

CHAPTER 6: Simple Fractions

Introduction

In this chapter, teachers explore what young children learn about fractions in the early grades. Teachers are encouraged to complete the mini-modules in order. This chapter has more mini-modules than other chapters, so it will take more time to complete.

Mini-Modules in This Chapter

- A) Fractions as part of a whole
- B) Fractions on a number line
- C) Fractions of a set
- D) Comparing simple fractions
- E) Equivalent fractions
- F) Addition and subtraction of fractions

Goals of the Chapter

This chapter aims to help teachers:

- Describe what students learn about fractions in the early grades.
- Identify how materials are used to teach children about fractions.
- Develop new teaching practices.

Key terms

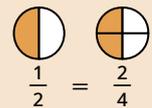
Denominator

The number of equal parts into which a whole is divided; the bottom number in a fraction

$\frac{1}{4}$ ← denominator

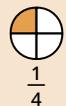
Equivalent fractions

Fractions that are equal and represent the same part of the whole, even though they have different numerators and denominators



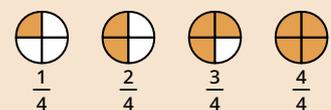
Fraction

A way to show a portion or part of something that is divided into equal parts



Like fractions

Fractions in which the whole has been divided into the same number of parts; like fractions have the same denominator



Numerator

The number of parts of a whole that are being considered; the top number in a fraction

$\frac{1}{4}$ ← numerator

Representation

A way of showing a number or idea (e.g., using real objects, using pictures, using numerals)

Set

A group of objects or numbers

Unit fraction

A fraction representing one part of a whole (e.g., $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{2}$)

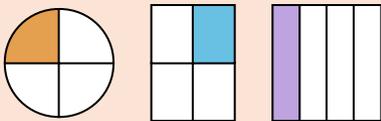
Different Ways of Thinking about Fractions

Fractions can be thought about in different ways. It is important to use concrete materials and a variety of representations so that children understand these different ideas.

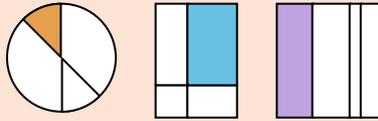
FRACTIONS AS PARTS OF A WHOLE

Fractions can represent parts of a whole. They can be shown with many different shapes, including squares, circles, and rectangles. To show a fraction, shapes are always divided into equal parts, and the parts can be shaded to represent a given fraction. Consider the pictures below. The shapes divided into four equal parts, with one part shaded, show $\frac{1}{4}$. The others do not show $\frac{1}{4}$ because the parts are unequal. Shapes help students see how one whole can be broken down into different equal-sized parts.

Shapes that show equal parts:



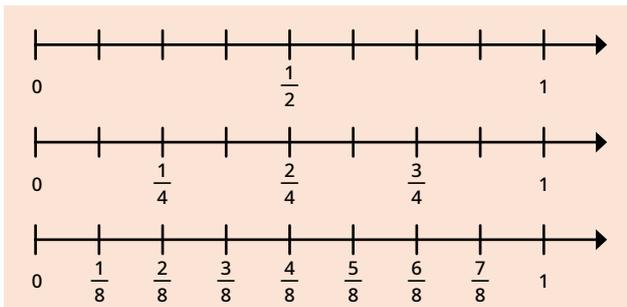
Shapes that do not show equal parts:



FRACTIONS AND NUMBERS ON A NUMBER LINE

Fractions can be numbers on a number line between whole numbers. In the early primary grades, the focus is on fractions between the whole numbers 0 and 1.

Fractions shown on a number line can be like fractions with the same denominator (e.g., $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$). The tick marks on a single number line should all be the same distance apart. They divide the number line into the number of spaces in the denominator of the fractions (e.g., four spaces for a number line showing fourths).



PARTS OF SETS

Fractions can represent part of a set or group. For example, a group of three children can form a set. If two out of three children in the group are girls, we can say that $\frac{2}{3}$ of them are girls. Sets of real objects and images can be used to teach children about this concept of fractions.



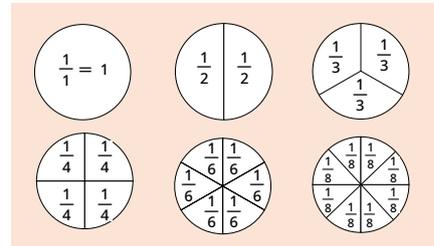
Fraction Materials

Different types of concrete materials and images drawn on paper or the board can be used to help students better understand fractions.

FRACTION CIRCLES

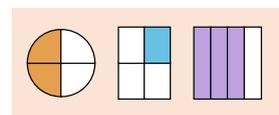
Fraction circles are concrete materials that support children's understanding of fractions as parts of a whole. Shapes can be paper or cardboard cutouts. Fraction shapes that can be cut out are provided in Mini-Module A.

Fraction circles help students see how one whole can be divided into different equal-sized parts. These are especially important for comparing fractions and equivalent fractions.



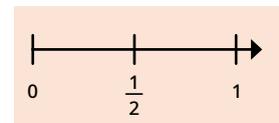
SHAPES

Different shapes—such as circles, squares, and rectangles—can be used to show fractions. Shapes can be drawn on paper or the board; they can also be cut out from cardboard. When drawing shapes, the shapes and their parts should be drawn neatly so that the parts are the same size. It is okay if hand-drawn shapes are not exact, as long as the parts appear to be the same size.



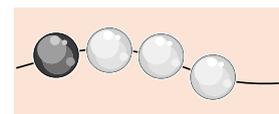
NUMBER LINES

Number lines can be printed or drawn on the board, paper, or a classroom poster. Individual number lines can be used at first to identify and compare fractions with the same denominator. Then, multiple number lines can be used together. This is useful for comparing fractions with different denominators and identifying equivalent fractions by seeing two different fractions at the same point on the number line.



SETS OF OBJECTS

When teaching fractions of a set, it can help to have a set of objects that are similar except for a specific characteristic, like their color. The example of black and white beads is used in these mini-modules. However, other sets could consist of different-colored bottle caps, straws, balls, pieces of paper, or other object available in the community.



Connections with Other Mathematical Concepts

NUMBERS AND QUANTITIES

Children should have a good understanding of whole numbers (0, 1, 2, 3, ...) and quantities before they learn about fractions. They should be comfortable with tasks such as identifying, writing, and comparing whole numbers before they learn how to identify, write, and compare fractions.

FRACTIONS, DECIMALS, AND PERCENTAGES

In later grades, children will learn about more advanced topics with fractions, including fractions greater than 1 and how to perform operations on fractions. They will also learn about two other representations for fractions: decimals and percentages. Building a strong understanding of fractions in the early grades will support children as they learn these more advanced topics later on.

GEOMETRY

A good understanding of basic shapes (e.g., circle, square, rectangle) and their properties will help children understand fractions. Children learn about fractions of shapes that have been divided into equal parts, and an understanding of shape properties will help them understand these representations.

MEASUREMENT

A good understanding of fractions helps children understand measurement, which is important in math and everyday life. When children first learn to measure, they use whole units (e.g., 2 meters, 5 liters). Later on, they learn to measure partial units with fractions and decimals (e.g., 3.75 meters, $2\frac{1}{2}$ meters).



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AUTHORS: Brittany Meredith, Yasmin Sitabkhan, Wendi Ralaingita, Linda Akach