N5.3 Dividing a decimal by a single-digit number

objectives

- Recall multiplication facts to 10 × 10 and derive associated division facts.

- Estimate calculations.

- Use a written method to calculate TU.t ÷ U.

- Round up or down after division, depending on the context.

starter

Vocabulary
divided by
remainder

Resources
digit cards or
    mini-whiteboards

As a class, chant the eight times table, forwards and backwards.

Q What is the remainder when 26 is divided by 8? Explain why you are right.

Remind pupils that if they are asked to explain how they know they are right, it is helpful to describe or write a calculation. Establish that 26 = (8 × 3) + 2, and that 2 is the remainder. The remainder can be written as $\frac{2}{8}$ or $\frac{1}{4}$ or 0.25.
So 26 ÷ 8 = 3.25.

Tell the class that you are going to call out some numbers. You want them to use their digit cards or whiteboards to show what the remainder would be when that number is divided by 8. Call out whole numbers less than 80, and check responses. Ask individual pupils to explain why they are right.

main activity

Vocabulary
round up or down

Resources
mini-whiteboards
OHT N5.3a

Write on the board 48 ÷ 8, and 4.8 ÷ 8 immediately below it.

Q Which one can you answer?

Establish that 48 is ten times bigger than 4.8 and that 4.8 is ten times smaller than 48.

Q How can we use the answer to 48 ÷ 8 to work out 4.8 ÷ 8?

Establish that we need to divide the answer to 48 ÷ 8 by 10. Write:

    48 ÷ 8 = 6   6 ÷ 10 = 0.6
    4.8 ÷ 8 = 0.6

Q Can you work out 0.48 ÷ 8?

Establish that this time 48 ÷ 8 has to be divided by 100, so that:

    48 ÷ 8 = 6   6 ÷ 100 = 0.06
    0.48 ÷ 8 = 0.06

Write on the board 35 ÷ 7, 3.5 ÷ 7 and 0.35 ÷ 7. Ask pupils to show the answers on their whiteboards. Repeat for other examples.

Show the first problem on **OHT N5.3a**.

A baker made 67 buns.
The baker packed the buns in boxes of 4.
How many boxes did the baker pack?

Ask pupils to work in pairs for a few minutes to try to answer the problem, then take feedback.

Establish that we need to know how many fours there are in 67, or 67 ÷ 4. Establish that the answer to this problem will be a whole number bigger than 10 (enough boxes for 40 buns) and less than 20 (enough boxes for 80 buns), but that it will be closer to 20 than to 10 because 67 is closer to 80 than to 40.

One way to work out the answer would be to keep subtracting four buns to put in a box but that this might take a long time. It would be easier to take away 40 buns for 10 boxes and then see what is left.

Write on the board:

```
67 ÷ 4
    67
    40        4 × 10
    27
    24        4 × 6
     3
```

Q How many lots of 4 buns have we taken away? (10 + 6 = 16)

Establish that the answer to 67 ÷ 4 is 16 r 3 (or $16\frac{3}{4}$).

Q Do we need to round $16\frac{3}{4}$ up to 17 or down to 16?

Ask pupils to discuss this in pairs for a few seconds, then establish that, in the context of the problem, the answer needs to be rounded down to 16.

Work through the second problem on **OHT N5.3a** in a similar way.

143 people are going to a wedding reception.
They will sit at tables for 6 people.
What is the least number of tables needed?

Establish that the answer will lie between 20 tables (for 120 people) and 30 tables (for 180 people) but will be closer to 20 than to 30. This time the answer of 23 r 5 (or $23\frac{5}{6}$) needs to be rounded up to 24.

Show the third problem on **OHT N5.3a**.

John spent £8.54 on 7 pens.
How much was each pen?

Establish that the answer to this problem will be more than £1 and less than £2, and that it will be 100 times smaller than £854 ÷ 7.

Write on the board: 854 ÷ 7

```
854
700        7 × 100
154
 70        7 × 10
 84
 70        7 × 10
 14
 14        7 × 2
  0
```

Establish that the answer to £854 ÷ 7 is £122. The answer to the original problem is 100 times smaller, and is £1.22. This is compatible with the estimate.

Show pupils how the calculation could be more efficient:

```
 854
 700    7 × 100
 154
 140    7 × 20
  14
  14    7 × 2
   0
```

Work through the fourth problem on **OHT N5.3a**.

The Town Hall is 13.6 metres tall.
A model of it is one eighth of its size.
How tall is the model?

other tasks **Springboard 7** Unit 15	**Unit 15 section 2: Mental calculations – division**

Unit 15 section 2: Mental calculations – division

4 Dividing whole numbers with decimal answers	page 479
Star challenge 3: Division challenges	page 480
Star challenge 4: Problems	page 480

Unit 15 section 4: Division – written methods

1 Sensible answers to mental problems	page 484
2 Review of division	page 484

plenary

Resources
self-prepared OHT of
  division calculations
  (optional)

Show a self-prepared OHT with a few examples of division calculations, some that could be done mentally (e.g. $2.4 \div 6$, $0.49 \div 7$), and some that might involve a written method (e.g. $38.25 \div 5$, $44.1 \div 9$). Alternatively, write a selection on the board. Point to the calculations one at a time.

Q   What advice would you give a friend about how best to do this calculation?

Q   How do you think your friend should check the answer?

> **Remember**
>
> • Look back at the question and ask yourself whether it makes sense to round up the answer or round it down.

1   A baker made 67 buns.
    The baker packed the buns in boxes of 4.
    How many boxes did the baker pack?

2   143 people are going to a wedding reception.
    They will sit at tables for 6 people.
    What is the least number of tables needed?

3   John spent £8.54 on 7 pens.
    How much was each pen?

4   The Town Hall is 13.6 metres tall.
    A model of it is one eighth of its size.
    How tall is the model?