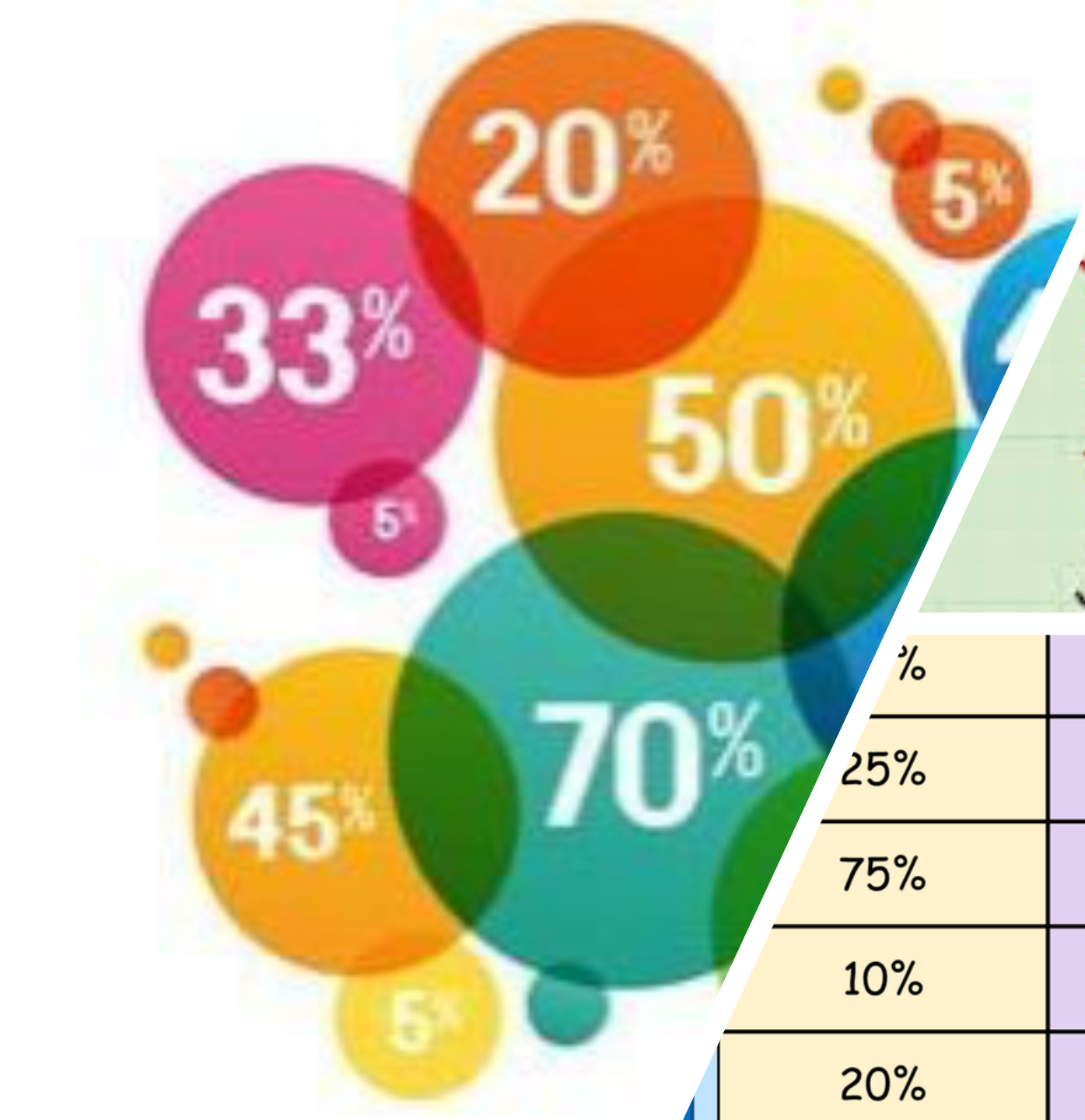
