CENTRES FOR EXCELLENCE IN MATHS

FE centre resource

Pearson

Lesson plan

Percentages with a calculator

1. Lesson objectives

- Work out how to increase and decrease a quantity with a calculator, using a multiplier
- Solve a range of percentage questions using a multiplier (percentage of an amount, percentage increase/decrease, an amount as a percentage, reverse percentages)
- Use a double number line to see the common mathematical structure across a range of percentage questions

2. GCSE curriculum

Ratio, proportion and rates of change
R9 interpret percentages and percentage changes as a fraction or a decimal, and interpret these multiplicatively; express one quantity as a percentage of another; compare two quantities using percentages; work with percentages greater than 100%; solve problems involving percentage change, including percentage increase/decrease and original value problems.

This lesson is the second of two lessons on **working with percentages**. It follows on from a non-calculator lesson on '**Benchmark' percentages and equivalent fractions and decimals (Lesson 19)**.

It also introduces learners to drawing and using double number lines to highlight the structure of the questions. Later lessons on percentages as well as one on exchange rates build on the use of double number lines to support understanding.

3. Lesson plan

This is an overview of the lesson. More notes can be found in the notes in the lesson slides.

Activity	Purpose of this activity	Time (min)	Guidance	Materials
Discuss	To address common misconceptions in finding percentages of an amount.	5	Introduce the context of the lesson and the objectives. Misconceptions: Khadeja says that to find 10% of a number you divide by 10 and to find 20% you divide by 20. Is she correct? Encourage learners to discuss the question and their explanations in groups. Ensure that a range of views is then discussed with the class rather than just stopping at the correct answer. Highlight that the original amount is 100%, to support learners' understanding.	Slides 1–2
Introduction	To introduce the context of the lesson.	5	Jamie has a lot of financial decisions to make for his holiday and he is researching his accommodation in Spain. He has found a hotel and is looking at the costs of the different rooms available.	Slide 3
Explore 1	To check current understanding of finding percentages of amounts and to focus learners on different methods and their efficiency.	15	In pairs, learners calculate the costs of economy, deluxe and super deluxe rooms with the 'standard' room as the base price and the other types of room costed as a percentage of the 'standard' room. Learners are encouraged to think about different methods to do these calculations and see which are more efficient.	Slide 3–4 Jamie's hotel rooms handout Mini whiteboards

Activity	Purpose of this activity	Time (min)	Guidance	Materials
Review	To highlight different methods including using multipliers.	10	Groups give feedback on how they completed the calculations. Model their answers on double number lines, including the use of multipliers, if not mentioned by learners. • What methods did you use to calculate the answers? • What is the most efficient way to do that with a calculator? • Which methods are you confident using? Promote the use of multipliers.	Slides 5–7
Explore 2	To model creating double number lines for percentage questions and to practise using them to support answers to questions.	25	Jamie is booking his holiday flights and is looking at the cost of flying at different times and at the additional charges for luggage and seat booking. In pairs or small groups, learners match six percentage scenarios with a set of pre-drawn double number lines. The set will include a scenario that matches to a blank double number line and vice versa. Learners can then use the double number lines to help them solve the problems, which will involve percentage of amounts, percentage increase, amounts as percentages and reverse percentages.	Slide 8–10 Matching activity handout Mini whiteboards
Practice	To practise interpreting similar looking questions to identify the key information and to use an efficient method to solve them.	15	Jamie is buying some essentials for his holiday including sunglasses and suntan cream. He is looking at the various deals in the shops. In pairs, learners solve four different percentage problems with very similar numbers, without any scaffolding. Learners will use the methods they feel confident with. Encourage learners to draw double number lines for the situations they are not confident about.	Slide 11–12 Holiday shopping handout Mini whiteboards

Activity	Purpose of this activity	Time (min)	Guidance	Materials
Exam question	To apply the learning to an exam question for which learners scored an Edexcel average of 0.28 out of 2 marks.	10	Reverse percentage exam question, from Edexcel June 2022 3F Q30. • Do learners feel confident about how to start? • Can they draw and fill in a double number line to help them to solve the problem? • Can they calculate the multiplier?	Slide 13 Exam question handout
Review	To summarise the key learning points.	5	Review what was learned during the lesson (identifying what value is the original 100% and what percentage the new amount is, and how to find and use multipliers to find the missing value) by going through the method for the exam question. Review the learning objectives for the lesson. • Do learners feel more confident tackling percentage questions now? • For which questions do they want more practice?	Slide 14