Grade 3 Module 5 –Fractions as Numbers on the Number Line

New or Recently Introduced Terms

- Unit fraction (fractions with numerator 1)
- Non-unit fraction (fractions with numerators other than 1)
- Fractional unit (half, third, fourth, etc.)
- Equal parts (parts with equal measurements)
- Unit interval (the interval from 0 to 1, measured by length)
- Equivalent fraction (2 fractions that name the same size)
- Copies (refers to the number of unit fractions in 1 whole)

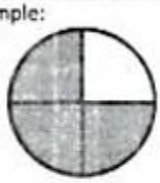
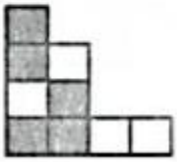
Topic A: Partitioning a Whole into Equal Parts

In Topic A, students partition a whole using a ruler to precisely measure equal parts. They then use a cup to measure equal parts of water. From there, students are invited to fold fraction strips, and estimate to draw pictorial models. The topic culminates in an exploration wherein they model a designated fraction with a meter string, 12 ounces of water, 200 grams of clay, a 4″ × 4″ square, a 12″ × 1″ strip, and a 6″ × 2″ strip. Students then tour the fraction displays created by their peers and analyze their observations. They specify that the whole has a certain number of equal parts.

Topic B: Unit Fractions and their Relation to the Whole

In Topic A students divided a given whole into equal parts to create fractional units (e.g., halves, thirds, fourths, etc.). Now, students associate one of the fractional units with a number, which we call the unit fraction (e.g., 1/2, 1/3, 1/4, etc.), as they build toward their eventual understanding of a fraction as a point on the real number line.

An advantage of the term *fractional unit* is that it distinguishes the nature of the equal parts generated by partitioning a whole from the whole number division students have been studying in Modules 1 and 3. In Topic B, to avoid confusion, the term *fractional unit* will largely be replaced by the term *equal part*. The equal part is represented numerically by the *unit fraction*. Students will recognize that any fraction is composed of multiple copies of a unit fraction and use number bonds to represent this fact. In particular, students will construct fractions greater than 1 using multiple copies of a given unit fraction.

	Total Number of Equal Parts	Total Number of Shaded Equal Parts	Unit Fraction	Fraction Shaded
Sample: 	4	3	$\frac{1}{4}$	$\frac{3}{4}$
a) 	9	5	$\frac{1}{9}$	$\frac{5}{9}$

Topic C: Comparing Unit Fractions and Specifying the Whole

Students practiced identifying and labeling unit and non-unit fractions in Topic B. Now, in Topic C, they start out by comparing unit fractions. Using fraction strips, students recognize that when the same whole is folded into more equal parts, each part is smaller. Next, using real life examples and area models, students understand that when comparing fractions, the whole needs to be the same size.

Next, students make corresponding wholes based on a given unit fraction using similar materials to those in Lesson 4's exploration: clay, yarn, two rectangles, and a square. They conduct a "museum walk" to study the wholes, identifying the unit fractions and observing part–whole relationships. Finally, students learn that redefining the whole can change the unit fraction that describes the shaded part.

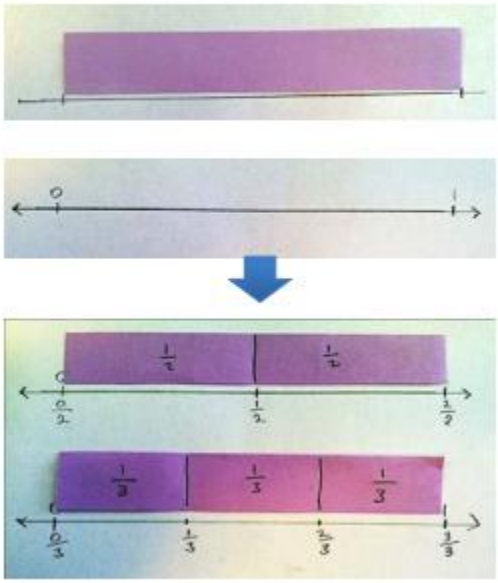
is less than

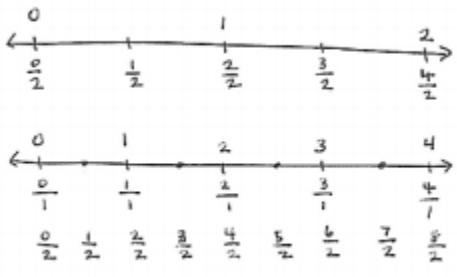
$\frac{1}{6}$ is less than $\frac{1}{3}$

Topic D: Fractions on the Number Line

In Topic C, students compared unit fractions and explored the importance of specifying the whole when

