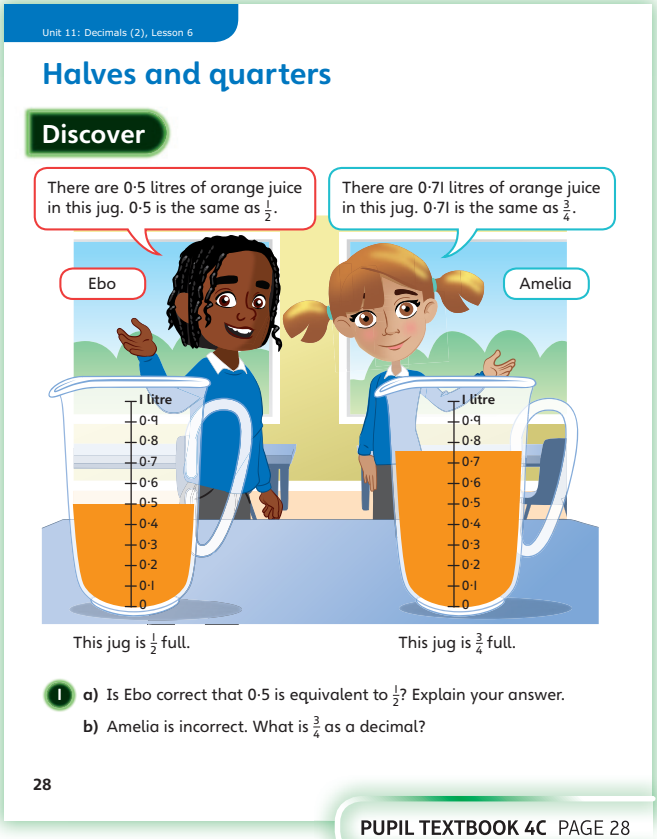
IN FOCUS This part of the lesson focuses on the decimal equivalents of $\frac{1}{2}$ and $\frac{3}{4}$. Begin by recapping with children what a fraction means. $\frac{1}{2}$ is 1 out of 2 equal parts and $\frac{3}{4}$ is 3 out of 4 equal parts.

PRACTICAL TIPS For each question, encourage children to make their own representation of the fraction. Children may use a number line or a hundredths grid to represent the fraction.

ANSWERS

Question 1 a): $\frac{1}{2}$ is equivalent to 0·5, so Ebo is correct.

Question 1 b): $\frac{3}{4}$ as a decimal is 0·75.



PUPIL TEXTBOOK 4C PAGE 28

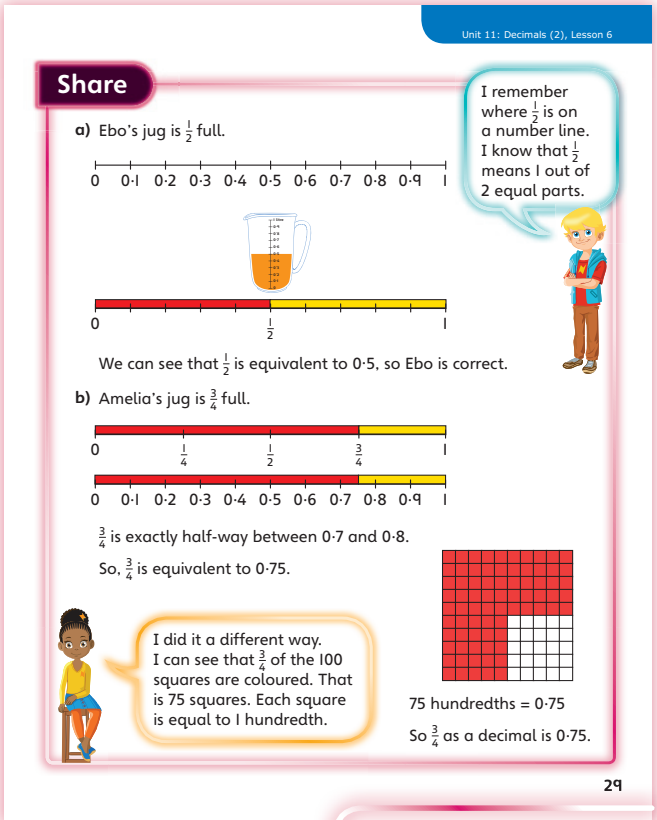
Share

WAYS OF WORKING Whole class teacher led

ASK

- Question 1 a): *How full is Ebo's jug? How can you use a number line to show this?*
- Question 1 b): *What does $\frac{3}{4}$ mean? How can you use a hundredths grid to show this? What do you need to look at to help you change the fraction to a decimal?*

IN FOCUS Discuss where $\frac{3}{4}$ is on the number line. Explain that $\frac{3}{4}$ is exactly halfway between 0·7 and 0·8. Can children explain why this is 0·75? This is where some children may give an answer of 7·1. Avoid this misconception by showing children the hundredths grid. Can children see that $\frac{3}{4}$ is shaded? Discuss how many small squares are shaded. Encourage children to say this as 75 hundredths. Can children explain why $\frac{3}{4}$ is equivalent to 0·75? A place value grid may be needed to remind children what 75 hundredths looks like as a decimal.