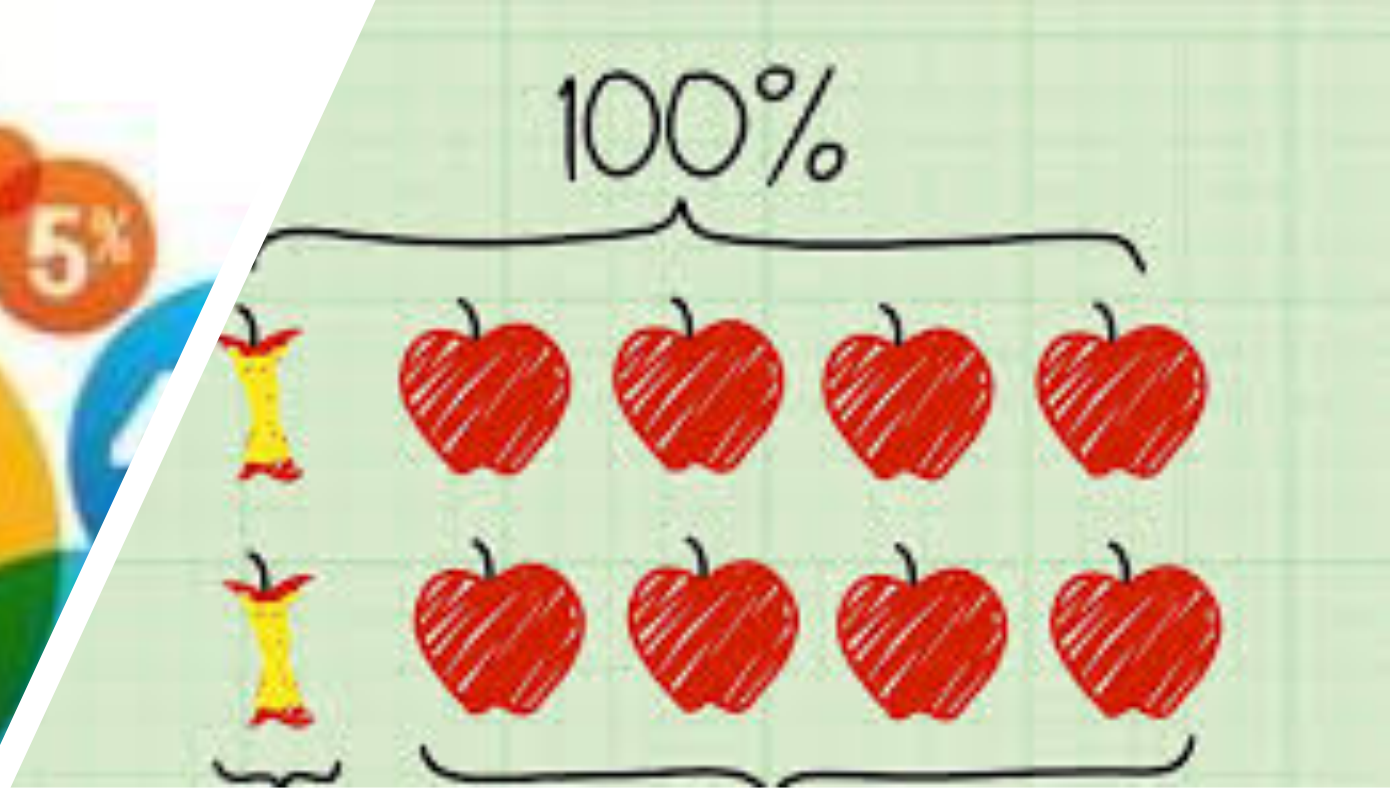
NUMERACY TARGETS 2019-20





