

Lesson 3: Unit Fractions

Lesson Objectives

- Students will compare the number of unit fractions needed to make 1 whole.
- Students will compare the size of unit fractions in relation to a fixed unit length.

Instructional Materials

Material	Quantity	Description
Colored pencils	1 per student	
How Am I Doing? graph	1 per student	
Display Masters	1 each	<ul style="list-style-type: none"> • Preview: Key Ideas: Unit Fractions • Demonstrate: Comparison Chart • Demonstrate: Unit Fractions
Master <i>Paper strips divided into thirds, fourths, fifths, and sixths can be cut from the Paper Strip display master.</i>	1 each per student	<ul style="list-style-type: none"> • Paper Strips
Handouts	1 per student	<ul style="list-style-type: none"> • Cumulative Review • Practice 1 • Practice 2 • Independent Practice
Answer Keys	1 each	<ul style="list-style-type: none"> • Cumulative Review • Practice 1 • Practice 2 • Independent Practice

Cumulative Review

Have students answer the questions on the Cumulative Review handout. Go over the answers. Correct misconceptions. Have students use a colored pencil to make corrections as needed. Collect student papers to determine who needs additional instruction.

Preview

This lesson will develop students' fractional number sense and understanding of the size of fractions. Students will examine the relationship between the number of unit fractions needed to make 1 whole and the size of the unit fractions. Students will use the mathematical ideas taught in this lesson when comparing and ordering fractions.

Display and introduce through a brief explanation the key ideas for this lesson:

- Given a unit length, as the number of parts (unit fractions) needed to make 1 whole increases, the size of each unit part decreases.
- Given a unit length, as the number of parts (unit fractions) needed to make 1 whole decreases, the size of each unit part increases.

Use the Key Ideas: Unit Fractions  display master as needed.

Engage Prior/Informal Knowledge

To open the lesson, present questions to activate students' background knowledge related to the content to be taught in this lesson. Ask students questions such as:



- In this area models what is the numerator? (3) What does it represent? (The numerator tells the number of parts¹.)

- What is the denominator? (3) What does it represent? (The denominator tells what type of parts are being created¹.)

If students cannot correctly answer these questions, stop and explicitly teach these mathematical ideas before continuing with the lesson. Refer to previous lessons for examples of instructional methods.

Demonstrate



1. Label each part with the unit fraction that describes it.

Display the $\frac{1}{3}$ paper strip.

Draw attention to the segments and remind students that unit fractions are formed by dividing a whole (region, set, or distance on a number line) into equal parts.² A unit fraction describes one of these equal parts.

Think aloud as you label each part with the unit fraction that describes it.

For example, for the paper strip divided into thirds:

Say: *There are 3 total parts in the whole. The denominator, which is below the fraction bar, is 3. I am writing the denominator on each part.*

Display 3 under a fraction bar on each part.

Say: *Each of these equal parts is 1 part. I am selecting 1 part, so the numerator, which is above the fraction bar, is 1. I am writing 1 above the fraction bar on each unit fraction.*

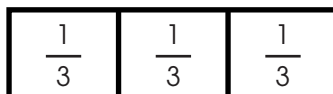


TEACHER NOTE

This is a formal definition of a fraction: If A and B are counting numbers, and if an object can be divided into B parts, then $\frac{1}{B}$ of the object is the amount formed by 1 part, and $\frac{A}{B}$ of the object is the amount formed by A parts (or copies of parts).³ Use the definition as appropriate.

Display 1 above the fraction bar on each part.

The fraction strip should look like the diagram below.



TEACHER NOTE

1 whole is made up of b copies of the unit fraction $\frac{1}{b}$.

2. Find the number of copies of the unit fraction needed to make one whole.

Say: *How many copies of the $\frac{1}{3}$ unit fraction are needed to make 1 whole? The whole is divided into thirds. 1 whole is made up of 3 copies of the $\frac{1}{3}$ part.*

3. Complete the row for the unit fraction $\frac{1}{3}$.

Display the Comparison Chart display master.

Say: *For the unit fraction $\frac{1}{3}$, 3 parts are needed to make 1 whole. On the first row, for the unit fraction $\frac{1}{3}$, I am writing $\frac{1}{3}$ in the first column and 3 in the second column.*



Display $\frac{1}{3}$ and 3 in the first and second columns respectively.

Say: *I am drawing the rectangle for the unit fraction $\frac{1}{3}$. It is this big.*

Display drawing of the unit fraction $\frac{1}{3}$ in the third column of the Comparison Chart.

4. Repeat steps 1 – 3 for the paper strip divided into fourths, adjusting your language as needed.

Example:

Unit fraction	Number of parts needed to make 1 whole	Size of unit fraction
$\frac{1}{3}$	3	
$\frac{1}{4}$	4	

5. Compare the number of parts needed to make one whole and size of the unit fractions for one whole when divided into thirds and fourths.

Ask and answer questions comparing these 2 examples, such as:


- Which example needs more parts to make 1 whole? ($\frac{1}{4}$)
- Which example needs fewer parts to make 1 whole? ($\frac{1}{3}$)
- Which unit fraction is larger? ($\frac{1}{3}$)
- Which unit fraction is smaller? ($\frac{1}{4}$)

Emphasize that the unit fraction is smaller for $\frac{1}{4}$ than for $\frac{1}{3}$. Also emphasize that for $\frac{1}{4}$, more copies of the unit fraction are needed to make 1 whole than for $\frac{1}{3}$.

It may be helpful to display the unit fraction lengths $\frac{1}{4}$ and $\frac{1}{3}$ next to each other.

6. Repeat steps 1–5 for the fraction strips divided into fifths and sixths, adjusting your language as needed.

Guide students to understand that the fewer parts needed to make 1 whole, the larger the part and that the more parts needed to make 1 whole, the smaller the part.


To prevent students from believing the only way to think of unit fraction is as parts of a rectangular area use the Unit Fractions  display master to discuss various representations of $\frac{1}{4}$.

Practice



TEACHER NOTE

If students would benefit from extending the table, add rows for the unit fractions $\frac{1}{7}$, $\frac{1}{8}$, $\frac{1}{9}$, $\frac{1}{10}$, etc.

For each practice activity, provide detailed feedback to students, highlighting what was done correctly and what needs improvement. Provide opportunities for students to correct their errors. Collect student work to review and monitor student progress. 

Activity 1: Have students work in pairs or small groups to complete the activity on the Practice 1 handout. Have students verbalize their reasoning and each step in the process to their partners. Listen for the development of any misconceptions within the reasoning.

Activity 2: Have students work in pairs or small groups to complete the activity on the Practice 2 handout. Have students verbalize their reasoning and each step in the process to their partners. Listen for the development of any misconceptions within the reasoning.

Independent Practice

1. Have students work independently to complete the activity on the Independent Practice handout.
2. Go over the answers (students self-check and correct using a colored pencil).
3. Have students record the number correct in the box and complete their How Am I Doing? graph.
4. Collect the papers to review and monitor student progress.

Closure

Review the key ideas. Have students provide examples from the lesson.

Ask questions such as:

- What is the general rule relating the number of parts needed to make a whole and the size of the unit fraction?
- How would you explain what a unit fraction is to a younger sibling?

Clear up any misconceptions. Students who believe that fractions cannot equal 1 need additional instruction.

1. National Council of Teachers of Mathematics. (2009). *Focus in grade 3: Teaching with curriculum focal points*. Reston, VA: Author.
2. Beckman, Sybilla. (2011). *Mathematics for elementary teachers with activity manual, 3rd Edition*. Boston, MA: Addison-Wesley.