PUPIL TEXTBOOK 4C PAGE 29

Think together

WAYS OF WORKING Whole class teacher led (I do, We do, You do)

ASK

- Question 1: *Can you see $\frac{1}{4}$ on the hundredths grid? How many hundredths are shaded in? What is 25 hundredths as a decimal?*
- Question 2: *Can you shade $\frac{1}{2}$ of your hundredths grid? How many hundredths do you need to colour? How many tenths are coloured? What is 5 tenths as a decimal?*
- Question 3 a): *Can you write each diagram as a fraction or a decimal?*
- Question 3 b): *Can you use some of the resources and items on your table to demonstrate 0·25?*

IN FOCUS Questions 1 and 2 look at using hundredths grid to write the decimal equivalents for $\frac{1}{4}$ and $\frac{1}{2}$. Encourage children to make their own representations for each question. Ensure children are aware that they are dealing with hundredths and not whole numbers when looking at the hundredths grid. Say the numbers aloud to reinforce this.

STRENGTHEN To support understanding, ensure children have access to and use hundredths grids. For question 3 b), encourage children to write 25 hundredths on a place value grid so they can see why it is 0·25. They should also look at 3 a) to help them think of different ways of representing the decimal.

DEEPEN For question 3 b), can children offer an equivalent fraction to 0·25 that is not $\frac{1}{4}$? Encourage children to represent $\frac{1}{2}$ and $\frac{3}{4}$ in as many different ways as they can.

ASSESSMENT CHECKPOINT Questions 1 and 2 will provide an indication of whether children can accurately represent their answers on a hundredths grid and then translate their work with the physical resources into a more abstract written format.

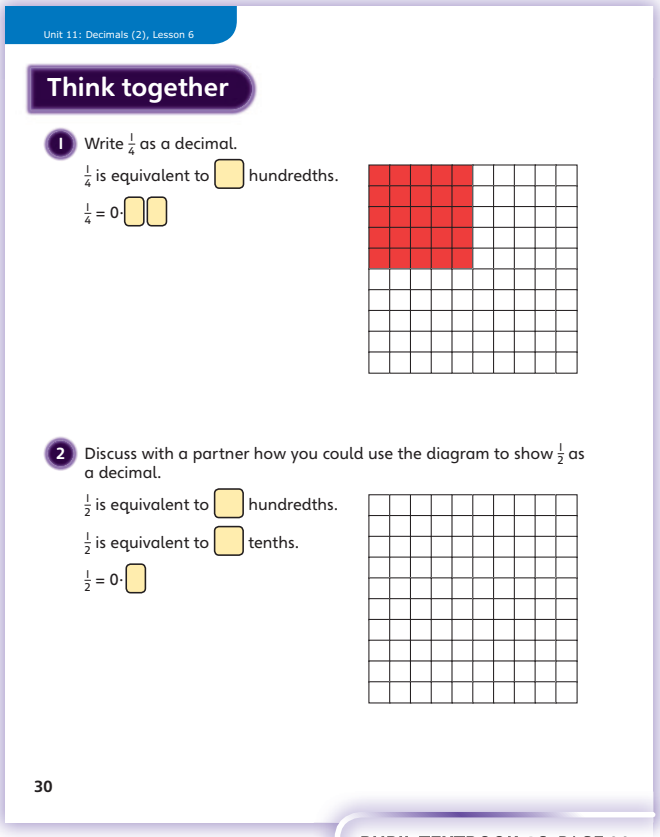
ANSWERS

Question 1: $\frac{1}{4}$ is equivalent to 25 hundredths.
$\frac{1}{4} = 0{\cdot}25$

Question 2: $\frac{1}{2}$ is equivalent to 50 hundredths.
$\frac{1}{2}$ is equivalent to 5 tenths.
$\frac{1}{2} = 0{\cdot}5$

Question 3 a): 3·4 is the odd one out as all the other representations show $\frac{3}{4}$ (or 0·75).

Question 3 b): Various possible representations.



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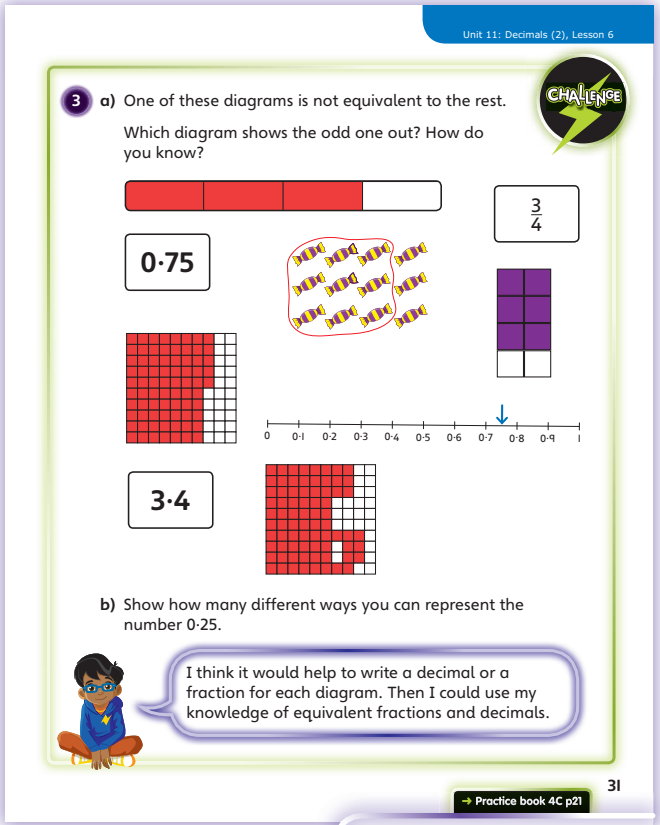


PUPIL TEXTBOOK 4C PAGE 31

Practice

WAYS OF WORKING Independent thinking

IN FOCUS Question 5 consolidates the equivalence of 0·5 and $\frac{1}{2}$. Children could work out $\frac{1}{2}$ of 12, but discuss with them whether this is necessary. Ask children what they know about $\frac{1}{2}$ and 0·5. What can they say about the number of apples each child has? This should reinforce the equivalency of $\frac{1}{2}$ and 0·5.