%	$\frac{50}{100} = \frac{1}{2}$	Divide by 2
25%	$\frac{25}{100} = \frac{1}{4}$	Divide by 4
75%	$\frac{75}{100} = \frac{3}{4}$	Find 25%, then multiply by 3
10%	$\frac{10}{100} = \frac{1}{10}$	Divide by 10
20%	$\frac{20}{100} = \frac{1}{5}$	Divide by 5, or double 10%

Numeracy Target 2019-20

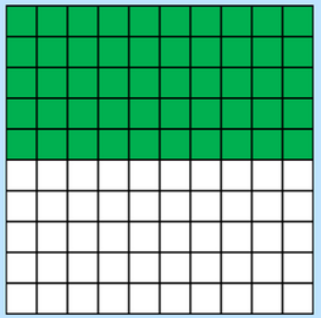
To raise the profile of Numeracy across the curriculum and streamline practice; in particular, **to improve the confidence of pupils when performing calculations involving 'Percentages'.**

WHAT IS A PERCENTAGE?

What is a percentage?

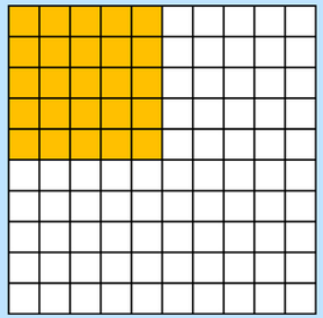
"Percent" means "out of 100". A percentage is another way of expressing a fractional quantity.

Here are some grid split into 100 parts:



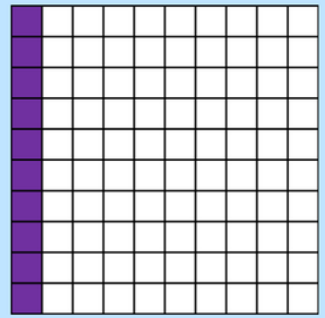
50 out of 100 (50%) are shaded.

$$\frac{50}{100} = \frac{1}{2}$$



25 out of 100 (25%) are shaded.

$$\frac{25}{100} = \frac{1}{4}$$



10 out of 100 (10%) are shaded.