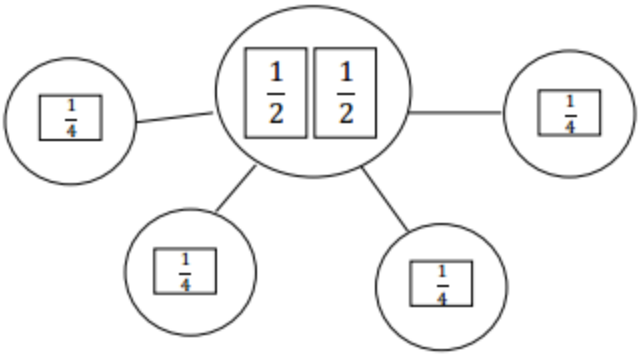
doing so. In Topic D, they apply their learning to the number line. Number bonds and fraction strips serve as bridges into this work. Students see intervals on the number line as wholes. They initially measure equal lengths between 0 and 1 with their fraction strips. They then work with number lines that have endpoints other than 0 and 1, or that include multiple whole number intervals. This naturally leads into comparing fractions with the same denominator, and fractions and whole numbers on the number line. As they compare, students reason about the size of fractions and contextualize their learning within real world applications.

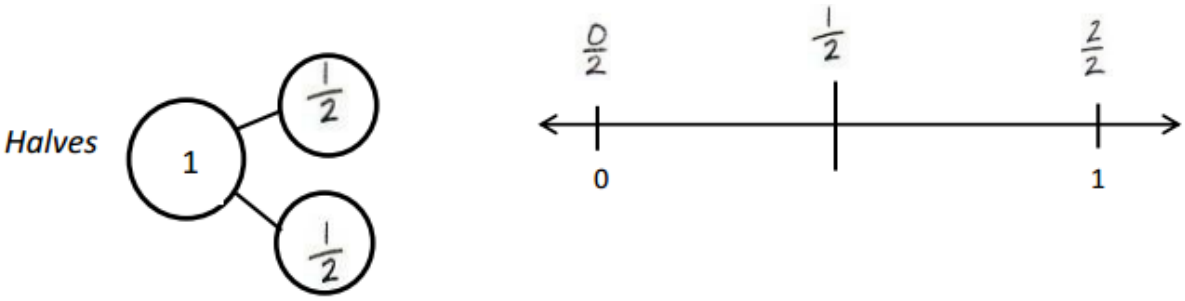




Topic E: Equivalent Fractions

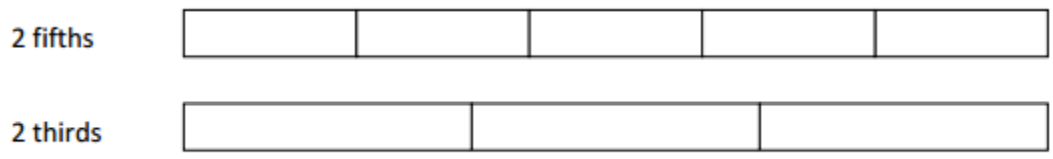
In Topic D, students practiced placing and comparing fractions on a number line. In Topic E, they identify equivalent fractions using fraction strips, number bonds, and the number line as models. Students compare fractions on the number line to recognize that equivalent fractions refer to the same whole and to the same point on the line. Initially, students find equivalence in fractions less than 1 whole, e.g., 1 half = 2 fourths. They then express whole numbers as fractions using number bonds and number lines to show how many copies of a unit are needed to make the whole, e.g., 4 copies of 1 fourth equals 1 whole. They reason about why whole numbers can be written as fractions with a denominator of 1. Finally, students explain equivalence through manipulating units.

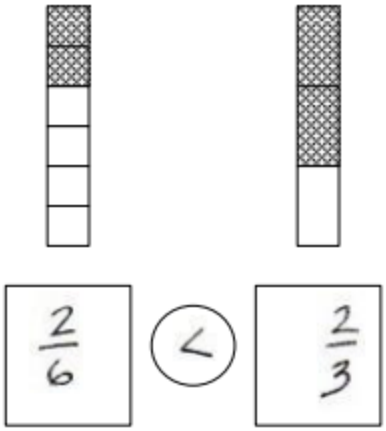




Topic F: Comparison, Order, and Size of Fractions

Fraction strips and the number line carry into Topic F as students compare fractions with the same numerator. As they study and compare different fractions, students continue to reason about their size. They develop understanding that the numerator or number of copies of the fractional unit (shaded parts) does not necessarily determine the size of the fraction. The module closes with an exploration in which students are guided to develop a method for precisely partitioning various wholes into any fractional unit using the number line as a measurement tool.




2/6
<
2/3