Fractions, decimals and percentages 2

OBJECTIVES

- Calculate percentages and find the outcome of a given percentage increase or decrease.

STARTER

15 minutes

Vocabulary
partition
percentage decrease
percentage increase

Resources
OHT 9N1.2a
Mini-whiteboards
  (optional)

Using the target number board on **OHT 9N1.2a**, ask pupils to calculate a percentage increase/decrease of one of the amounts. Invite them to explain how they arrived at their answers. Discuss their methods.

Encourage pupils to use jottings, when appropriate, to record steps in their working.

Q How did you work that out?

Q How did you partition 35%?

As preparation for the main teaching, ask:

Q If you increase an amount by 15%, what percentage of the original will you then have?

MAIN ACTIVITY

30 minutes

Vocabulary
percentage decrease
percentage increase

Resources
Objects (e.g. pencils)
Mini-whiteboards
OHP calculator
Calculators for pupils
OHT 9N1.2b
Framework examples,
  page 77

Discuss examples involving whole numbers of objects, using statements such as:

Q If something increases by 100%, it doubles. What percentage do you then have?

Q How can you describe an increase by 500%?

Demonstrate this pictorially or with real objects. You need to explain that you have the original 100% *plus* the increase of 500%.

Model an increase of 10%. Demonstrate that this results in a total of 110%: 100% can be represented by 10 pencils, so 1 pencil represents 10% and the new amount, 11 pencils, is 110%.

Q How do you write 110% as a decimal?

Model a decrease of 10%. Demonstrate that this leads to 90%: 10 pencils represent 100%, so 1 pencil represents 10%; the new amount of 9 pencils represents 90%.

Q How do you write 90% as a decimal?

Repeat this with another example, such as a 20% increase/decrease.

Use a set of short questions to assess whether pupils can generalise these results.

Q If something increases by 15%, what percentage of the original amount do you then have? (Check that pupils have written 115% on their whiteboards.) **How do you write that as a decimal?**

Repeat this with a decrease of 35%. Pupils write 65% to represent the final amount.

Q How do you write this as a decimal?

Extend to decreasing £450 by 17%. Recap how to calculate 83% of £450, using the OHP calculator (see lesson 9N1.1).

Q How would you increase £450 by 17%?

Pupils then need to practise similar calculations. Use the target number board on **OHT 9N1.2b**. These examples require the use of calculators.

For level 6 use questions from the Year 9 supplement of examples, page 77.

Discuss these problems:

Q **I start with £250 on January 1st. This increases by 10% on February 1st.
How much do I then have?
This further increases by 10% on March 1st. How much have I now?**

Q **I start with £250 on January 1st. This increases by 20% on March 1st.
Is this the same result as before?**

Discuss how a 10% increase followed by another 10% increase is not the same as a 20% increase. Go on to illustrate how a 20% increase + 20% increase is not the same as a 40% increase.

KEY IDEAS FOR PUPILS

- Calculate percentages of quantities using a calculator.
- Calculate percentage increases and decreases.

Increase	Decrease

£40	70 cm
300 g	1 kg
£12	650 m

by

10%	15%	100%	35%	12.5%

Increase	Decrease

£70	83 cm
350 g	1 kg
£12.50	650 m

by

11%	17%	120%	38%	16.5%