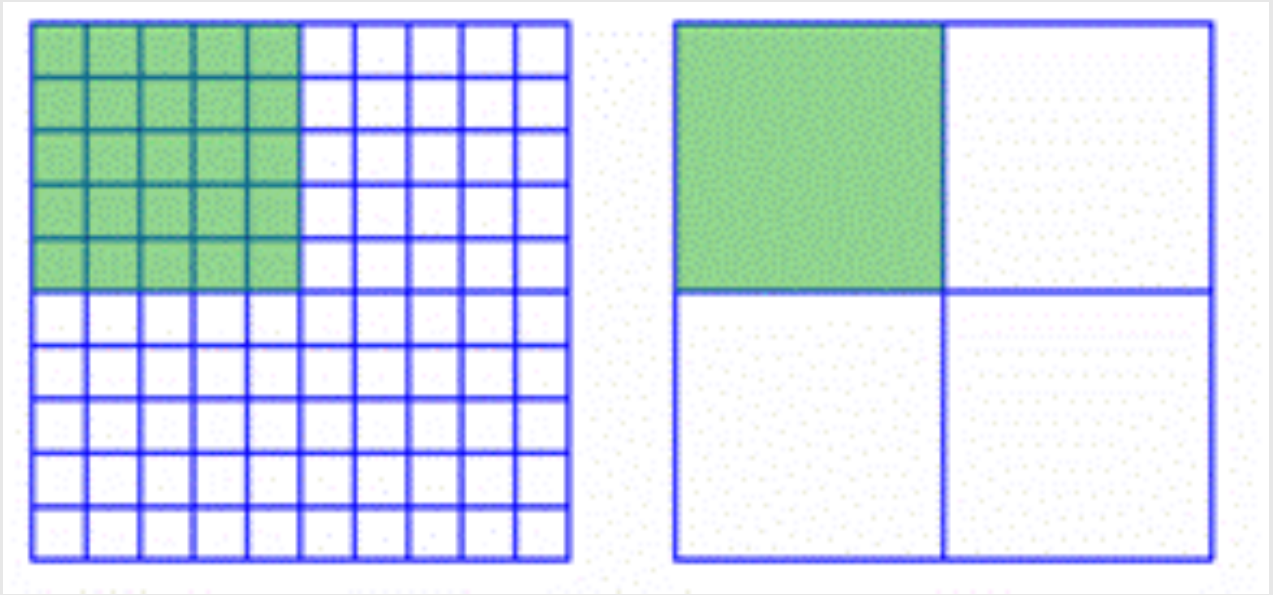
$$\frac{10}{100} = \frac{1}{10}$$

Key Facts to Learn

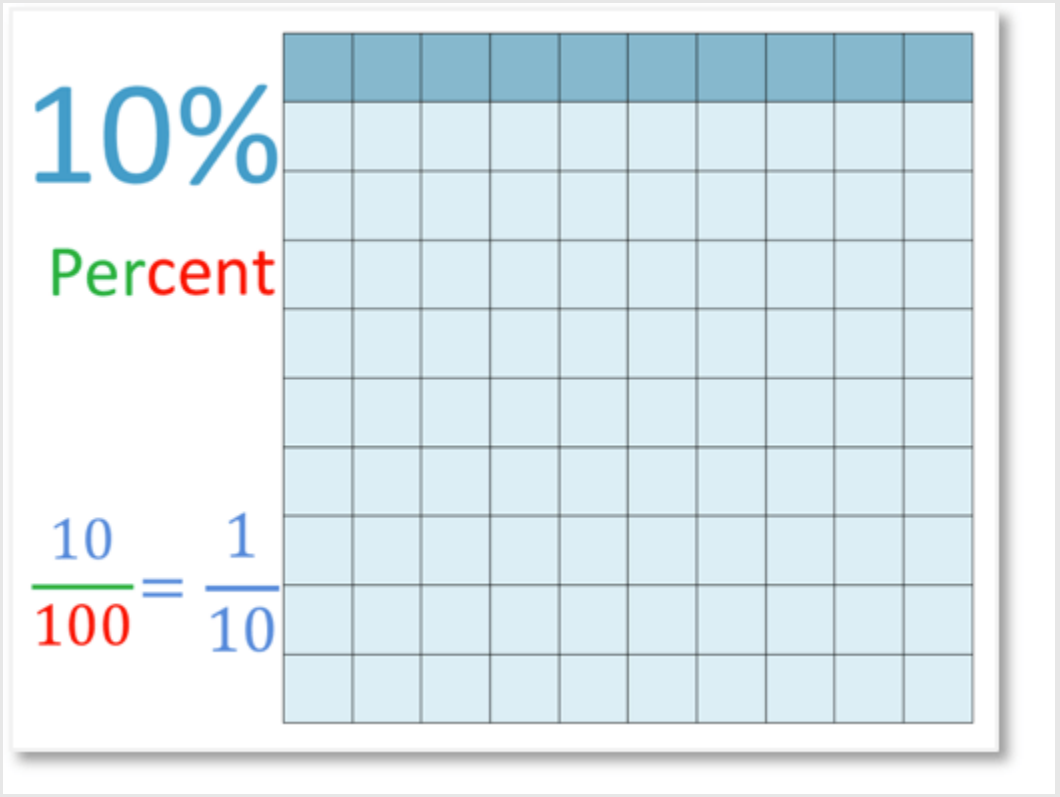
- The following facts underpin all percentage understanding.
- Pupils should **memorise** these key facts connecting percentages and fractions in Slides 6-8

Key Fraction to Percentage Facts

100%	1
25%	$\frac{1}{4}$
50%	$\frac{1}{2}$
75%	$\frac{3}{4}$



100%	1
10%	$\frac{1}{10}$
30%	$\frac{3}{10}$
70%	$\frac{7}{10}$
90%	$\frac{9}{10}$



100%	1
20%	$\frac{1}{5}$
40%	$\frac{2}{5}$
60%	$\frac{3}{5}$
80%	$\frac{4}{5}$

Calculating Percentages without a Calculator

- **Memorising** the facts on Slide 10 will enable pupils to calculate any percentage without a calculator.

