

Year 6 Autumn 1

Unit 1: Place Value

Lesson 6: Round decimals with three decimal places to the nearest whole number and tenth.

Lesson Objectives:

Round numbers with decimals in different ways.

Lesson Focus:

Children will extend their understanding of rounding numbers with three decimal places, identifying which multiple of one or tenth a given number is closest to. The children will continue to identify the midpoint between any two adjacent multiples of 1 or 0.1 before placing the number to be rounded either below or above this midpoint in order to round it accurately. The children will begin by using a number line and should continue to imagine it when working with only abstract numerals.

Starter (No more than 10 minutes)

Recall multiplication and division facts up to 12×12

Show page 1 of the SMART Notebook file.

- *One minute challenge!*

You have 1 minute to answer all of these multiplications on your whiteboard.

Allow children 1 minute before marking the answers together.

Repeat for page 2 in which the calculations are all division.

9×4	6×2	8×8
0×11	7×3	9×6
5×7	7×12	4×8
12×9	1×8	10×9

Initial Problem

Show page 3 of the SMART Notebook file with the initial problem. Read through the prompts and question. Children to work in pairs to discuss the question.

The children are rounding 14.548

It rounds to 15

It rounds to 10

It rounds to 14.6

It rounds to 14.55

Who is correct? Explain how you know.

Scaffold

Where would 14.548 fit on a number line?

What multiples of 10 would it lie between?

What whole numbers would it lie between?

What multiples of one tenth would it lie between?

Extension

Kim says that the 8 in the thousandths place rounds the hundredths digit up to 5 which is why it rounds to 14.6

How would you explain to her that this is incorrect?

Take feedback of children's responses.

Agree that 14.548 lies between

10 and 20 but is less than the midpoint (15) so rounds to 10 to the nearest ten, so Tom is correct.

Agree that 14.548 lies between 14 and 15 but is more than the midpoint (14.5) so rounds to 15 to the nearest one, so Ben is correct.

Agree that 14.548 lies between 14.5 and 14.6 but is less than the midpoint (14.55) so rounds to 14.5 to the nearest tenth, so Kim is not correct.

Agree that 14.548 lies between 14.54 and 14.55 but is more than the midpoint (14.545) so rounds to 14.55 to the nearest hundredth, so Kim is correct. However, this is beyond the expectation of this lesson so children should not be expected to answer this correctly.

Misconception / lack of fluency

The extension prompt deals with a common misconception. To prevent this, the children need to go back to the modelling for rounding they have learned: identify the multiples of one tenth either side of the number, identify the midpoint and then position the number relative to this midpoint. Therefore, the other digits beyond are deemed irrelevant.

Guided Learning

Show page 4 of the SMART Notebook file and ask:

- *What does the sentence say at the bottom?* Read it together, ensuring the number is read accurately.
- *What numbers are on the number line?* 4 on the left, 5 on the right.
- *What other number would be useful to place on the number line?*

The midpoint: 4.5

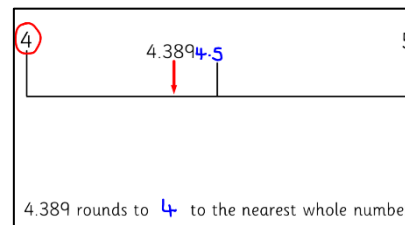
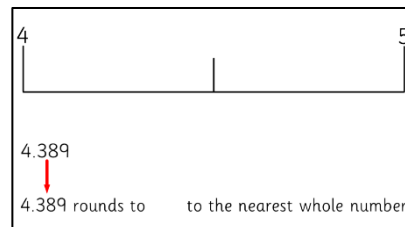
Write this on the page.

- *Where does this number fit in relation to the midpoint?* Just to the left of 4.5

Move the number with the arrow into the correct place on the line.

- *What does 4.389 round to, to the nearest whole number?* **4.389 rounds to 4 to the nearest whole number.** Complete the sentence at the bottom and say it together.

The image on the right shows the completed modelling.



Show page 5 and ask children to show how they would round

12.487 to the nearest whole number on their whiteboards. Share answers and model as before on the page, starting with identifying the missing whole number on the right of the number line.

Repeat with page 6, rounding to the nearest one but with scaffold being removed.

Page 7 is available for further practice as necessary.

Ask children to complete **Guided Learning Task 1** (mark the number and circle what it rounds to).

Guided Learning Task 1 (Round the number in the box to the nearest whole number, mark it on the line and circle the number it rounds to.)

a) b)

c) d)

Four number lines are shown, each with a box containing a number and a tick mark on the line. a) Box: 54.634, line: 54 to 55. b) Box: 54.364, line: 54 to 55. c) Box: 89.492, line: 89 to 90. d) Box: 149.602, line: 149 to 150.

Circulate and support as necessary.