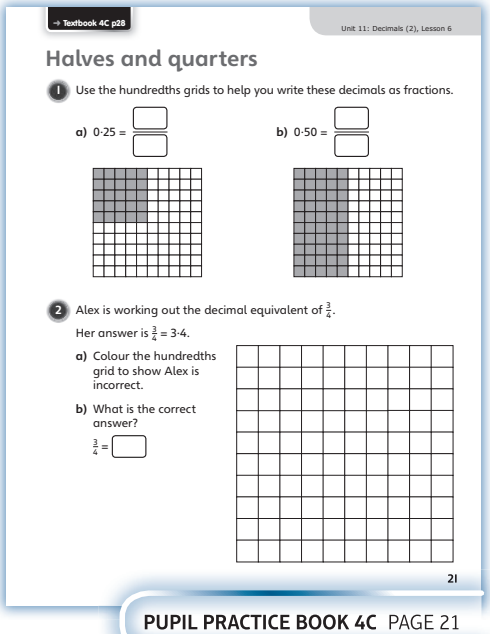
STRENGTHEN For all questions where diagrams are not provided, encourage children to make their own representations. For question 6, encourage children to use counters to represent the problem. This may help them to see how many counters there are in total. They can also convert 0·25 to a fraction and draw a bar model to represent the problem.

DEEPEN Question 6 can be explored further by asking children to find the total number of counters if 6 white counters represented 0·75 of the total counters. How many grey counters are there?

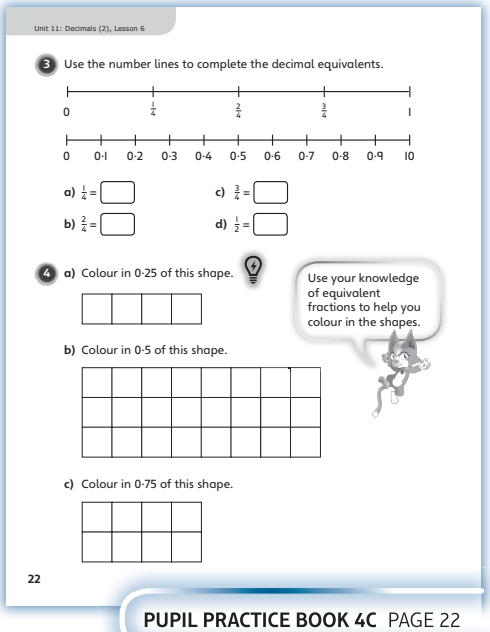
THINK DIFFERENTLY Question 4 provides an alternative representation. Encourage children to convert the decimals to fractions and think about how they would colour the fractions in.

ASSESSMENT CHECKPOINT By the end of **Practice**, children should be confident in writing the decimal equivalents for $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{3}{4}$ using a hundredths grid and a number line. Their responses to question 3 should indicate their level of understanding and highlight any areas where further practice may be necessary.

ANSWERS Answers for the **Practice** part of the lesson appear in the separate **Practice and Reflect answer guide**.



PUPIL PRACTICE BOOK 4C PAGE 21



PUPIL PRACTICE BOOK 4C PAGE 22

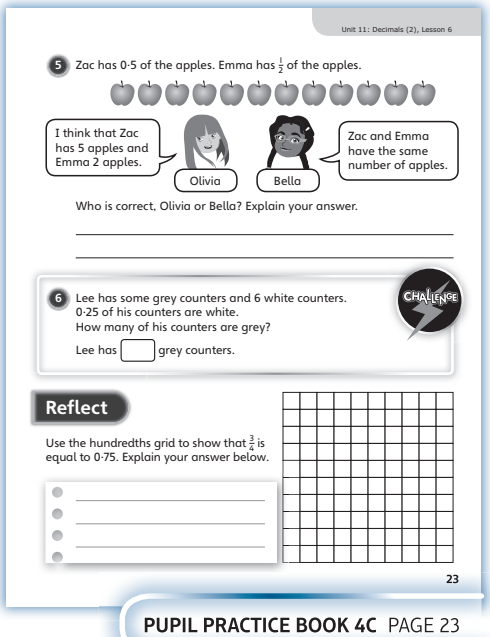
Reflect

WAYS OF WORKING Independent thinking

IN FOCUS In this part of the lesson, children must demonstrate the equivalency of 0·75 and $\frac{3}{4}$. Suggest that they colour the hundredths grid. Do children understand what they need to do and how many squares need to be coloured?

ASSESSMENT CHECKPOINT Children should use the hundredths grid provided to show that 0·75 is equivalent to $\frac{3}{4}$. Children should recognise that $\frac{3}{4}$ is 75 hundredths and colour the squares accordingly. They should then be able to write this as 0·75.

ANSWERS Answers for the **Reflect** part of the lesson appear in the separate **Practice and Reflect answer guide**.



PUPIL PRACTICE BOOK 4C PAGE 23

After the lesson

- Can children show the decimal equivalents for $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{3}{4}$ on a hundredths grid?
- Can children locate and write the decimal equivalents for $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{3}{4}$ on a number line?

Problem solving – decimals

Learning focus

In this lesson, children will convert between different units of measurement and solve simple problems.

Small steps

- Previous step: Halves and quarters
- **This step: Problem solving – decimals**
- Next step: Pounds and pence

NATIONAL CURRICULUM LINKS

Year 4 Number – Fractions (Including Decimals)

Solve simple measure and money problems involving fractions and decimals to two decimal places.

ASSESSING MASTERY

Children can convert between different units of measurement, including grams to kilograms, litres to millilitres, and kilometres to metres to centimetres and vice versa.

