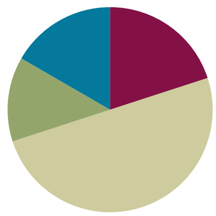
Lesson 29

Objective: Compare fractions with the same numerator using <, >, or = and use a model to reason about their size.

Related Topics: More Lesson Plans for the Common Core Math

Suggested Lesson Structure

Fluency Practice	(12 minutes)
Application Problems	(8 minutes)
Concept Development	(30 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**



Fluency Practice (12 minutes)

- Multiply by 8 **3.OA.4** (8 minutes)
- Compare Fractions with the Same Numerator **3.NF.3d** (4 minutes)

Multiply by 8 (8 minutes)

Materials: (S) Double-sided Multiply by 8 Problem Sets

T: Skip-count by eights. (Write multiples horizontally as students count.)

S: 8, 16, 24, 32, 40, 48, 56, 64, 72, 80.

T: (Write 8 x 5 = ____.) Let's skip-count by eights to find the answer. (Count with fingers to 5 as students count.)

S: 8, 16, 24, 32, 40.

T: (Circle 40 and write 8 x 5 = 40 above it. Write 8 x 3 = ____.) Let's skip-count up by eights again. (Count with fingers to 3 as students count.)

S: 8, 16, 24.

T: Let's see how we can skip-count down to find the answer, too. Start at 40. (Count down with your fingers as students say numbers.)

S: 40, 32, 24.

T: (Write 8 x 7 = ____.) Let's skip-count up by eights. (Count with fingers to 7 as students count.)

S: 8, 16, 24, 32, 40, 48, 56.

T: (Write 8 x 9 = ____.) Let's skip-count up by eights. (Count with fingers to 8 as students count.)

S: 8, 16, 24, 32, 40, 48, 56, 64, 72.

T: Let's see how we can skip-count down to find the answer, too. Start at 80. (Count down with your fingers as student say numbers.)

S: 80, 72.

T: Let's get some practice multiplying by 8. Be sure to work left to right across the page. (Distribute Multiply by 8 Problem Set.)

Compare Fractions with the Same Numerator (4 minutes)

Materials: (S) Personal white boards

T: (Project a tape diagram partitioned into 3 equal units with the first 2 units shaded.) Say the fraction that is shaded.

S: 2 thirds.

T: (Write 2 thirds to the left of the tape diagram. Project a tape diagram of 6 equal, unshaded units directly below the first tape diagram. Next to the second tape diagram, write 2 sixths.) How many units should I shade to show 2 sixths?

S: 2.

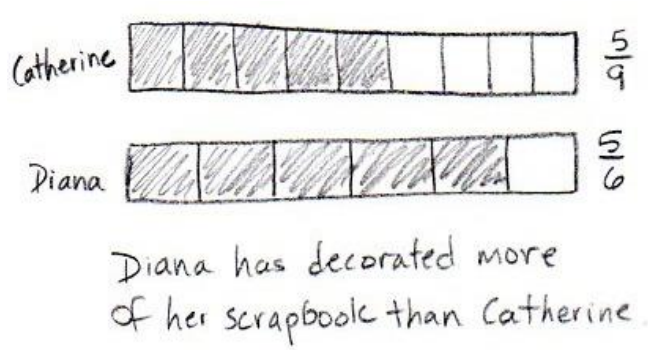
T: (Shade the first 2 units in the second tape diagram). On your personal white board, write the larger fraction.

S: (Write $\frac{1}{2}$.)

Continue process for 3 tenths and 3 fourths, 5 sixths and 5 eighths, and 7 eighths and 7 tenths.

Application Problem (8 minutes)

Catherine and Diana bought matching scrapbooks. Catherine decorated $\frac{5}{9}$ of the pages in her book. Diana decorated $\frac{5}{6}$ of the pages in her book. Use a tape diagram to show who has decorated more pages of their scrapbooks.



NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

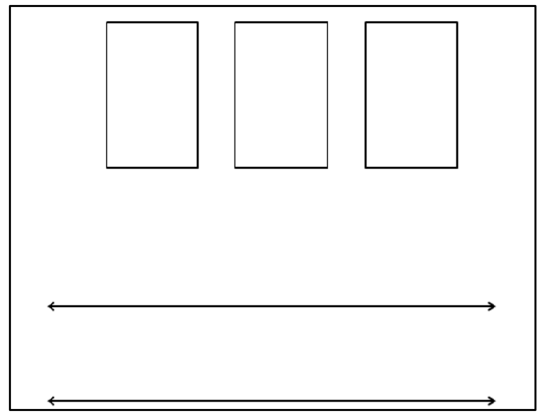
Challenge students above grade level to model the comparison on a number line (or two), as well. Have students evaluate and compare the models. Ask (for example), "How might you decide when to use a tape diagram rather than a number line to solve?"

Concept Development (30 minutes)

Materials: (S) Personal white boards, Lesson 25 Template (pictured below)

Students begin in pairs facing each other, arranged in a large circle around the room. Students slip the template from Lesson 25 into personal white boards.

Lesson 25 Template, Side A



T: Start on Side A of your template. Today we'll only use the first rectangle. On my signal, draw and shade a fraction less than $\frac{1}{2}$ and label it below the rectangle. (Signal.)

S: (Draw and label.)

T: Check your partner's work to make sure it's less than $\frac{1}{2}$.

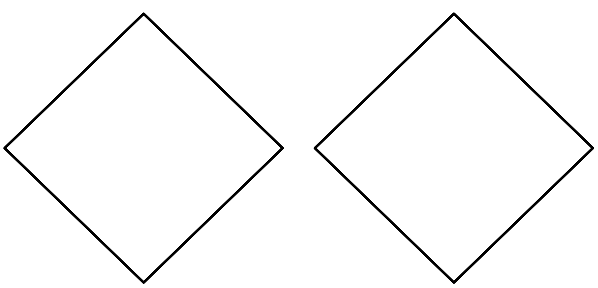
S: (Check.)

T: This is how we're going to play a game today. For the next round, we'll see which partner is quicker but still accurate. As soon as you finish drawing raise your board. If you are quicker, then you are the winner of the round. You'll move to partner with the person on your right who stays. Ready? Erase your boards. On my signal draw and label a fraction that is greater than $\frac{1}{2}$. (Signal.)

S: (Draw and label.)

The student who goes around the entire circle and arrives back at their original place faster than the other students wins the game. The winner can also just be the student who has moved the furthest if it takes too long to play all the way around. Move the game at a brisk pace. Use a variety of fractions and mix it up between greater than and less than so that students constantly need to update their drawings and feel challenged. You may even decide to mix it up by calling out 'equal to.'

T: Draw my shapes on your personal white board. Make sure they match in size like mine. (Draw or show the image below.)



S: (Draw.)

T: Partition both squares into sixths.

S: (Partition.)

T: Partition the second square to show double the number of units in the same whole.

S: (Partition.)

T: What units do we have?

S: Sixths and twelfths.

T: Shade in 4 units of each shape and label the shaded fraction below the square.

S: (Shade and label.)

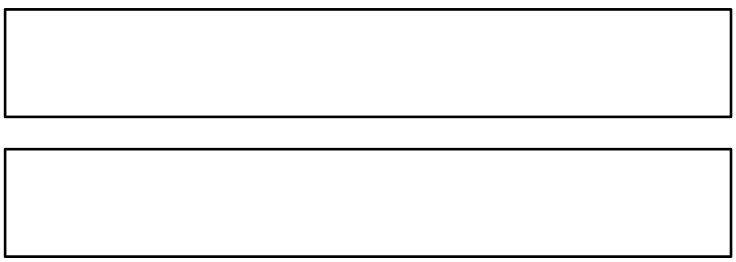
T: Whispering to your partner, say a sentence comparing the fractions using the words ‘greater than,’ ‘less than,’ or ‘equal to.’

