CENTRES FOR EXCELLENCE IN MATHS

FE centre resource

Pearson

Lesson plan

Dividing fractions

1. Lesson objectives

- Divide a whole number by a fraction
- Divide a fraction by a whole number
- Divide any fraction by a fraction
- Be able to draw a bar model to support thinking when dividing fractions

2. GCSE curriculum

Number

N8 calculate exactly with fractions

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 of division with fractions and assess prior learning	5	Ask learners to explain why Adam's statement is incorrect by drawing a picture. Collate a range of learners responses on the board, paying attention to the language used.	Slide 2 Mini whiteboards
Discuss 1	To introduce a representation of dividing by a fraction using concrete or pictorial approaches	5	Model what $3 \div \frac{1}{4}$ looks like (multilink cubes could be used but are not essential). Each whole is four cubes so in total there are 12 cubes. Some students may make the link to 'KFC' methods (keep, flip , change the sign) previously learnt. Explain to them that this is why the rule works.	Slide 3 Multilink cubes (optional)

Activity	Purpose of this activity	Time (min)	Guidance	Materials
Explore 1	To develop the use of bar models to answer questions where a whole number is divided by a unit fraction through collaborative exploration	20	In pairs students use bar models to calculate the division of whole number by a unit fraction. This activity is an important building block for the construction and use of bar models for division. The handout moves away from preconstructed bar models so that students can either complete the questions in the abstract or, depending on your group, draw more bar models themselves to find the correct answer. Once learners have completed the task, discuss the different learner approaches. Ask groups to share their methods. How do they calculate the answer if there are too many parts of a bar model drawn?	Slides 4–6 'Dividing a whole number by a unit fraction' handout 1
Discuss 2	To explore an example where a whole number is divided by a non-unit fraction	5	Slides 7 and 8 develop the use of bar models to answer questions where a whole number is divided by a non-unit fraction (numerator is greater than one).	Slide 7-8
Explore 2	To develop understanding of the use of bar models to answer questions where a whole number is divided by a non-unit fraction	10	Students use bar models to calculate the division of a whole number by a non-unit fraction. Ask learners to work independently at first, then share their ideas, discuss and explain.	Slides 9–10 'Dividing a whole number by any fraction' handout 2

Activity	Purpose of this activity	Time (min)	Guidance	Materials
Discuss 3	To extend learners' understanding of the use bar models to dividing fractions by a whole number	5	Introduce the division of a fraction by a whole number (other way round). What does that look like?	Slide 11
Explore 3	To develop understanding of the use of bar models to answer questions where a fraction is divided by a whole number	15	Ask learners to work in pairs to match bar models to calculations, filling in the blanks. Once learners have completed the task, discuss the solutions using the bar models to explore student thinking and reasoning.	Slides 12–13 'Dividing a fraction by whole number' handout 3a
Explore 4	To deepen learners' understanding using bar models to solve the fraction calculation	10	Ask learners to work in pairs on the 'more division' handout procedural variation task and encourage them to draw bar models. When completed, ask some learners to share their diagrams to justify their answers. Use slides 15-17 as required to support discussion.	Slides 14-17 'More division' handout 3b

Activity	Purpose of this activity	Time (min)	Guidance	Materials
Review	To summarise learning and clarify the concepts of the lesson	5	Use slide 18 to clarify the concepts learned and capture the ways of thinking for each of dividing: • a whole by a unit fraction, • a whole by a non-unit fraction • a fraction by a whole number. Draw the examples from slide 19 on the main whiteboard. It is important to make sense and capture students' ways of thinking – not to prescribe a best method. The lesson should have helped students understand why 'KFC' works and given them a way of thinking to be able to answer exam questions even if they cannot remember the abstract rule.	Slides 18-19
Practice question	Learners check and consolidate their understanding by answering exam questions	10	Ask learners to answer the exam questions. Depending on time and ability of learners in the group, you may choose only one of the two questions for the class. Ask learners whether they have used a different approach to that used prior to the lesson when dividing fraction. How has their thinking changed? What have they learned about dividing fractions?	Slides 20-21