COMMON MISCONCEPTIONS

Children may use the incorrect number when converting. Use real-life objects where possible, for example show children a metre ruler. Ask:

- *Can you find 100 centimetres? Is 100 centimetres the same as 1 metre?*

Children may not know whether to multiply or divide to convert between measurements. For instance, when converting 5 millilitres to litres, they may try 5 × 1,000. Show children a litre jug to help them understand. Ask:

- *What does 5 millilitres look like? Is 5,000 litres a realistic answer?*

STRENGTHENING UNDERSTANDING

Children who need support converting between measurements should focus on one conversion to begin with. Centimetres and metres is a good starting point as children can use a metre ruler to help them convert. Talk about whether the number will be bigger or smaller before they work anything out. For example, when converting 60 centimetres to metres, do they think the number is going to be bigger or smaller than 60? Ask them to explain how they know.

GOING DEEPER

Ask children to solve problems that involve converting between units. For example, ask children to find the perimeter of a rectangle with a length of 3 kilometres and a width of 440 metres. They could represent this in a diagram.

KEY LANGUAGE

In lesson: kilometres, metres, centimetres, litres, millilitres, kilograms, grams, mass, convert, capacity, cube, cylinder, units, divide (÷), heaviest, lightest

STRUCTURES AND REPRESENTATIONS

bar model

RESOURCES

Optional: metre ruler, weighing scales and weights, measuring jug

In the eTextbook of this lesson, you will find interactive links to a selection of teaching tools.

Before you teach

- Do children know how to multiply and divide by 10, 100 and 1,000?
- Are children confident measuring in centimetres, millilitres and grams?

Discover

WAYS OF WORKING Pair work

ASK

- Question 1: *What does it mean if the scale is balanced? Are both of these scales balanced?*
- Question 1 a): *What is the mass of 2 cubes? How could you work out the mass of 1 cube?*
- Question 1 b): *How many cubes are on the left-hand side of the scale? What is the mass of the cubes?*
- Question 1 b): *How many grams are in a kilogram? How can you convert 2 kilograms to grams?*

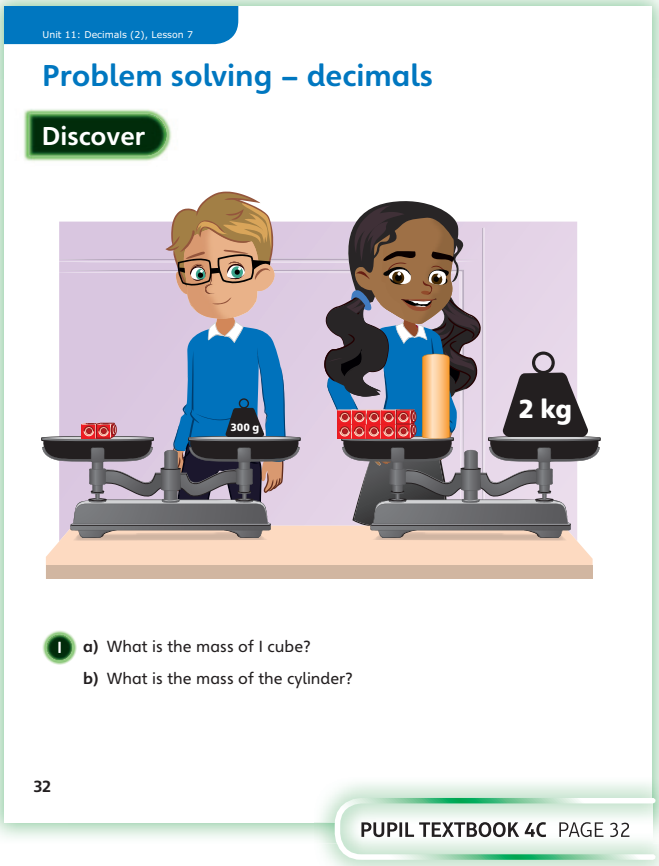
IN FOCUS For question 1 b), encourage children to use 10 cubes and a counter to represent the second scale. Remind them that each cube weighs 150 grams. Can they say the combined mass in grams of the 10 cubes on the left-hand side of the scale? Can they say the mass in grams of the object on the right-hand side of the scale? Allow children to say the units of each mass so they realise it is necessary to convert between units. Encourage children to use their concrete objects or draw a bar model to show what is happening in this problem and get them to write the masses in grams.

PRACTICAL TIPS Recreate the **Discover** scene using classroom equipment and balance scales, if available.

ANSWERS

Question 1 a): The mass of 1 cube is 150 grams.

Question 1 b): The mass of the cylinder is 500 grams.