Extension:

- *If 149.602 rounds to 150 to the nearest whole number, what would 149,602 round to, to the nearest thousand?*
- What is the same and what is different about these numbers?*

Show slide 9 and ask:

- *What would this number round to, to the nearest tenth?*

Show me on your whiteboards.

Share ideas and agree that it rounds to 8.7 to the nearest tenth.

Model on the board, starting by identifying the midpoint between 8.7 and 8.8

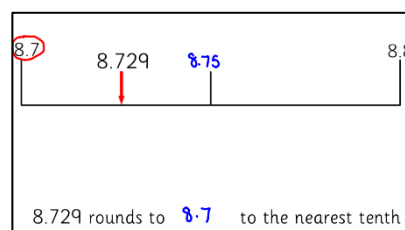
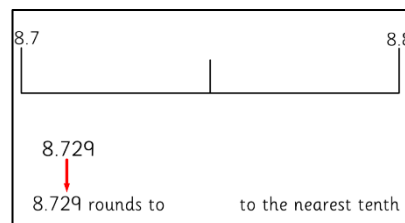
- *What is the midpoint between these?* 8.75 Write this on the page.

Children may benefit from writing this as 8.750 to support the comparison to 8.729

- *Where does 8.729 fit relative to this midpoint so what does it round to?*

8.729 is less than the midpoint of 8.75 so rounds down to 8.7

Move the arrow and number to show this, complete the sentence and say it together.



Show page 10 and ask children to show how they would round 24.108 to the nearest tenth on their whiteboards. Share answers and model as before on the page, starting with identifying the missing multiple of one tenth on the right of the number line.

Repeat with page 11, rounding to the nearest tenth but with scaffold being removed.

Page 12 is available for further practice as necessary.

Say together:

Round down if the number is less than halfway between the two multiples.

Round up if the number is halfway or greater between the two multiples.

Guided Learning Task 2 (Round the number in the box to the nearest tenth, mark it on the line and circle the number it rounds to.)

e) f)

78.4 78.45 78.5 31.5 31.6

g) h)

522.1 299.9

Ask children to complete **Guided Learning Task 2** (mark the number and circle what it rounds to).
Circulate and support as necessary.

Independent Learning

Independent Learning Tasks

g Round 75.932 to the nearest 1

j Round 75.932 to the nearest 0.1

k rounded to the nearest one rounded to the nearest tenth

l Tick the numbers that round to 28 to the nearest whole number.

28.079 27.651 28.571 28.475 27.499

m Circle the number that is closest to 20.

19.955 20.1 19.091 20.099 20.201

n Kim's mum bought wood to make two shelves.
The first shelf was 2.20 m long.
And the other shelf was 3.9 m long.
What is the shortest length of wood she must buy to make the two shelves?
Circle the correct answer to the nearest metre.

3 m 4 m 5 m 6 m 7 m 8 m

The first two questions replicate the Guided Tasks but with less scaffold provided.

Questions k and l are more abstract without the scaffold of a number line, however, children could sketch one for support if necessary.

Question m asks children to identify all of the given numbers that round to 28 to the nearest whole number. Some of the options are less than 28 and some are greater.

In question n, the children need to identify the number closest to 20, with the answer being a number starting with 19

In question o, the children need to apply their knowledge of rounding and understand the context.

Deeper Learning

When tackling this problem, children need to identify that the mass of each child's parcel is within a range according to how it has been rounded.

Kim's parcel is between 3.050kg and 3.149kg

Tom's parcel is between 2.5kg and 3.499kg

Ben's parcel is between 3.135kg and 3.149kg

Therefore it is not possible to identify which parcel is the heaviest from these clues.

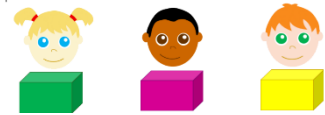
For Kim's to be the heaviest, hers would have to be greater than 3.135kg and Tom's and Ben's being less than or equal to this.

For Tom's to be the heaviest, his would have to be greater than 3.149kg or greater than 3.135kg with Ben's being 3.135 and Kim's being equal to or less than this.

For Ben's to be the heaviest, his would have to be 3.135 or more with Kim's and Tom's being less than this.

Kim's parcel has a mass of 3.1kg when rounded to the nearest 100g.
Tom's parcel has a mass of 3kg when rounded to the nearest kg.
Ben's parcel has a mass of 3.14kg when rounded to the nearest 10g.

Whose parcel is heaviest?
What would the masses be for:
Kim's parcel to be heaviest?
Tom's parcel to be heaviest?
Ben's parcel to be heaviest?



Key Outcomes

Children can round numbers with three decimal places to the nearest one and tenth.

Children know to round down if the number is less than halfway between the two multiples.

Round up if the number is halfway or greater between the two multiples.

Resources

Whiteboards and pens

Children's task sheets copied (one per child)