CENTRES FOR EXCELLENCE IN MATHS

FE centre resource

Pearson

Lesson plan

Scales, maps and scale drawings Level 2

1. Lesson objectives

- To be able to convert metric units of measurement
- To be able to use a scale to find lengths
- To be able to represent a proportional situation in a ratio table

2. Functional skills Level 2 curriculum

Using numbers and the number system
11 understand and calculate using ratios, direct proportion and inverse proportion

Measures, shape and space
18 calculate actual dimensions from scale drawings and create a scale diagram given actual measurements

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
Introduction	Introduction to different metric units of length	10	Launch the activity by telling learners that having a basic understanding of different measurements is very useful in everyday life. Give examples, e.g. telling your hairdresser how much you want to cut off if you are having a trim, buying the correct screws for a DIY job etc. Learners recap on metric measurements (mm, cm, m and km) and choose the most appropriate measurement of choices provided. Class discussion about the different units and their conversions.	Slides 2–3 Handout 1: Find the measurements
Model	To introduce the concept of measurement and how to change freely between different units using ratio tables	5	Tutor models reading a scale on a ruler and then how to change between cm and mm and cm to metres. Tutor shows learners ratio tables to support converting metric units of lengths which are then used to explain their thinking.	Slide 4
Explore 1	Collaborative exploration to develop the concept of scale using rulers to measure	10	In pairs, learners explore how to represent the lengths in different measurement units, carefully reading the scales on the rulers.	Slide 5 Handout 2: Reading scales and converting metric units

Activity	Purpose of this activity	Time (min)	Guidance	Materials
Discuss 1	Deepen learners' understanding of how to use a ruler to measure distances	5	Groups feedback on the measurement exploration and confirm their answers. How to explore different graduation scales is addressed.	Slide 6
Explore 2	Misconception – not knowing when to divide or multiply before problem-solving tasks	5	Independently at first, and then in pairs, learners look at Rahima's mistake. Can they explain why she is not correct? Can they use ratio tables to explain their thinking?	Slide 7 Handout 3: Rahima's mistake
Discuss 2	Deepen learners' understanding of how to use ratio tables to convert between units	5	Tutor asks learners for their feedback. Slides can be used for illustration of a range of approaches, not limiting to ratio table.	Slide 8

Activity	Purpose of this activity	Time (min)	Guidance	Materials
Introduction to Explore 3 activity	Introduction to using scales which then leads on to the activity	5	Show learners the scale drawing of the bedroom and the scale that has been used. Model how to convert the units of the actual bed (metres) to the ones in the scale drawing (centimetres) and then find the measurements for the scale version of the bed. The example shown does not neatly fit into the scale as the bed works out as 2.8 cm in length. Look out for students who do not know how to approximate this length using the 1 cm grid paper provided.	Slides 9–10
Explore and discuss 3	Collaborative exploration to develop the use of scales given in the form 1 : *n* to solve the dimensions of scale furniture and to calculate scaled distances	20	For task 1, learners work in pairs to plan the layout of a bedroom, within given restrictions. They use a scale provided to draw items of furniture on a grid plan. Encourage learners to use ratio tables to organise their thinking and working. For task 2, learners use a garden plan to calculate the real-life sizes of features in the garden. Again, ratio tables can be used. Review the learner's final bedroom designs for Task 1, and answers to Task 2.	Slides 11–14 Handout 4
Explore 4	To understand how scale works on online maps	10	Maps and technology. Tutor opens up an online map of the local area and learners do the same on their phones or follow what's on the board. Choosing two fixed points to travel between. Can they see the scale? How is this different to the scales we have seen so far? What happens to the scale when you zoom in or out? Estimate, using the scale, how far it is between the two points.	Slide 15

Exam questions	Exam questions	10	Learners will work independently on the exam questions. Check the answer on the next slide. Ask learners whether they have used a different approach to that used prior to the lesson. How has their thinking changed? Would or when might they use this approach again in the future?	Slides 16–19 Handout 5: Exam questions
Review	Summarise learning, to capture ways of thinking and to clarify the concept of reading and interpreting scale, maps and units	5	Summarise the learning. • Clarify the concept of measurement and the use of ratio tables • Capture the ways of thinking about measurement. Draw on the examples from the slide on the main whiteboard. It is important to make sense and capture learners' ways of thinking – not to prescribe a best method. The lesson should have helped learners understand how to apply the rules of conversion in stages using ratio tables and given them a way of thinking to be able to answer these sorts of questions under the pressure of an exam even if they cannot remember how to convert e.g. from mm to metres in one step.	Slide 20