MULTIPLYING AND DIVIDING FRACTIONS

MINI-LESSON

For the Multiplying and Dividing Fractions key concept

Summary

Students will use a method of splitting rectangles and shading parts to understand fraction multiplication.

Suitable for 2-6 students

Length 30 min (approximately)

Lesson Preparation

- **Rectangle Sheet** (download) – one copy per student
- **Coloured Pencils** – enough for 2 colours for each student
- **Whiteboard (or spare paper)** – for your use when demonstrating parts of the lesson

Optional:

- **Rectangles (teacher notes)** (download) – one teacher copy for reference

LEARNING INTENTIONS

This activity helps students to:

- Understand the meaning of multiplication as 'of' (not 'times').
- Understand how to perform fraction multiplications using rectangle diagrams

CURRICULUM LINKS

- Multiplying fractions (ACMNA154)

AFTER THE LESSON

In later lessons, follow up with practice of multiplying mixed and improper fractions. Students may find it useful to continue using rectangle diagrams during this practice.

INTRODUCTION — 3 MINUTES

Explain that in this activity, students will be splitting up and shading rectangles to help multiply fractions.

Demonstrate $1/2$ of $1/3$:

1. Draw a rectangle on the whiteboard (or blank paper). Starting with the second fraction, use vertical lines to split it into 3 equal areas and shade $1/3$.

2. Use a horizontal line to split the rectangle in half. Shade the area that is $1/2$ of the $1/3$.

3. Ask students: *what fraction has just been shaded?*

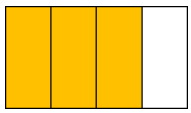
[Answer: $1/6$, since there are 6 equal parts in total & one of them has just been shaded]

Whole group:

Watch and listen. Explain what $1/2$ of $1/3$ is.

DEMONSTRATION WITH STUDENT DIRECTION — 3 MINUTES

Demonstrate with student direction: Demonstrate $2/3$ of $3/4$, but this time ask the students to tell you what the steps are. Their steps should be as follows:



1. Draw a rectangle. Use vertical lines to split it into 4 equal areas and shade $3/4$.
2. Then use horizontal lines to split the rectangle in 3 equal parts. Colour the area that is $2/3$ of the $3/4$.

3. There are 3×4=12 parts in total and 2×3=6 of the parts have just been shaded. So $2/3$ of $3/4$ is $6/12$ (or $1/2$).

Note, the answer can be seen by calculating the area of rectangles:

- Area of the rectangle shaded last: length is 2 and width is 3 (*i.e. the numerators of the fractions*).
- Area of the whole rectangle: length is 3 and width is 4 (*i.e. the denominators of the fractions*).

Whole group:

Give the teacher directions about the method, ask and answer questions.

DIRECT STUDENTS — 10 MINUTES

Using the rectangle sheet, students complete each question by using the method of splitting and shading rectangles.

Prompt student thinking: As students work, ask questions to check for understanding, e.g.:

- What does × mean in fraction multiplication? [i.e. 'of']
- How do you use the rectangle method to get one fraction of another?
- Why does the product of numerators make the numerator of the answer, and the product of denominators make the denominator of answer?

Whole group:

Work carefully through the rectangle sheet (even if the sheet is not completed).

DISCUSSION — 5 MINUTES

Ask students questions about what they have learned, such as:

- How do the blocks help you to compare numbers?
- How would you explain to another student how to compare a pair of two/three/four-digit numbers?

Discuss the answers to the rectangle sheet, getting students to share their solutions. You can extend students' thinking about fraction multiplication by asking questions based on other situations, such as:

- What is $2/5$ of $1/2$ a dollar? [Answer: $2/5$ of 50 cents is 20 cents, or $1/5$ of a dollar]
- What is $1/2$ of $2/5$ a dollar? [Answer: $1/2$ of 40 cents is 20 cents, or $1/5$ of a dollar]
- Does it matter in what order you multiply fractions? [No! As shown above]

Whole group:

Share solutions. Discuss other situations with fraction multiplication.