CHAPTER 6: Simple Fractions
MINI-MODULE B

Fractions on a Number Line

Objectives

This mini-module aims to help teachers:

- Explain and demonstrate fractions on a number line.
- Teach fractions between 0 and 1 using a number line.
- Practice a new teaching activity.

Recommended Materials

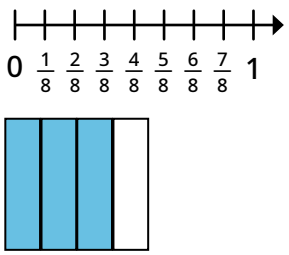
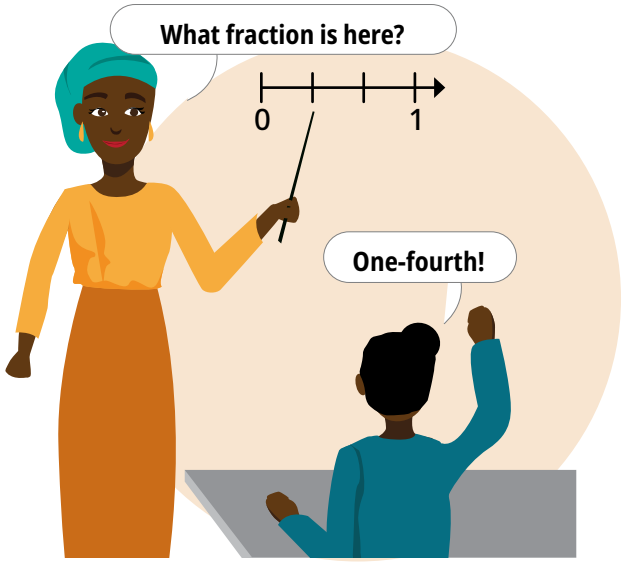


Illustration of Teaching

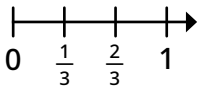


REFLECT:

- What mistake did the student make?
- Why do you think the student has misunderstood this number line?
- What questions could you ask this student to help them understand?

Ideas to Consider

The teacher pointed to $\frac{1}{3}$ on the number line, and the student answered with $\frac{1}{4}$. The student may not yet understand how to represent fractions on a number line. This number line has four marks from 0 to 1 that divide it into three equal spaces. The three spaces that it is divided into represent the fraction: thirds. The teacher could point and ask the student to count the number of spaces between 0 and 1. She could label the fractions on the number line and then read the numbers aloud with the student: zero, one-third, two-thirds, one. The teacher should give the student more practice with fraction number lines and guide the student on how to draw fraction number lines.



In this mini-module, you will explore how fraction number lines are used to display and identify fractions.

ACTIVITY: IDENTIFY FOURTHS ON A NUMBER LINE

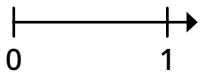
This activity can be completed alone, in pairs, or with a group of teachers. Discuss your responses to the questions.

Purpose: Identify how a number line can be used to display fractions.

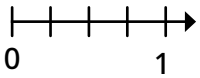
Materials needed: Writing materials for all participants.

Instructions

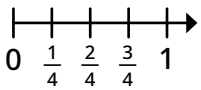
- Draw a number line from 0 to 1.



- ***What are some examples of fractions between 0 and 1?***
- Note that there are no whole numbers between 0 and 1, but there are many fractions.
- ***How could we show fourths on this number line?***
- Divide the number line into fourths by drawing three more marks. These marks divide the space between 0 and 1 into four equal spaces:



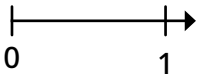
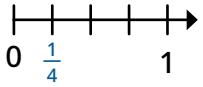
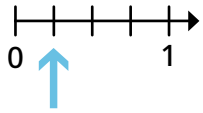
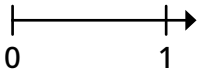
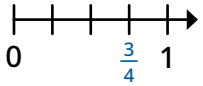
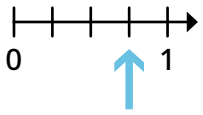
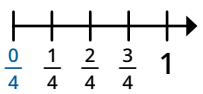
- Label the marks on the number line:

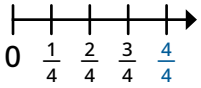
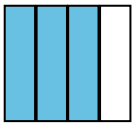
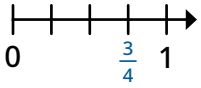


- Repeat with another example (e.g., thirds, fifths) if there is time.

