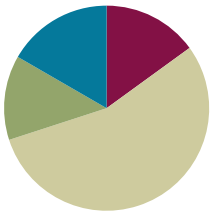
Lesson 20

Objective: Recognize and show that equivalent fractions have the same size, though not necessarily the same shape.

Related Topics: More Lesson Plans for the Common Core Math

Suggested Lesson Structure

Fluency Practice	(9 minutes)
Application Problem	(8 minutes)
Concept Development	(33 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**



Fluency Practice (9 minutes)

- Multiply by 7 Sprint **3.OA.4** (9 minutes)

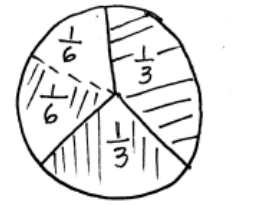
Multiply by 7 Sprint (9 minutes)

Materials: (S) Multiply by 7 Sprint

T: Skip-count by sevens. (Write multiples horizontally as students count.)
S: 7, 14, 21, 28, 35, 42, 49, 56, 63, 70.
T: (Write 7 x 5 = ____.) Let's skip-count by sevens to find the answer. (Count with fingers to 5 as students count.)
S: 7, 14, 21, 28, 35.
T: (Circle 35 and write 7 x 5 = 35 above it. Write 7 x 3 = ____.) Let's skip-count up by sevens again. (As students count show your fingers to count with them.)
S: 7, 14, 21.
T: Let's see how we can skip-count down to find the answer too. Start at 35. (Count down with your fingers as students say numbers.)
S: 35, 28, 21.
T: (Write 7 x 9 = ____.) Let's skip-count up by sevens. (Count with fingers to 9 as students count.)
S: 7, 14, 21, 28, 35, 42, 49, 56, 63.
T: Let's see how we can skip-count down to find the answer too. Start at 70. (Count down with your fingers as student say numbers.)
S: 70, 63.
T: Let's get some practice multiplying by 7. Be sure to work left to right across the page. (Distribute Multiply by 7 Sprint.)

Application Problem (8 minutes)

Max ate $\frac{2}{3}$ of his pizza for lunch. He wanted to eat a small snack in the afternoon, so he cut the leftover pizza in half and ate 1 slice. How much of the pizza was left? Draw a picture to help you think about the pizza.



$\frac{1}{6}$ of the pizza was left.

NOTES ON MULTIPLE MEANS OF REPRESENTATION:

Empower ELLs to solve the Application Problem by connecting its context to their prior knowledge. Discuss their experiences at lunch, eating pizza, having leftovers, and eating a snack.

Concept Development (33 minutes)

Materials: (S) Personal white boards, linking cubes, coins, rods

Show Model 1:

T: The whole is all the blocks. Whisper the fraction of cubes that are blue to your partner.

S: (Whisper $\frac{1}{4}$.)

Show Model 2:

T: Again, the whole is all the blocks. Whisper the fraction of cubes that are blue to your partner.

S: (Whisper $\frac{1}{4}$.)

NOTES ON MULTIPLE MEANS OF REPRESENTATION:

Students who have not mastered fraction comparisons at an abstract level may benefit from a pictorial reference tool, such as a chart of unit fraction models for the sprint.

T: Discuss with your partner whether or not the fraction of cubes that are blue is equal, even though the models are not the same shape.

S: They don't look the same, so they are different. → I disagree. They are equal because they are both $\frac{1}{4}$ blue. → They are equal because the units are still the same size, and the wholes have the same number of units. They are just in a different shape.

T: I hear you noticing that the units make a different shape in the second model. It's square rather than rectangular. Good observation. Take another minute to notice what is similar about our models.

S: They both use the same linker cubes as units. → They both have the same amount of blues and reds. → Both wholes have the same number of units, and the units are the same size.

T: The size of the units and the size of the whole didn't change. That means $\frac{1}{4}$ and $\frac{1}{4}$ are equal, or what we call equivalent fractions, even though the shapes our wholes make are different.

If necessary, do other examples to demonstrate the point made with Model 2.

Show Model 3:

T: Why isn't the fraction represented by the blue cubes equal to the other ones we made with cubes?

S: This fraction shows $\frac{2}{4}$ of the cubes are blue.

T: When we are finding equivalent fractions in area models, the shapes of the wholes can be different. However, equivalent fractions describe an equal amount of shaded and unshaded units.

