

## Percentages – missing values

### Notes and guidance

For the final small step in this block, children use their understanding of percentages to find the whole number from a given percentage. This links back to the previous step, as children will have to know how many lots of \_\_\_\_\_% are in 100% and multiply accordingly. For example, if they know 20% of a number, then they multiply that by 5 to work out 100%.

Once confident with simple percentages such as 1%, 10%, 20%, 25% or 50%, children work out percentages such as 12% that cannot be solved in one step. With examples such as these, children recognise that for any percentage, they can find 1% first before multiplying up to 100%. For example, if they know 9% of a number, they divide that by 9 then multiply by 100. Similarly, if they know 30% of a number, they can divide that by 3 and then multiply by 10

### Things to look out for

- Children may be confused with two-step solutions, for example saying “30% of a number is 12, so I will multiply 12 by 30”
- Children may use inefficient methods to multiply, for example using the formal method for  $\times 10$

### Key questions

- If you know \_\_\_\_\_% of a number, how can you work out the whole?
- How many lots of \_\_\_\_\_% are there in 100%?
- If you know 23%, how can you find 1%? Once you know 1%, how can you find 100%?
- If you know 40%, how can you find 10%? Once you know 10%, how can you find 100%?
- How can linking percentages to fractions help you to answer this question?

### Possible sentence stems

- If \_\_\_\_\_% of a number is \_\_\_\_\_, then the whole is \_\_\_\_\_
- There are \_\_\_\_\_ lots of \_\_\_\_\_% in 100%.
- If \_\_\_\_\_% of a number is \_\_\_\_\_, then 1% of the number is \_\_\_\_\_, so 100% is \_\_\_\_\_

### National Curriculum links

- Solve problems involving the calculation of percentages and the use of percentages for comparison

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## Key learning

- If you know 10% of a number, you can multiply by 10 to find the whole.

100%									
10%	10%	10%	10%	10%	10%	10%	10%	10%	10%

Work out the missing numbers.

- ▶ 10% of \_\_\_\_\_ = 2.8
  - ▶ 10% of \_\_\_\_\_ = 709
  - ▶ 10% of \_\_\_\_\_ = 45p
  - ▶ 10% of \_\_\_\_\_ = 38 g
- ▶ If 50% of a number is 123, what is the number?
  - ▶ If 25% of a number is 45, what is the number?
  - ▶ If 20% of a number is 70, what is the number?
- Tom knows that 30% of a number is 210  
He then works out the whole by finding 10% first.

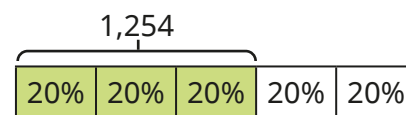
$$10\% = 210 \div 3 = 70$$

$$100\% = 70 \times 10 = 700$$

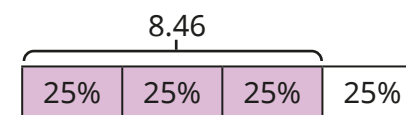
Use Tom's method to work out the missing numbers.

- ▶ 30% of \_\_\_\_\_ = 360
  - ▶ 70% of \_\_\_\_\_ = 4.9
  - ▶ 90% of \_\_\_\_\_ = 0.36 kg
  - ▶ 60% of \_\_\_\_\_ = 92p

- Use the bar models to work out the missing numbers.



$$60\% \text{ of } \underline{\hspace{2cm}} = 1,254$$



$$75\% \text{ of } \underline{\hspace{2cm}} = 8.46$$

- If you know 1% of a number, you can work out the whole by multiplying by 100

Use this fact to work out the missing numbers.

- ▶ 1% of \_\_\_\_\_ = 0.06
  - ▶ 1% of \_\_\_\_\_ km = 56 m
  - ▶ 3% of \_\_\_\_\_ = 0.27
  - ▶ 1% of \_\_\_\_\_ g = 2.9 g
- 12% of a number is 36

I can find 1% by dividing by 12, then multiply by 100 to find the whole.



Use Max's method to find the whole.

- Annie is thinking of a number.  
15% of her number is 90  
What is her number?

# Percentages – missing values

## Reasoning and problem solving

A bag contains red, blue and yellow balloons.

20% of the balloons in the bag are red.

There are 24 red balloons.

There are three times as many blue balloons as yellow balloons.

How many blue and yellow balloons are there in the bag?



72 blue, 24 yellow

Fill in the missing values to make the statement correct.

25% of  =  % of 60

Can you find more than one way?



multiple possible answers, e.g.

25% of 60 = 25% of 60

25% of 120 = 50% of 60

Tiny is solving this problem.

5% of  = 0.3

I know that there are 20 lots of 5% in 100%, so I will multiply 0.3 by 20 to find the answer.



5% = 0.3  
100% =  $0.3 \times 20 = 6$

Do you agree with Tiny?

Explain your answer.



Yes