What Do Children Learn about Fractions on a Number Line?

Students are first introduced to fractions using shapes, and they learn that fractions divide "one whole." Using a fraction number line builds on this understanding. While a fraction shape shows only one fraction, a number line provides a visual representation of different fractions. It helps students understand their relative size and their relationships to whole numbers (0 and 1 in the early primary grades).

Children should be able to . . .	What does this mean?	Example
Identify unit fractions	Identify unit fractions between 0 and 1 on a number line.	Q: ***How can we find $\frac{1}{4}$ on this number line?***  A: Divide the space between 0 and 1 into four equal spaces by drawing tick marks. Count from 0 to the first tick mark. 
		Q: ***What fraction is the arrow pointing to?***  A: $\frac{1}{4}$
Identify non-unit fractions	Identify non-unit fractions between 0 and 1 on a number line.	Q: ***How can we find $\frac{3}{4}$ on this number line?***  A: Divide the space between 0 and 1 into four equal spaces by drawing tick marks. Count from 0 to the third tick mark. 
		Q: ***What fraction is the arrow pointing to?***  A: $\frac{3}{4}$
Identify fractions equal to 0	Identify fractions (e.g., $\frac{0}{2}, \frac{0}{3}, \frac{0}{4}$) that are equal to 0.	Q: ***What fraction is equal to 0 on this number line?***  A: $\frac{0}{4}$

Children should be able to . . .	What does this mean?	Example
Identify fractions equal to 1	Identify fractions (e.g., $\frac{2}{2}, \frac{3}{3}, \frac{4}{4}$) that are equal to one whole.	Q: ***What fraction is equal to 1 on this number line?***  A: $\frac{4}{4}$
Relate fractions as part of a whole with fractions on a number line	Identify the same fraction with a shape and number line.	Q: ***What is this fraction?***  A: $\frac{3}{4}$ Q: ***Can you show $\frac{3}{4}$ on a number line?*** A: It's here: 

Reflection

Write your responses down or discuss your ideas with your colleagues:

- Why do you think it is important for students to learn fractions using different representations, such as shapes and number lines?
- What do you think your students will find challenging about identifying fractions on a number line? How can you support them?

Teaching Practice

This practice activity may be completed by teachers with their own class or with a smaller group of students.

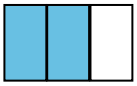
ACTIVITY: FRACTION SHAPES AND THE NUMBER LINE

Purpose: Identify fractions on a number line and relate them to fractions shown with shapes.

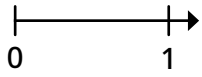
Materials needed: Shapes and number lines drawn on the board.

Instructions

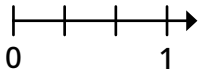
- Show students a shape with a fraction shaded. For example:



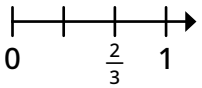
- Discuss: ***What is this fraction? How do you know?***
- Invite a student to write the fraction on the board: $\frac{2}{3}$
- Show students a number line from 0 to 1 on the board.



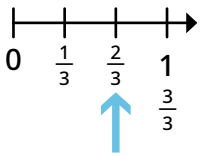
- Discuss: ***We have this shape that shows two-thirds. Now, how can we show two-thirds on this number line?***
- Say: ***The two-thirds shape is divided into three equal parts. We will also divide our number line into three equal parts.***
- Draw two tick marks on the number line, dividing it into three equal parts:



- Point to each equal part on the number line and count them with students: ***1, 2, 3.***
- Say: ***There are three parts that divide one whole, so each of these parts is one-third. Let's count them as thirds.***
- Point to each part on the number line again and count them as thirds with students: ***One-third, two-thirds, three-thirds.***
- Discuss: ***Now, where would you write two-thirds on the number line?***
- Invite a student to come and point to or write the fraction $\frac{2}{3}$ on the number line.



- Say: ***Two-thirds is a number between 0 and 1. We have shown it using both a fraction shape and number line.***
- Write the other fractions ($\frac{1}{3}$ and $\frac{3}{3}$) on the number line, and draw an arrow pointing to the answer, $\frac{2}{3}$.



- Repeat with other shapes and number lines if there is time.

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