PUPIL TEXTBOOK 4C PAGE 32

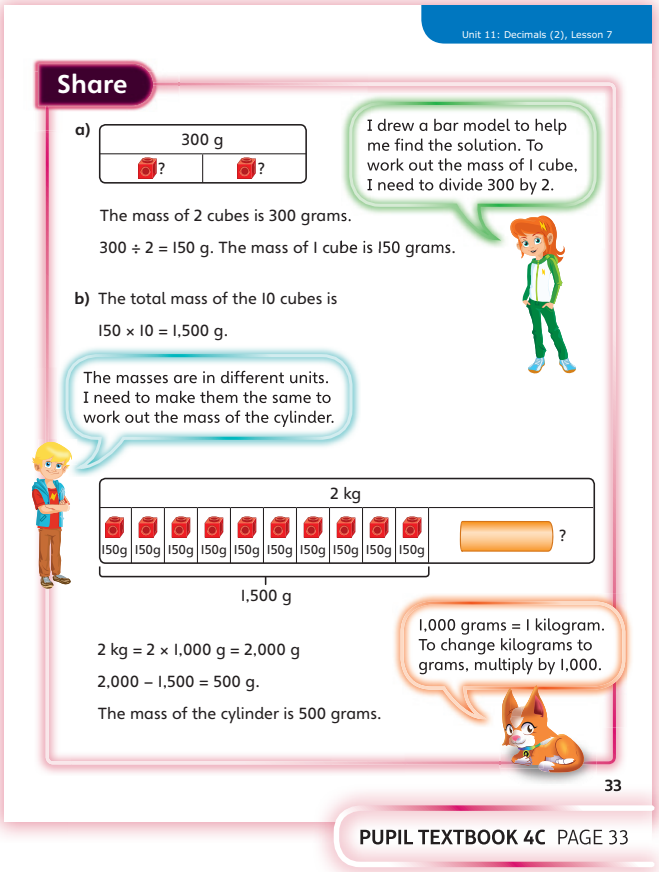
Share

WAYS OF WORKING Whole class teacher led

ASK

- Question 1 a): *How do you know the mass of 2 cubes is 300 grams? How can you use a bar model to show this?*
- Question 1 b): *How can you use a bar model to show the mass of the 10 cubes and the cylinder? How can you work out the mass of the cylinder?*

IN FOCUS Show children the diagram of the bar model for question 1 b) with the cubes and cylinders. Can children see why the 10 cubes and cylinder are together in 1 bar and why 2 kg is written at the top of the bar? Explain that to work out the mass of the cylinder we need to be dealing with the same units of measurement. Can children explain why 2 kilograms is 2,000 grams? Can children see why they need to subtract 1,500 from 2,000 to find the mass of the cylinder?



PUPIL TEXTBOOK 4C PAGE 33

Think together

WAYS OF WORKING Whole class teacher led (I do, We do, You do)

ASK

- Question 1 a): *If 1 kilogram is 1,000 grams, what is 7 kilograms?*
- Question 1 d): *Can you partition 7,300 m into 1,000s and 100s? What is 7,000 metres in kilometres?*
- Question 1 f): *In millilitres, what is the combined total of 5,000 ml and 300 ml?*

IN FOCUS Encourage children to think carefully about whether they are going to multiply or divide for each question. Ensure children show the calculation they are doing and always write the units after every number.

STRENGTHEN To support understanding, question 2 could be represented using metre rulers. Give children some questions using smaller numbers, for example, converting 65 centimetres to metres or 2 metres to centimetres. Children can then use the rulers to help them.

DEEPEN Question 1 can be explored further by asking children to write their answers as decimal numbers. For example, instead of 3,600 g = 3 kg and 600 g, ask children to write it as 3·6 kg. Question 3 can also be explored further by asking children to give their answers in kilometres as well as centimetres and metres.

ASSESSMENT CHECKPOINT Can children convert between grams and kilograms, litres and millilitres, kilometres and metres, metres and centimetres?

ANSWERS

Question 1 a): 7 kilograms = 7,000 grams.

Question 1 b): 3,600 g = 3 kg and 600 g.

Question 1 c): 9 kilometres = 9,000 metres.

Question 1 d): 7,300 m = 7 km and 300 m.

Question 1 e): 6,000 millilitres = 6 litres.

Question 1 f): 5 l and 300 ml = 5,300 ml.

Question 2: Luis needs to swim 20 lengths.
50 m × 20 = 1,000 m or 1 km.

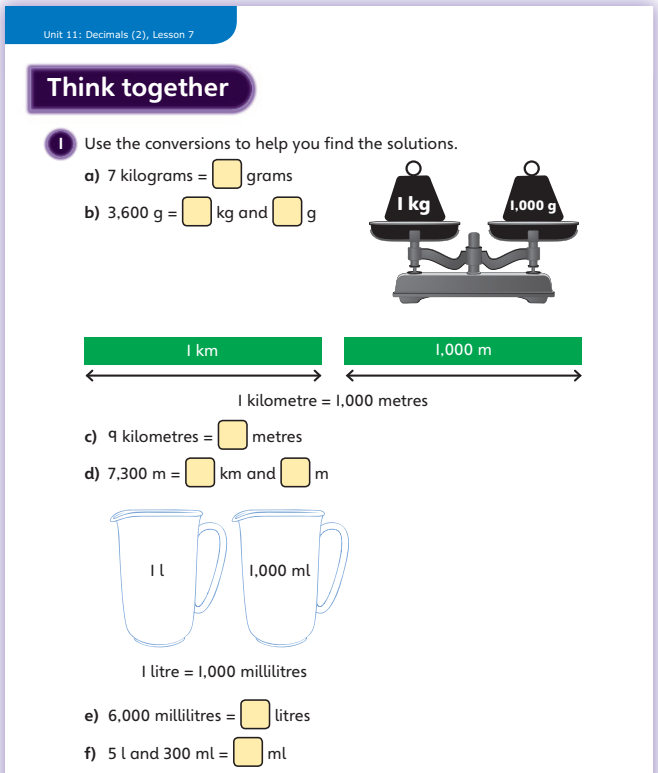
Question 3 a): There are 100 centimetres in 1 metre.

