

CHAPTER 6: Simple Fractions

MINI-MODULE C

Fractions of a Set

Objectives

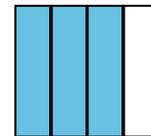
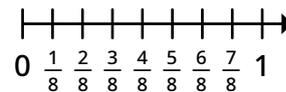
This mini-module aims to help teachers:

- Explain and demonstrate fractions as part of a set using sets of objects.
- Teach fractions using different representations.
- Practice a new teaching activity.

Illustration of Teaching



Recommended Materials



REFLECT:

- What mistake did the student make?
- What do you think the student misunderstood?
- What would you do to address this misunderstanding?

Ideas to Consider

There are five students standing in a group, and two of them are girls. This means that two-fifths of the group are girls. The student counted the girls and answered “2.” It seems that they do not understand fractions as part of a set. The teacher could have them count the girls (2) and the whole group (5). They could use non-math language to explain—for example, “Two out of five students in the group are girls.” Then, the teacher could repeat their original question: “What fraction of this group are girls?” They could state the fraction and write it on the board: $\frac{2}{5}$.

It will help this student to see many different examples of fractions as part of a set. The teacher could use the boys in this example to show $\frac{3}{5}$. They could ask different groups of students to stand (e.g., three girls and one boy), and repeat the activity. They could also do this activity with groups of objects or pictures.

In this mini-module, you will explore what children learn about fractions of a set.



ACTIVITY: SHOW FRACTIONS OF A SET

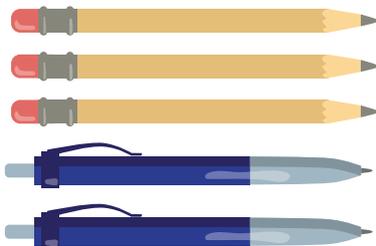
This activity can be completed alone, in pairs, or with a group of teachers. Discuss your responses to the questions.

Purpose: Identify different ways to represent fractions using a set of objects.

Materials needed: Sets of everyday objects, each having two different types (e.g., a set of writing tools with both pens and pencils, a set of books with both English and math books).

Instructions

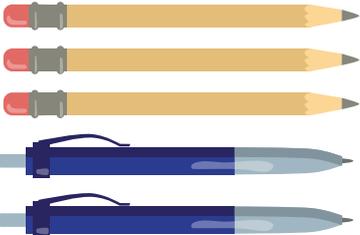
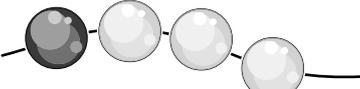
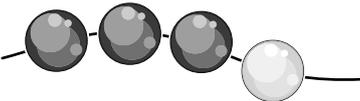
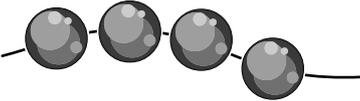
- Form a small set of objects of two different types. This example shows a set of writing tools consisting of pencils and pens.

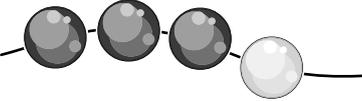
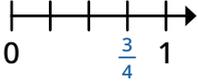


- What fraction are pens? What fraction are pencils? How do you know?**
- Identify the fraction that are one type (e.g., pens) and write the fraction. Repeat with the other type.
- Pens: $\frac{2}{5}$ Pencils: $\frac{3}{5}$
- We've just shown how we can think about fractions using sets. How is this different from identifying fractions using a shape or number line? How is it similar?**

What Do Children Learn about Fractions of a Set?

Children first learn about fractions as part of one whole, usually using fraction circles. With sets, they learn to think about fractions as part of a whole *group*. A set is a group of distinct objects (e.g., fruits, balls, even numbers) where it is clear what belongs in the group and what does not. Teachers can give students opportunities to work with sets composed of different types of objects and different quantities.

Children should be able to ...	What does this mean?	Example
<p>Identify a whole set</p>	<p>Identify that a set of objects can be one whole.</p>	<p>This is one set of balls:</p>  <p>This is one set of writing tools:</p> 
<p>Identify unit fractions</p>	<p>Identify unit fractions in a set.</p>	<p>This is one-fourth of the set of balls:</p>  <p>One-fourth of the beads are black:</p> 
<p>Identify non-unit fractions</p>	<p>Identify non-unit fractions in a set.</p>	<p>This is three-fourths of the set:</p>  <p>Three-fourths of the beads are black:</p> 
<p>Identify fractions equal to 1</p>	<p>Identify fractions (e.g., $\frac{2}{2}, \frac{3}{3}, \frac{4}{4}$) that are equal to one whole in a set.</p>	<p>Four-fourths is the whole set of balls:</p>  <p>Four-fourths is the whole set of beads:</p> 

Children should be able to ...	What does this mean?	Example
<p>Relate fractions using shapes, a number line, and sets</p>	<p>Identify the same fraction with a shape, number line, and set of objects.</p>	<p>Q: What is this fraction?</p>  <p>A: $\frac{3}{4}$</p> <p>Q: Can you show $\frac{3}{4}$ with beads?</p> <p>A: Yes. Three of the four beads are black:</p>  <p>Q: Can you show $\frac{3}{4}$ on the number line?</p> <p>A: It's here:</p> 

Reflection

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

- Why do you think it is important for students to learn fractions of a set?
- What do you think your students will find challenging about fractions of a set? 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: IDENTIFY FRACTIONS OF A SET

Purpose: Identify fractions of a set using a set of objects.

Materials needed: A set of everyday objects of two different colors (e.g., balls, pieces of paper, or pieces of chalk of two different colors). The example below uses red and blue balls, but you may use any appropriate objects.

Instructions

- Show students a set of four objects of the same type (e.g., four red balls).

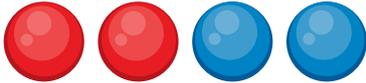


- Ask: **This is a set of red balls. How many are there?**
- Say: **Very good. There are four red balls in this set. This is one set, and the whole set is red.**

- Show children a new set of four, where three are a different color (e.g., one red ball and three blue balls).



- Ask: **How many balls are there now? How many are red?**
- Say: **There are four balls and only one of them is red. This means that one-fourth of the set is red.**
- Write on the board: $\frac{1}{4}$
- Repeat the steps above with another fraction, $\frac{2}{4}$.



- Show students three red balls and one blue ball:



- Ask: **Now, what fraction of this set is red?**



Three-fourths



Three



One-fourth

(Tip: The second student counted the red balls but did not consider them a fraction of the set. The third student might have misunderstood the question or counted the blue balls. Check for understanding, explain, and give more examples.)

- Invite a student to write the fraction on the board: $\frac{3}{4}$
- Repeat with different sets of a different number of objects (e.g., with a set of five balls). Form the sets and ask students to identify and write the fractions represented.



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