- The **most important** percentage to remember is that to **find 10%,** you divide by 10.

Percentage	Division
50%	$\div by\ 2$
25%	$\div by\ 4$ **OR** $\div by\ 2$ ***twice***
10%	$\div by\ 10$
1%	$\div by\ 100$

ALL **NON-CALCULATOR** PERCENTAGES CAN BE COMPLETED FROM **KNOWING** THESE FACTS

Examples of Calculating Percentages

- Calculation of a percentage of an amount can be done in **several different ways.**

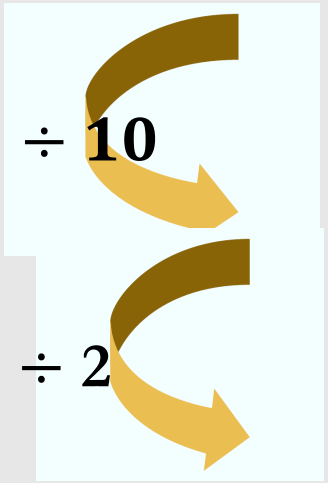
15% = Find 10%, half to get 5%. Add the 2 amounts together, since 15% = 10% + 5%

OR

15% = Find 1% and then multiply by15

Problem

1) Lorraine goes shopping to update her Winter Wardrobe before she returns to work. She spies a gorgeous skirt costing £40 which has been reduced by 15%. How much is the **discount**?

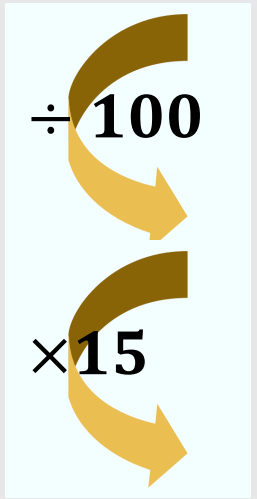


100% = £40

10% = £4

5% = £2

⇒ 15% = £6



100% = £40

1% = £0.40

15% = £6.00

How many different ways can you complete these calculations ?

2) Simone has booked an appointment to get her nails done. She is distraught as the usual price of £20 has gone up by 35%.
Calculate how much extra she has to pay ?

35% = 30% + 5%

OR

35% = 25% + 10%

OR

Find 1% and then multiply by 35

100% = £20

10% = 20 ÷ 10 = £2

30% = 2 ×3 = **£6**

5% = 2 ÷ 2 = **£1**

⇒ **35%** = £7

100% = £20

1% = 20 ÷ 100 = **0.2**

⇒ **35%** = 0.2 × 35 = £7

100% = £20

25% = 20 ÷ 4 = **£5**

10% = 20 ÷ 10 = **£2**

⇒ **35%** = £7

How many different ways can you complete these calculations ?

James got a last minute holiday deal in August. The cost is 77% of the original price of £440 ? **Calculate the cost of his holiday.**

77% = 75% + 2%

OR

77% = 70% + 7%

OR

Find 1% and then multiply by 77

OR

77% = 100% - 23%

100% = £440

10% = 440 ÷ 10 = £44

70% = 44 ×7 = £308

7% = 308 ÷ 10 = £30.80

⇒ 77% = £338.80

100% = £440

25% = 440 ÷ 4 = £110

75% = 110 × 3 = £330

1% = 440 ÷ 100 = £4.40

2% = £8.80

⇒ 77% = £338.80

100% = £440

1% = 440 ÷ 100 = £4.40

⇒ 77% = 4.40 × 77 = £338.80

100% = £440

20% = 440 ÷ 5 = £88

1% = 440 ÷ 100 = £4.40

3% = 4.40 × 3 = £13.20

23% = £101.20

⇒ 77% = 100% - 23%

=440 – 101.20 = £338.80

Finding Percentages Using a Calculator

Find 1% by dividing by 100

Multiply by the actual %

Percentages Using Calculator

Find 35% of £20

$100\% = £20$

$1\% = 20 \div 100 = 0.2$

$\Rightarrow 35\% = 0.2 \times 35 = £7$

Find 77% of £440:

