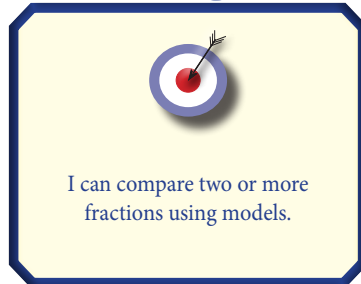


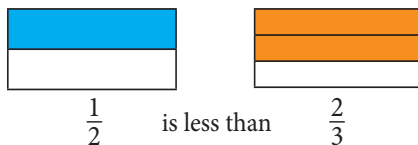
Comparing Fractions Using Models

Lesson 2

TARGET



You can compare two fractions by shading equal-sized models. Look at the two models below. There is less area shaded in the model of $\frac{1}{2}$ than in the model of $\frac{2}{3}$. Therefore, $\frac{1}{2}$ is less than $\frac{2}{3}$.



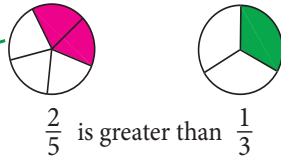
This can also be written $\frac{1}{2} < \frac{2}{3}$.

Math Symbols for Comparing

- < less than
- > greater than
- = equal to

Compare $\frac{2}{5}$ and $\frac{1}{3}$ using circle models.

More area is shaded on this model so it is the larger number.



$$\frac{2}{5} > \frac{1}{3}$$

Materials

Fraction tiles (optional)

Pre-Requisite Skills

- ◆ Compare numbers using models and number lines.

Common Core State Standard

4.NF.2 Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $\frac{1}{2}$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model.

Learning Progression

In earlier grades, students have...

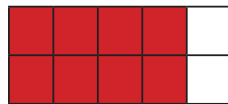
- ◆ compared and ordered whole numbers to 1,000. (2.NBT.4)
- ◆ compared fractions to 1. (A2 Lesson 4)
- ◆ compared fractions using number lines and models. (A2 Lesson 5)

In future grades, students will...

- ◆ compare positive and negative fractions. (6.NS.6, 6.NS.7)



Compare $\frac{8}{10}$ and $\frac{3}{5}$. Use $>$, $<$ or $=$.



$\frac{8}{10}$

Shade the correct number of boxes.



$\frac{3}{5}$

$\frac{8}{10} > \frac{3}{5}$



Use the fraction models to compare $\frac{4}{5}$, $\frac{1}{2}$ and $\frac{2}{3}$.



$\frac{4}{5}$



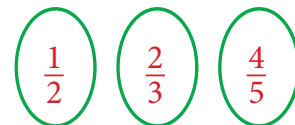
$\frac{1}{2}$



$\frac{2}{3}$

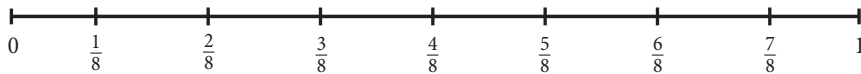
Shade to represent each fraction.

List the fractions in order from least to greatest.



least \longrightarrow greatest

Number lines can also be used to compare fractions.



\longrightarrow Fractions get larger from left to right. \longrightarrow

Incorporating the Mathematical Practices

MP 3 Use Practice Problem #10 to have students practice constructing a viable argument. Practice Problem #8 gives students the opportunity to critique another student's thinking.

MP 5 Students may choose to use a number line or a shaded model to compare fractions. In some cases, number lines may not be the appropriate tool if both fractions are not shown on the number lines. Give students an opportunity to see situations where a set of number lines may be difficult to use to compare fractions (e.g., $\frac{1}{5}$ and $\frac{1}{4}$).

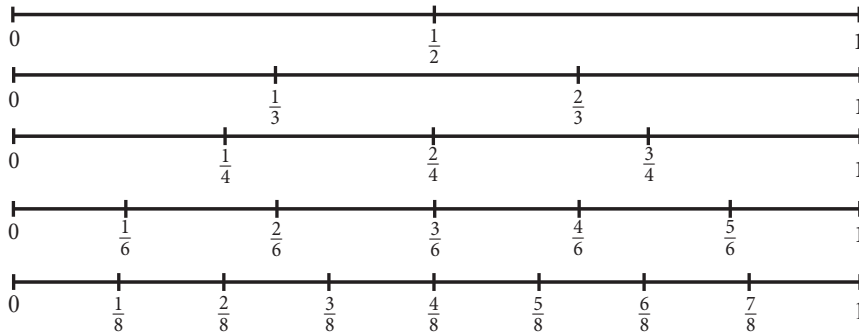
MP 7 Have students examine the set of number lines on the top of page 11. Have students discuss with a partner or small group ways in which the number line could be used to compare fractions.