Question 3 b) i): 700 cm = 7 m

Question 3 b) ii): 12 m = 1,200 cm

Question 3 b) iii): 450 cm = 4 m and 50 cm

Question 3 b) iv): 395 cm = 3 m and 95 cm



Unit 11: Decimals (2), Lesson 7

Think together

1 Use the conversions to help you find the solutions.

a) 7 kilograms = ☐ grams

b) 3,600 g = ☐ kg and ☐ g

1 kilometre = 1,000 metres

c) 9 kilometres = ☐ metres

d) 7,300 m = ☐ km and ☐ m

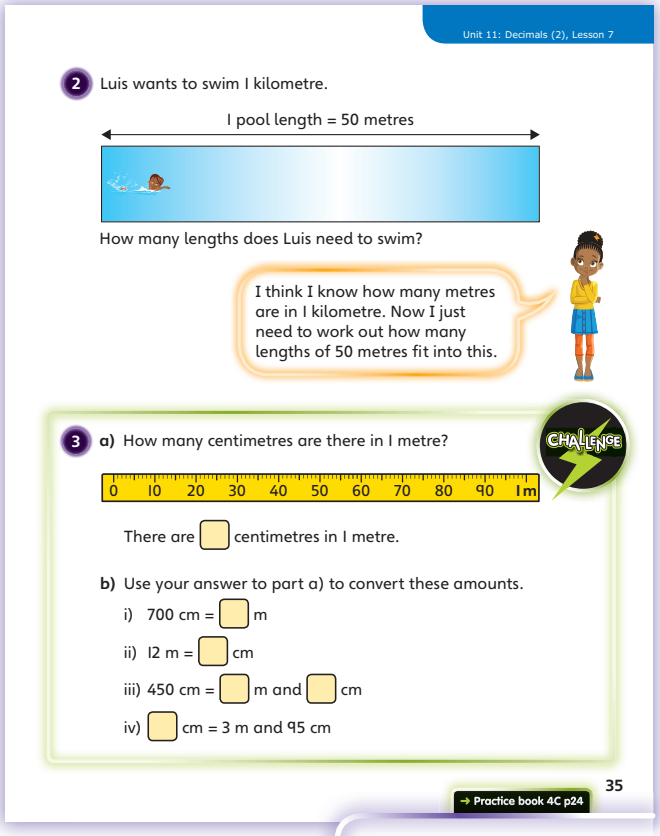
1 litre = 1,000 millilitres

e) 6,000 millilitres = ☐ litres

f) 5 l and 300 ml = ☐ ml

34

PUPIL TEXTBOOK 4C PAGE 34



Unit 11: Decimals (2), Lesson 7

2 Luis wants to swim 1 kilometre.

How many lengths does Luis need to swim?

I think I know how many metres are in 1 kilometre. Now I just need to work out how many lengths of 50 metres fit into this.

3 a) How many centimetres are there in 1 metre?

CHALLENGE

There are ☐ centimetres in 1 metre.

b) Use your answer to part a) to convert these amounts.

i) 700 cm = ☐ m

ii) 12 m = ☐ cm

iii) 450 cm = ☐ m and ☐ cm

iv) ☐ cm = 3 m and 95 cm

35

→ Practice book 4C p24

PUPIL TEXTBOOK 4C PAGE 35

Practice

WAYS OF WORKING Independent thinking

IN FOCUS Question 4 consolidates children's understanding of converting between centimetres and metres. Encourage children to convert all the numbers to the same unit, for example, all to metres or all to centimetres. Discuss with children which may be more useful.

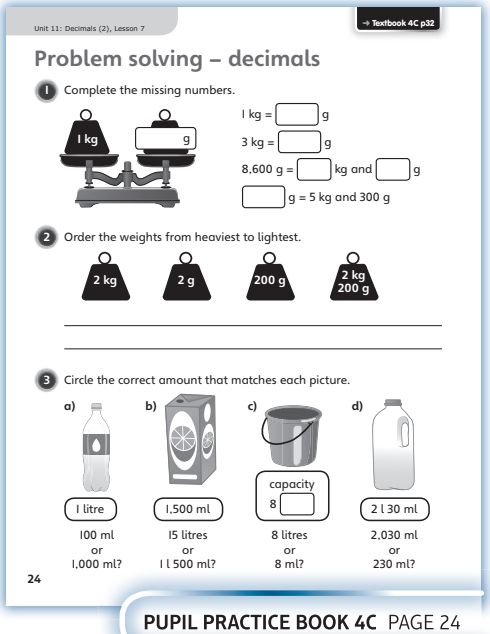
STRENGTHEN For question 3, show children real-life examples. For instance, show children what 8 millilitres of water looks like. Show children a bucket and 1 litre of water. Ask them if it would be logical to have a bucket that held 8 millilitres. This may help them to visualise the size of the measurements.

DEEPEN Question 7 can be explored further by asking children if they can represent the measurements in different ways. For example, 8 kg and 300 g + 1 kg and 700 g = 10 kg could be represented by 100 g + 2.9 kg + 7 kg = 10 kg. How many different ways can children come up with?

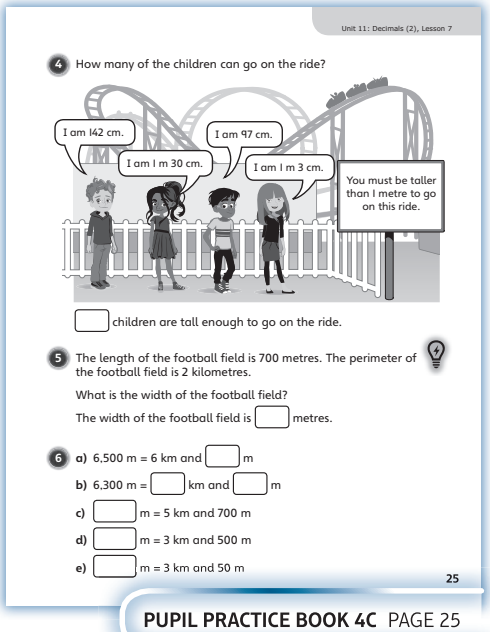
THINK DIFFERENTLY Question 5 encourages children to think a little differently in their problem solving, while also converting between units. Children may need reminding of the definition of perimeter. They need to realise that if they know one length, they will also know the other length. Ask them how they will work out the remaining distance of the two widths, and then one width.