$100\% = £440$

$1\% = 440 \div 100 = £4.40$

$\Rightarrow 77\% = 4.40 \times 77 = £338.80$

One Number as A Percentage of Another

Use when changing a score to a percentage:

If the **denominator** is a **factor of 100**, eg 2,4,5,10,20,25 or 50:

- ❑ **multiply** to get your fraction **out of 100**

If the **denominator** is **not a factor of 100:**

- ❑ change the **fraction** to a **decimal** (top divided by bottom)
- ❑ **multiply** by **100**

One Number as the Percentage of Another

Mrs Potter set 2 homeworks for her Year 11 Maths class. She wants to compare the results of one of her pupils.

Homework 1: 17 out of 25

Homework 2: 35 out of 43

Homework 1

$$\frac{17}{25} = \frac{68}{100} = 68\%$$

- Easily changed to a fraction with a denominator of 100

Homework 2

$$\frac{35}{43} \times \mathbf{100} = 35 \div 43 \times 100$$

$$= 81.4\% \text{ (1 dp)}$$

- Change to decimal by **Numerator ÷ Denominator**
- **Multiply by 100** to change to percentage

% Profit or Increase

Jane's weight increases from 60 kg to 67 kg. Find the **% increase**.

$$\%\ Increase = \frac{Actual}{Original} \times 100$$

$$= \frac{(67-60)}{60} \times 100$$

$$= 11.67\ \%\ (2\ dp)$$

% Loss or Decrease

Sylvia makes £15 000 in her business in 2018. In 2019, she makes £13, 500. Find the **% loss** in the amount she has made.

$$\%\ Decrease = \frac{Actual}{Original} \times 100$$

$$= \frac{(15000 - 13500)}{15\,000} \times 100$$

$$= 10\ \%$$

Percentage Calculations using Decimals (Higher Mathematics)

- **Quick** method to add or subtract a percentage to an amount
- Always **begin** with **100%**

- If money being **added** on: **add** the percentage **to 100**
- If money being **taken away**: **subtract** the percentage **from 100**

- Change the **percentage** to a **decimal** multiplier, by **dividing** by **100**

Use of Multipliers

Sam deposits £1,500 in a bank account which is paying 3% **compound** interest per year. **How much is in the account at the end of 3 years?**

Multiplier: 100% + 3% = **103% = 1.03**

Year 1: $1.03 \times 1500 = 1545$

Year 2: $1.03 \times 1545 = 1591.35$

Year 3: $1.03 \times 1591.35 = \mathbf{1639.09}\ (2dp)$

Depreciation

Jessica buys a laptop from Currys costing £350. It depreciates in value by 8% each year. **How much is it worth after 2 years?**

Multiplier: 100% - 8% = **92% = 0.92**

Year 1: $0.92 \times 350 = £322$

Year 2: $0.92 \times 322 = £\mathbf{296.24}$

Helpful Videos

- http://corbettmaths.com/2012/08/20/percentages-of-amounts-non-calculator/
- http://corbettmaths.com/2013/02/15/percentages-of-an-amount-calculator/
- http://corbettmaths.com/2013/03/31/percentage-change/
- http://corbettmaths.com/2012/08/21/expressing-one-quantity-as-a-percentage-of-another/
- http://corbettmaths.com/2012/08/21/increasing-or-decreasing-by-a-percentage/
- http://corbettmaths.com/2012/08/21/multipliers-for-increasing-and-decreasing-by-a-percentage/
- http://corbettmaths.com/2012/08/21/compound-interest/

❑ Extra worksheets are also available on the Corbett Maths website to support your child's learning.