Communication Prompt

How can you use models to compare $\frac{2}{3}$ and $\frac{3}{4}$?

You can use a set of number lines to compare fractions with different denominators.

- ◆ Locate each fraction you are comparing on the number line(s).
- ◆ The fraction that is further to the right is the larger fraction.
- ◆ Put $>$, $<$ or $=$ between the fractions in your answer.



Compare each pair of fractions using $>$, $<$ or $=$ using the number lines above.

$\frac{3}{4} > \frac{1}{3}$	$\frac{2}{8} = \frac{1}{4}$	$\frac{1}{3} < \frac{4}{8}$
$\frac{6}{8} > \frac{2}{3}$	$\frac{1}{6} < \frac{1}{3}$	$\frac{3}{6} = \frac{1}{2}$



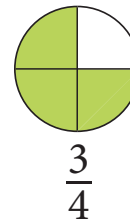
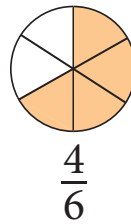
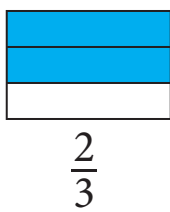
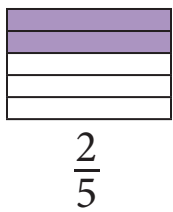
Use the number line to list the fractions from least to greatest: $\frac{5}{8}, \frac{3}{4}, \frac{5}{6}, \frac{1}{2}$.

$$\frac{1}{2}, \frac{5}{8}, \frac{3}{4}, \frac{5}{6}$$

Teaching Tips

- ◆ When using shaded diagrams, make sure that the figures have the same size whole in order to compare the fractional parts.
- ◆ Number lines are very useful when comparing fractions. The number lines need to be drawn parallel to each other and have equal-sized wholes (distance from 0 to 1). Have students physically place their fingers on the fractions they are comparing to determine which is further right (larger).
- ◆ Students may need to be reminded how to use the $>$ and $<$ symbols. Use the words “greater than” and “less than” each time you use the symbols. Refrain from only paraphrasing the symbols (e.g., “The alligator eats the bigger number.”).
- ◆ Shaded diagrams and number lines can be used for comparing fractions greater than 1.
- ◆ In **Lesson 3**, students will find common denominators to compare fractions. They will use models to support their answers.

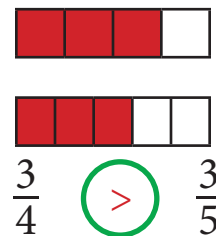
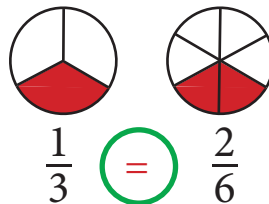
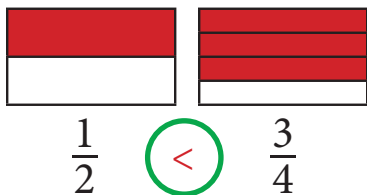
1. Fill in the blanks with greater than, less than or equal to.



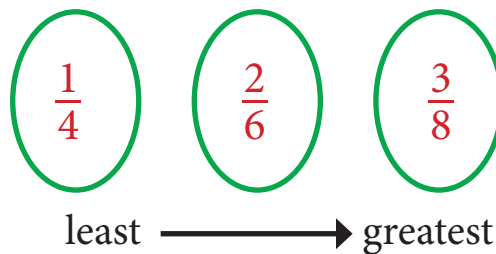
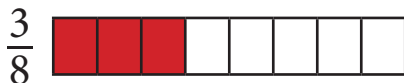
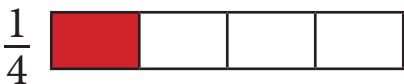
$\frac{2}{5}$ is less than $\frac{2}{3}$

