CENTRES FOR EXCELLENCE IN MATHS

FE centre resource

Pearson

Lesson plan

Direct proportion

Level 1

1. Lesson objectives

- Identify when two quantities vary in direct proportion to one another
- Understand the multiplicative relationship between two quantities (non-calculator)
- Solve simple proportional problems using efficient methods with ratio tables

2. Functional Skills Level 1 curriculum

17 work with simple ratio and direct proportion

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	To introduce the concept and meaning of direct proportion graphically	15	What do you see? What could this graph show? Show learners the graph (Slide 2) and ask what they see. Allow learners time in pairs to think about the missing information from the graph to encourage discussions around the relationships between the axes. Summarise their feedback and introduce (x, y) pairs (Slide 3). Gather their responses to lead to summary/definition of direct proportion (Slide 4).	Slides 2–4
Explore 1	Formalise the use of ratio tables by exploring proportionate amounts of ingredients for cookie recipe	15	In pairs learners find a different number of cookies and the amount of each ingredient in a self-guided investigation activity. This activity is an important building block for the construction and use of ratio tables. Blank/partially filled-in tables can be used as a scaffold for differentiation if required.	Handout 1: Recipes
Discuss 1	Exploration of problem – solving approaches using double number lines	10	Groups give feedback on how they calculated the ingredients for the recipes. Tutor can model using the ratio table with learners' methods. Some may have used a multiplicative method; others may have used the unitary method. An important discussion will be about which method they found the most efficient, even if it was not the one they initially used.	Slides 5–10

Activity	Purpose of this activity	Time (min)	Guidance	Materials
Explore 2	Procedural variation – opportunity to practise use of ratio tables using mastery approach to questioning	15	This handout provides scaffolded practice, moving from recipes to other contexts using direct proportion. Learners work independently at first, then share their work/ideas in pairs, discuss and explain. While learners are working, pay particular attention to any thinking that will be helpful to share in the discussion which follows.	Slide 11 Explore 2 Handout
Discuss 2	Exploration of problem – solving approaches using ratio tables	5	Groups give feedback on how they used the ratio tables. Tutor can model using the ratio table with learners' methods.	Slides 12–13 Explore 2 Handout answers
Explore 3	True or false – to draw upon common misconceptions Assessment for learning, checkpoint	10	A series of learner workings/answers will be used to elicit and to address key misconceptions learners exhibit when working with and trying to understand direct proportion calculations. It is important to emphasise that the learner did not complete a valid check which the question asked for and may have prevented the mistake. Can use mini whiteboards for responses or discussion in pairs for 2 minutes before feedback.	Slides 14–16 Handout 4: True or false Mini whiteboards
Discuss 3	Exploration of problem – solving approaches using ratio tables	5	Using the ratio tables explore learners' thinking and reasoning. Learners use the ratio tables to explain their thinking.	Slide 17 Handout 5: Spot the error

Activity	Purpose of this activity	Time (min)	Guidance	Materials
Consolidate	Exam questions – consolidation of learning	10	Functional skills exam questions have been selected for learners to attempt at the end of the lesson which link directly to the objectives explored. Tutor can differentiate where required. Once all groups have attempted the questions, draw them together to summarise the learning. • Clarify the concept of these kinds of proportional reasoning problems. • Capture, from the various pairs, their ways of thinking about each of the problems (you may use the ratio tables in the PowerPoint presentation or draw one on the main whiteboard). • It is important to make sense of and to capture learners' ways of thinking – not to prescribe a best method.	Slides 18–19 Handout 6: Exam questions
Review	Summarise learning, to capture ways of thinking and to clarify the concept of proportional reasoning	5	Ask learners whether they have used a different approach to that used prior to the lesson when solving direct proportion problems. How has their thinking changed? What have they learned about multiplicative structure? Discuss where else this approach might work. Where have they used it before? Where would they use it in future?	Slides 20–22