S: $\frac{4}{6}$ is greater than $\frac{4}{12}$.

T: Now place the correct symbol between the fractions.

S: (Students show $\frac{4}{6} > \frac{4}{12}$.)

T: Draw my shapes on your personal board. Make sure they match in size like mine. (Draw or show the image below.)



S: (Draw.)

T: Partition the first rectangle into sevenths and the second one into fifths.

S: (Partition.)

T: Shade in 3 units of each shape and label the shaded fraction below the square.

S: (Shade and label.)

T: Whispering to your partner, say a sentence comparing the fractions using the words ‘greater than,’ ‘less than,’ or ‘equal to.’

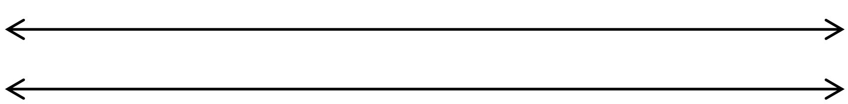
S: $\frac{3}{7}$ is less than $\frac{3}{5}$.

T: Now place the correct symbol between the fractions.

S: (Students show $\frac{3}{7} < \frac{3}{5}$.)

Do other examples if necessary using a variety of shapes and units.

T: Draw 2 number lines on your personal white board. And label the endpoints 0 and 1.



S: (Draw and label.)

T: Partition the first number line into eighths and the second one into tenths.

S: (Partition.)

T: On the first number line, make an arrow to label $\frac{8}{8}$ of the unit fraction.

S: (Label.)

T: On the second number line, make an arrow to label 2 copies of $\frac{5}{10}$.

S: (Label.)

T: Whispering to your partner, say a sentence comparing the fractions using the words ‘greater than,’ ‘less than,’ or ‘equal to.’

S: Wait, they’re the same! $\frac{8}{8}$ is equal to $\frac{10}{10}$.

T: How do you know?

S: Because they have the same point on the number line. That means they’re equivalent.

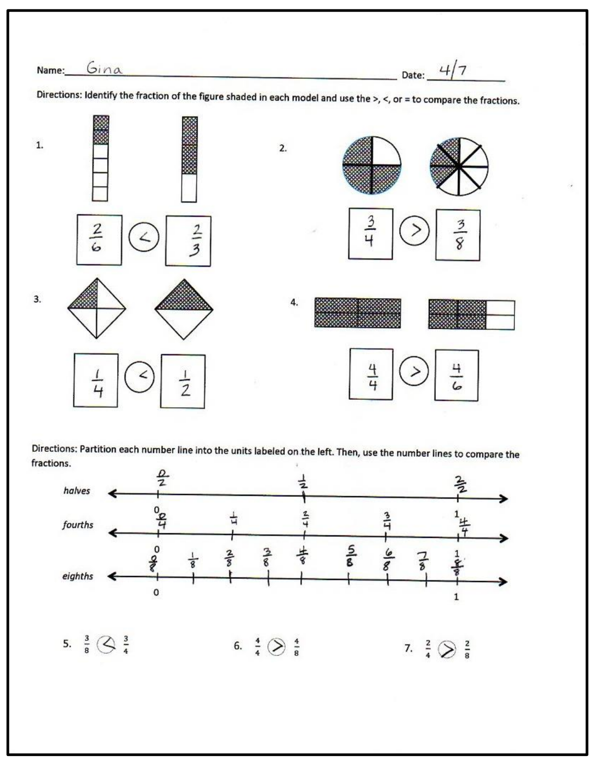
T: Now write the comparison as a number sentence with the correct symbol between the fractions.

S: (Students show $\frac{8}{8} = \frac{10}{10}$.)

Do other examples with the number line. In subsequent examples that use smaller units or units that are farther apart, move to using a single number line.

Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first. Some problems do not specify a method for solving. Students solve these problems using the RDW approach used for Application Problems.