$\frac{4}{6}$ is less than $\frac{3}{4}$

2. For each set of models, shade to match the fractions. Compare each pair of fractions using $>$, $<$ or $=$.

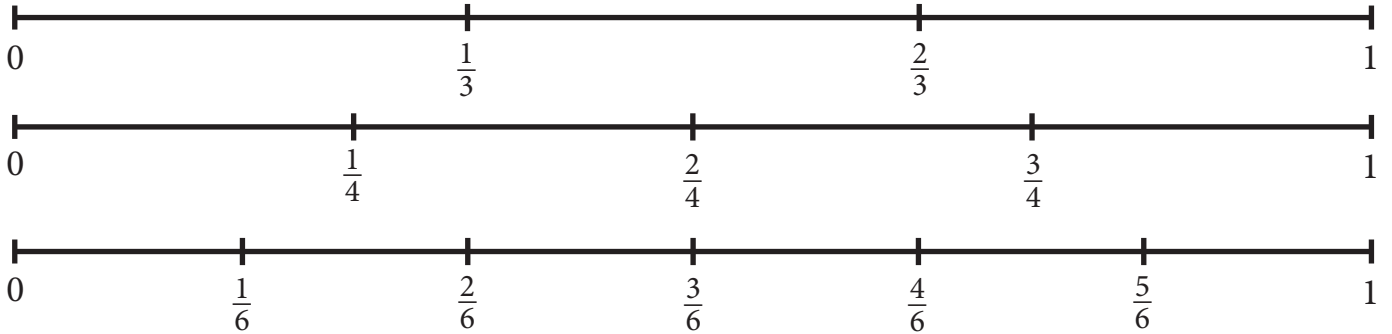


3. Shade each model to represent the given fraction. Then list the fractions in order from least to greatest.



4. Numbers on a number line get larger as you move from left to right.

5. Use the number lines below to compare each pair of fractions using $>$, $<$ or $=$.



$$\frac{5}{6} > \frac{3}{4}$$

$$\frac{2}{4} = \frac{3}{6}$$

$$\frac{1}{4} < \frac{2}{6}$$

$$\frac{1}{6} < \frac{1}{3}$$

$$\frac{4}{6} > \frac{2}{4}$$

$$\frac{2}{3} = \frac{4}{6}$$

6. Fill in each box with a fraction from the number lines above that makes the statement true.

$$\boxed{\frac{5}{6}} > \frac{3}{4}$$

$$\frac{1}{3} > \boxed{\phantom{\frac{1}{3}}}$$

$$\boxed{\frac{1}{3}} = \frac{2}{6}$$

Answers may vary.
See student work.

7. List the fractions below from least to greatest. Use words to explain how you determined the order.

$$\frac{5}{6}, \frac{2}{3}, \frac{2}{4}, \frac{3}{4}$$

$$\frac{2}{4}, \frac{2}{3}, \frac{3}{4}, \frac{5}{6} \quad \text{See student work for explanation.}$$

- 8.** Sean compared $\frac{3}{4}$ and $\frac{3}{3}$. He decided he did not need to draw a model or use a number line because 4 is larger than 3 so $\frac{3}{4}$ is larger than $\frac{3}{3}$. Do you agree or disagree? Use words and/or models to support your answer.

Disagree; see student work for explanation.

- 9.** Kristi does not understand how to use number lines to compare fractions. Explain to her how number lines can be used to compare fractions.

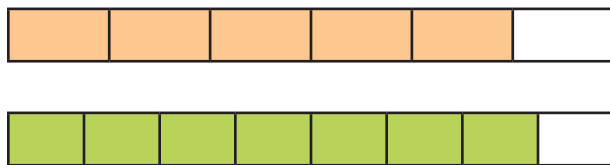
See student work.

- 10.** Kennedy had $\frac{1}{4}$ cup of raisins. Paul had $\frac{1}{2}$ cup of raisins. Who had more? Explain how you know your answer is correct.

Paul had more; see student work for explanation and/or model.



- 11.** Write a comparison of the two fractions shown in the models using $>$, $<$ or $=$.



$$\frac{5}{6} < \frac{7}{8}$$