ASSESSMENT CHECKPOINT By the end of **Practice**, children should be confident in converting between grams and kilograms, litres and millilitres, kilometres and metres, metres and centimetres. The ability to successfully answer all parts of questions 6 and 7 will indicate whether they need further practice or are mastering this skill.

ANSWERS Answers for the **Practice** part of the lesson appear in the separate **Practice and Reflect answer guide**.



PUPIL PRACTICE BOOK 4C PAGE 24



PUPIL PRACTICE BOOK 4C PAGE 25

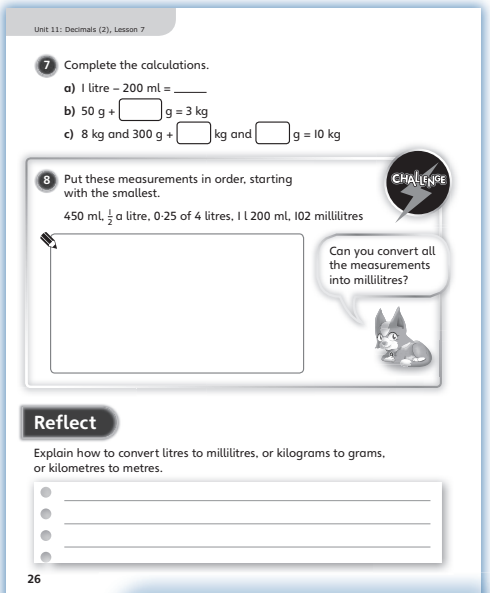
Reflect

WAYS OF WORKING Independent thinking

IN FOCUS This activity checks children's understanding of converting between measurements. Children should be able to confidently explain without looking back at the conversions in the workbook.

ASSESSMENT CHECKPOINT Children can explain how to convert between grams and kilograms or litres and millilitres or kilometres and metres. They offer a confident answer using accurate conversions and key vocabulary.

ANSWERS Answers for the **Reflect** part of the lesson appear in the separate **Practice and Reflect answer guide**.



PUPIL PRACTICE BOOK 4C PAGE 26

After the lesson

- Can children convert between grams and kilograms, litres and millilitres, kilometres and metres, metres and centimetres?

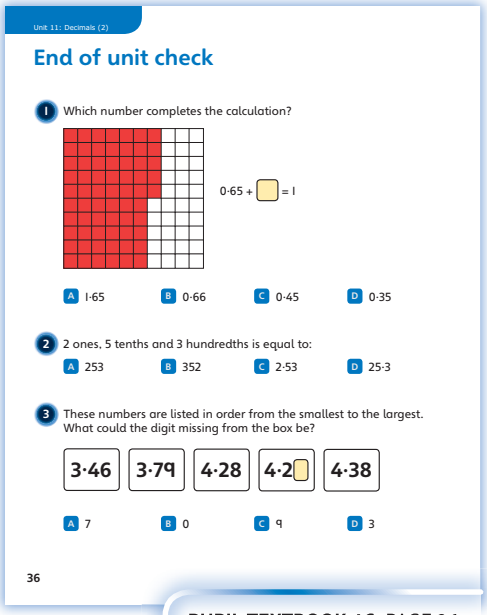
End of unit check

Don't forget the *Power Maths* unit assessment grid on p26.

WAYS OF WORKING Group work adult led

IN FOCUS These questions are designed to draw out particular misconceptions or misunderstandings. Question 6 is a SATS-style question which focuses on converting grams into kilograms. Children need to link this to the work they have just completed on decimals and their knowledge of how many grams are in a kilogram.

ANSWERS AND COMMENTARY By the end of the unit, children will be able to find the number bond to 1 of a decimal with two decimal places. They will be able to round numbers to the nearest whole number and order decimals with the same number of decimal places by comparing digits. Finally, children will know and understand decimal equivalents of simple fractions such as a half and a quarter.


Unit 11: Decimals (2)

End of unit check

1 Which number completes the calculation?

0·65 + ☐ = 1

A 1·65 B 0·66 C 0·45 D 0·35

2 2 ones, 5 tenths and 3 hundredths is equal to:

A 253 B 352 C 2·53 D 25·3

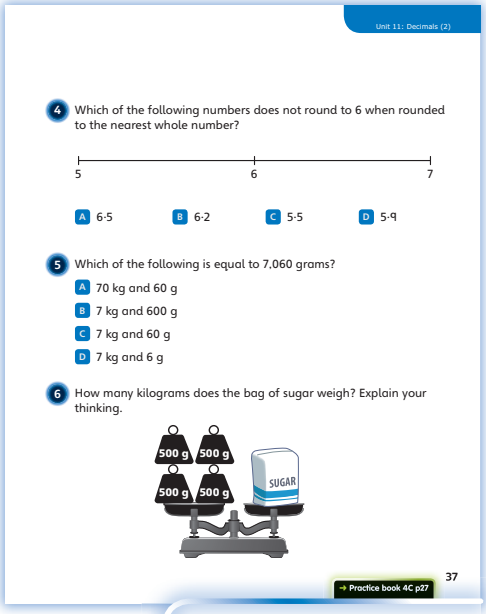
3 These numbers are listed in order from the smallest to the largest. What could the digit missing from the box be?