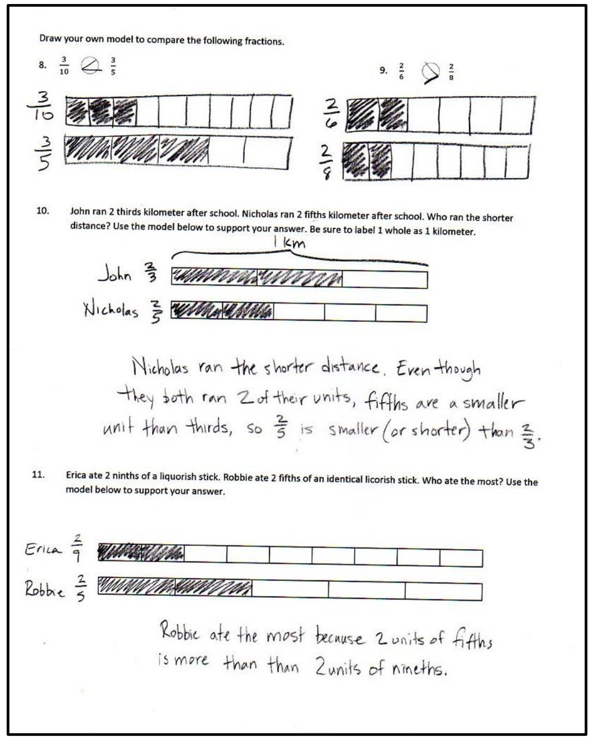
Student Debrief (10 minutes)

Lesson Objective: Compare fractions with the same numerator using <, >, or = and use a model to reason about their size.

The Student Debrief is intended to invite reflection and active processing of the total lesson experience.

Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set and process the lesson.

You may choose to use any combination of the questions below to lead the discussion.


Draw your own model to compare the following fractions.

8. $\frac{3}{10}$ < $\frac{3}{5}$

9. $\frac{2}{6}$ > $\frac{2}{8}$

$\frac{3}{10}$

$\frac{3}{5}$

$\frac{2}{6}$

$\frac{2}{8}$

10. John ran 2 thirds kilometer after school. Nicholas ran 2 fifths kilometer after school. Who ran the shorter distance? Use the model below to support your answer. Be sure to label 1 whole as 1 kilometer.

1 km

John $\frac{2}{3}$

Nicholas $\frac{2}{5}$

Nicholas ran the shorter distance. Even though they both ran 2 of their units, fifths are a smaller unit than thirds, so $\frac{2}{5}$ is smaller (or shorter) than $\frac{2}{3}$.

11. Erica ate 2 ninths of a liquorish stick. Robbie ate 2 fifths of an identical licorish stick. Who ate the most? Use the model below to support your answer.

Erica $\frac{2}{9}$

Robbie $\frac{2}{5}$

Robbie ate the most because 2 units of fifths is more than than 2 units of nineths.

- Use the questions in the vignette below to guide a conversation in which students reflect on their learning and articulate the objective of the lesson.

  T: Think back on our work from yesterday and today. What have we compared?

  S: Fractions. → Number lines and pictorial models. → Fractions with the same amount of shaded parts and different units.

  T: When comparing fractions, why is it so important that the wholes are the same size?

  S: Because you have to compare the same wholes. → If the wholes are different sizes, then you can't really tell how big the pieces are. A ninth might actually be bigger than a sixth if the whole is way bigger.

  T: If the wholes are the same, like the ones we've been practicing with, how do we determine greater than, less than, or equal to?

  S: We look at the unit to see if the pieces are small or big. → The bigger the number of pieces, the smaller the actual pieces are.

  T: What about when you're just looking at fractions without number lines or pictorial models?

  S: You can still tell from the bottom number. → Bigger numbers on the bottom mean more pieces, but therefore smaller in size.

  T: Let's try a few without models. (Write a handful of comparisons on the board and have students write the symbols that go between them on their personal boards.)

- To extend the lesson, draw fraction models greater than 1 and guide students to compare. For example, use $\frac{12}{9}$ and $\frac{12}{7}$.

NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

ELLs and students below grade level may benefit from math (and English) fluency practice using the Problem Set. For Numbers 1 through 4, encourage learners to whisper the unit fraction, whisper count the shaded units (e.g., 1 sixth, 2 sixths), and whisper the shaded fraction as they write.

Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students' understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.

8 x 1 = ____	8 x 2 = ____	8 x 3 = ____	8 x 4 = ____
8 x 5 = ____	8 x 1 = ____	8 x 2 = ____	8 x 1 = ____
8 x 3 = ____	8 x 1 = ____	8 x 4 = ____	8 x 1 = ____
8 x 5 = ____	8 x 1 = ____	8 x 2 = ____	8 x 3 = ____
8 x 2 = ____	8 x 4 = ____	8 x 2 = ____	8 x 5 = ____
8 x 2 = ____	8 x 1 = ____	8 x 2 = ____	8 x 3 = ____
8 x 1 = ____	8 x 3 = ____	8 x 2 = ____	8 x 3 = ____
8 x 4 = ____	8 x 3 = ____	8 x 5 = ____	8 x 3 = ____
8 x 4 = ____	8 x 1 = ____	8 x 4 = ____	8 x 2 = ____
8 x 4 = ____	8 x 3 = ____	8 x 4 = ____	8 x 5 = ____
8 x 4 = ____	8 x 5 = ____	8 x 1 = ____	8 x 5 = ____
8 x 2 = ____	8 x 5 = ____	8 x 3 = ____	8 x 5 = ____
8 x 4 = ____	8 x 2 = ____	8 x 4 = ____	8 x 3 = ____
8 x 5 = ____	8 x 3 = ____	8 x 2 = ____	8 x 4 = ____
8 x 3 = ____	8 x 5 = ____	8 x 2 = ____	8 x 4 = ____

8 x 1 = ______	8 x 2 = ______	8 x 3 = ______	8 x 4 = ______
8 x 5 = ______	8 x 6 = ______	8 x 7 = ______	8 x 8 = ______
8 x 9 = ______	8 x 10 = ______	8 x 5 = ______	8 x 6 = ______
8 x 5 = ______	8 x 7 = ______	8 x 5 = ______	8 x 8 = ______
8 x 5 = ______	8 x 9 = ______	8 x 5 = ______	8 x 10 = ______
8 x 6 = ______	8 x 5 = ______	8 x 6 = ______	8 x 7 = ______
8 x 6 = ______	8 x 8 = ______	8 x 6 = ______	8 x 9 = ______
8 x 6 = ______	8 x 7 = ______	8 x 6 = ______	8 x 7 = ______
8 x 8 = ______	8 x 7 = ______	8 x 9 = ______	8 x 7 = ______
8 x 8 = ______	8 x 6 = ______	8 x 8 = ______	8 x 7 = ______
8 x 8 = ______	8 x 9 = ______	8 x 9 = ______	8 x 6 = ______
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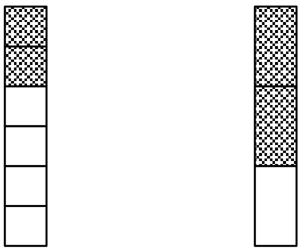
8 x 9 = ______	8 x 8 = ______	8 x 6 = ______	8 x 9 = ______
8 x 7 = ______	8 x 9 = ______	8 x 6 = ______	8 x 8 = ______
8 x 9 = ______	8 x 7 = ______	8 x 6 = ______	8 x 8 = ______

Name ____ Date ______________________

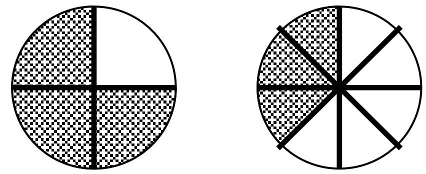
Directions: Identify the fraction of the figure shaded in each model and use the >, <, or = to compare the fractions.

1.

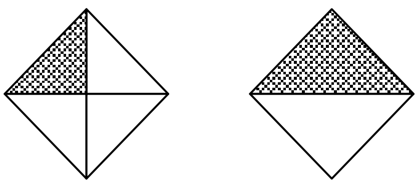


$\frac{2}{6}$ < $\frac{2}{3}$

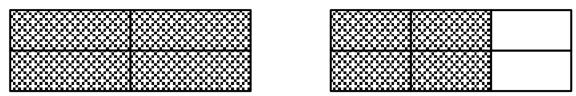
2.



3.



4.

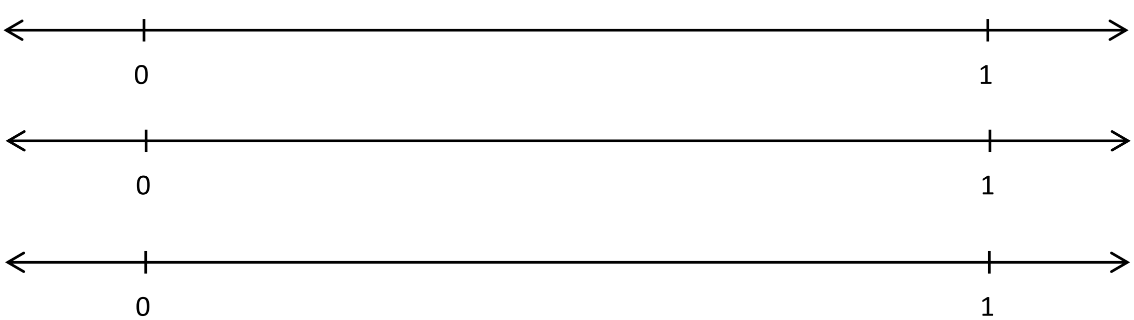


Directions: Partition each number line into the units labeled on the left. Then, use the number lines to compare the fractions.

halves

fourths

eighths



5. $\frac{3}{8}$ ◯ $\frac{3}{4}$

6. $\frac{4}{4}$ ◯ $\frac{4}{8}$

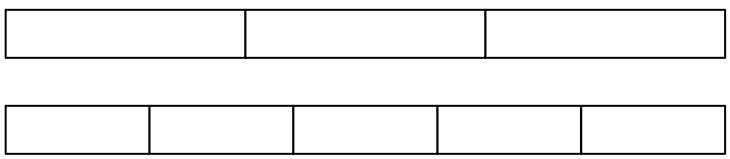
7. $\frac{2}{4}$ ◯ $\frac{2}{8}$

Draw your own model to compare the following fractions.

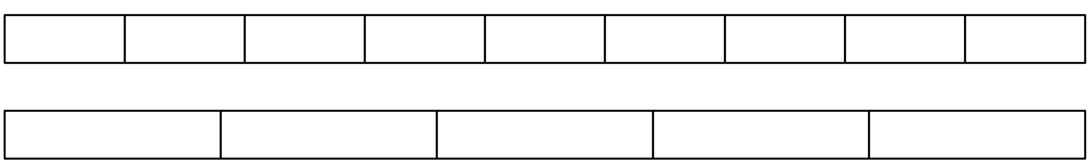
8. $\frac{3}{10}$ ◯ $\frac{3}{5}$

9. $\frac{2}{6}$ ◯ $\frac{2}{8}$

10. John ran 2 thirds kilometer after school. Nicholas ran 2 fifths kilometer after school. Who ran the shorter distance? Use the model below to support your answer. Be sure to label 1 whole as 1 kilometer.



11. Erica ate 2 ninths of a licorice stick. Robbie ate 2 fifths of an identical licorice stick. Who ate the most? Use the model below to support your answer.



Name ______________________________ Date ________________

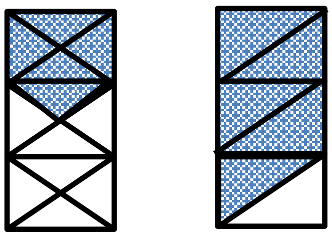
1. Complete the number sentence by writing >, <, or =.