3·46 | 3·79 | 4·28 | 4·2☐ | 4·38

A 7 B 0 C 9 D 3

36

PUPIL TEXTBOOK 4C PAGE 36


Unit 11: Decimals (2)

4 Which of the following numbers does not round to 6 when rounded to the nearest whole number?

A 6·5 B 6·2 C 5·5 D 5·9

5 Which of the following is equal to 7,060 grams?

A 70 kg and 60 g
B 7 kg and 600 g
C 7 kg and 60 g
D 7 kg and 6 g

6 How many kilograms does the bag of sugar weigh? Explain your thinking.

37

→ Practice book 4C p27

PUPIL TEXTBOOK 4C PAGE 37

Q	A	WRONG ANSWERS AND MISCONCEPTIONS	STRENGTHENING UNDERSTANDING
1	D	A suggests children added together the 1 and 0·65. B suggests they just added 1 to 65.	For question 1, children should count the squares. Encourage children to count in 10s, not 1s, where possible. For question 2, children might find a place value grid and counters help them better understand the value of the number. For question 4, children should place the numbers on a number line to help them.
2	C	B suggests children have confused tenths with 10s and hundredths with 100s. D suggests children are confused about where to put the decimal point.	
3	C	A, B and D suggest children are unsure about hundredths.	
4	A	C and D suggest children do not understand the '5 or above' rule of rounding up.	
5	C	A, B and D suggest children do not understand how to convert between units.	
6	2 kg	2,000 g suggests children are not yet confident converting g to kg.	

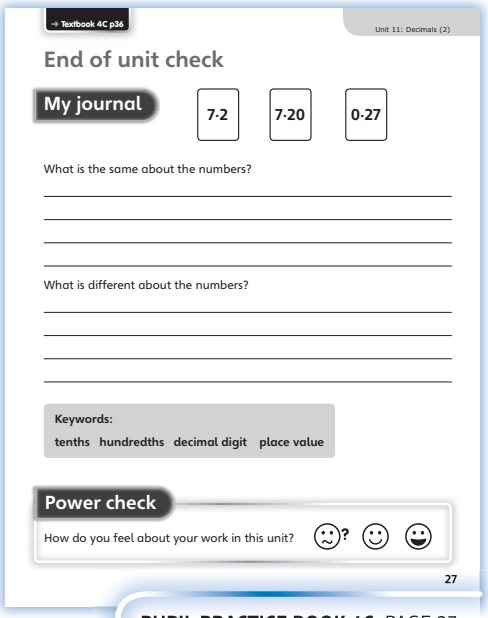
My journal

WAYS OF WORKING Independent thinking

ANSWERS AND COMMENTARY Children may make the numbers on a place value grid to help them understand the size of the numbers and what each digit in each number represents. Encourage children to read the numbers aloud. They should take care not to read the two digits after the decimal as a double digit, so they should avoid saying 'zero point twenty-seven' for '0·27' and instead say 'zero point two seven'. Children may also compare just two of the numbers, as opposed to finding similarities and differences about all three.

What is the same? Children may offer answers such as:
- They are all greater than 0.
- They all contain the digits 2 and 7.
- All the numbers have a decimal point in them.
- Two of the numbers have 2 numbers after the decimal (the other just has 1).
- 7·2 and 7·20 are equivalent.

What is different?
- One number does not show any hundredths.
- Two numbers start with a 7, the other one does not.



PUPIL PRACTICE BOOK 4C PAGE 27

Power check

WAYS OF WORKING Independent thinking

ASK
- *Can you explain how to round a number with one decimal place to the nearest whole number?*
- *Are you able to put some decimals in order?*

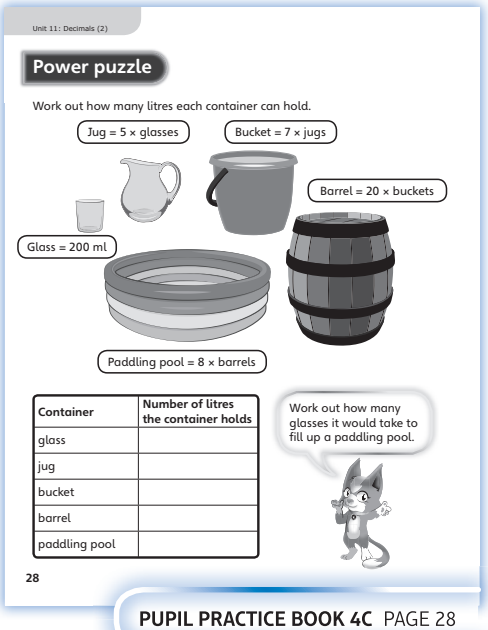
Power puzzle

WAYS OF WORKING Pair work or small groups

IN FOCUS This puzzle focuses on children understanding and applying the conversion between litres and millilitres. These can be difficult questions in assessments. Children should look at the information that they are given (one glass holds 200 ml) and then gradually work down the list, finding the other values. As children work through, they should realise they need to use their knowledge of multiplication and division from earlier units to find the answers to the last questions. For instance, they need to be able to multiply by 200 or count in 200s.

ANSWERS AND COMMENTARY

Glass = 0·2 litres. Jug = 1 litre (5 × 200 = 1,000 ml = 1 l).
Bucket = 7 litres (7 × 1 = 7 l). Barrel = 140 litres (20 × 7 = 140 l).
Paddling pool = 1,120 litres (8 × 140 = 1,120 litres).



PUPIL PRACTICE BOOK 4C PAGE 28

After the unit

- Can children find the number bond of a decimal to 1? Can they accurately represent a decimal on a place value grid or other representation?
- Can children round a number to the nearest whole number and compare and order numbers that have the same number of decimal places?
- Can children convert between common units of measurement?

Strengthen and **Deepen** activities for this unit can be found in the *Power Maths* online subscription.