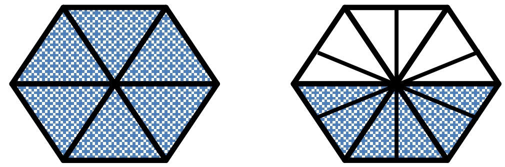
$\frac{3}{5}$ ________ $\frac{3}{9}$

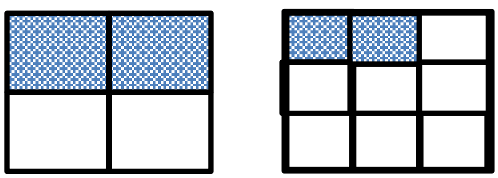
2. Draw 2 number lines with endpoints 0 and 1 to show each fraction in Problem 1. Use the models to explain how you know your comparison in Problem 1 is correct.

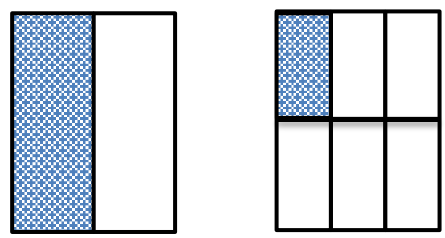
Name ____ Date ____________________

Directions: Label each shaded fraction. Use >, <, or = to compare.

1. 

2. 

3. 

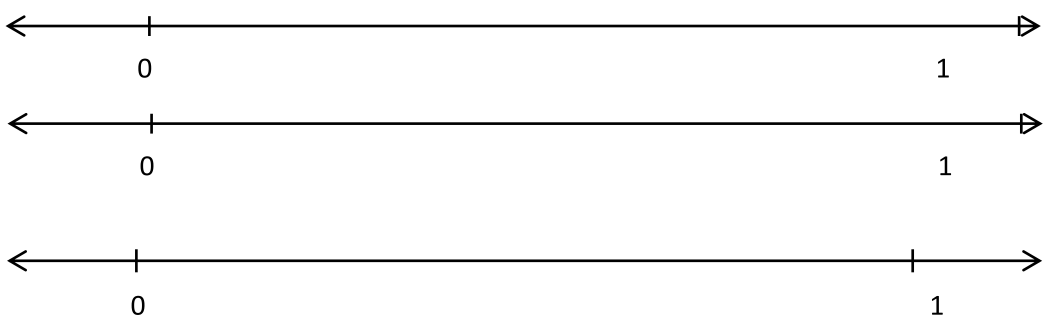
4. 

Directions: Partition each number line into the units labeled on the left. Then, use the number lines to compare the fractions.

thirds

sixths

ninths



5. $\frac{2}{6}$ ◯ $\frac{2}{3}$

6. $\frac{5}{9}$ ◯ $\frac{5}{6}$

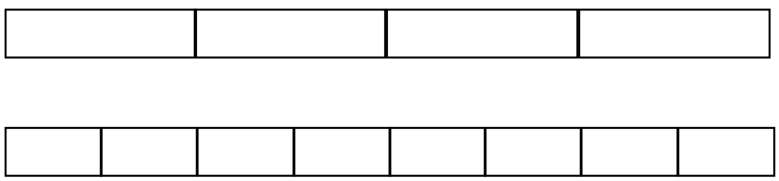
7. $\frac{3}{3}$ ◯ $\frac{3}{9}$

Draw your own models to compare the following fractions.

8. $\frac{7}{10}$ $\frac{7}{8}$

9. $\frac{4}{6}$ $\frac{4}{9}$

10. For an art project, Michello used $\frac{3}{4}$ of a glue stick. Yamin used $\frac{3}{6}$ of an identical glue stick. Who used more of the glue stick? Use the model below to support your answer. Be sure to label 1 whole as 1 glue stick.



11. After gym class, Jahsir drank 2 eighths of a bottle of water. Jade drank 2 fifths of an identical bottle of water. Who drank less water? Use the model below to support your answer.