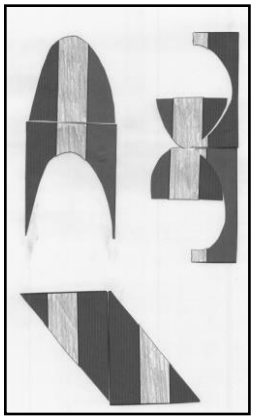
Show Model 4:

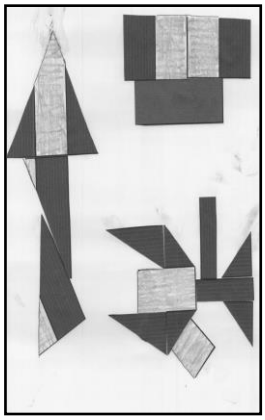
Equivalent Shapes Collage Activity

Materials: (S) copy of Model 4 (shown above), red crayon, scissors, glue stick, and blank paper

Directions:

1. Color the white stripe red.
2. Cut out the rectangle. Cut it into 2-4 smaller shapes.
3. Reassemble the pieces into a new shape with no overlaps.
4. Glue the new shape onto a blank paper.





Each of the 6 shapes pictured to the right is an example of possible student work. Each of the new shapes is equivalent to Model 4. All show $\frac{2}{3}$ grey, although clearly in different shapes.

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.

NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

For students below grade level, break the task of labeling fractions on the Problem Set into steps with sentence frames:

- There are ____ equal parts.
- ____ parts are shaded.
- The fraction shaded is _____.

These open-ended responses are "just-right" for students above grade level who enjoy independence. Communicate high expectations for explaining their reasoning clearly and with evidence.

Student Debrief (10 minutes)

Lesson Objective: Recognize and show that equivalent fractions have the same size, though not necessarily the same shape.

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

MP.6

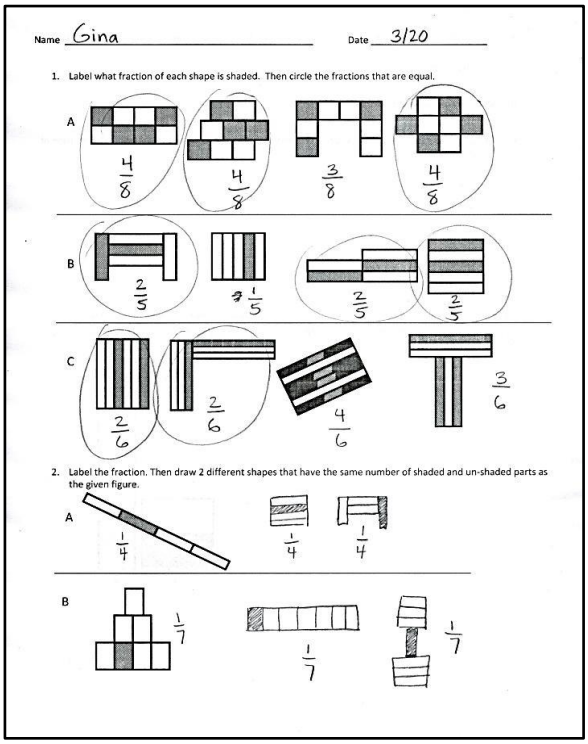
- Invite students to share their models for Problems 2A and 2B. Although answers will vary, students should consistently represent equivalent fractions for each question. Revisit the different work from the Equivalent Shapes Collage Activity.
- Problem Set Problem 3(c) presents seeing triangles as halves of squares. Some students might put $\frac{4}{8}$ as the answer since they see 8 units. You may want to pose the question, "Are all 8 parts equal

units?" Discuss how the answer can be $\frac{4}{12}$ if they choose to use the base unit of triangles or $\frac{2}{6}$ if they choose to use the base unit of squares. Lead them to see that the two fractions are equivalent.

- Problem 4 also presents an interesting discussion topic due to the use of containers that are different shapes with the same capacity. Without reading carefully, students are likely to make a mistake in their answer. This may provide you with an opportunity to further explore the difference between different sized wholes, and different looking wholes.

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.



Name Gina Date 3/20

1. Label what fraction of each shape is shaded. Then circle the fractions that are equal.

A $\frac{4}{8}$ $\frac{4}{8}$ $\frac{3}{8}$ $\frac{4}{8}$

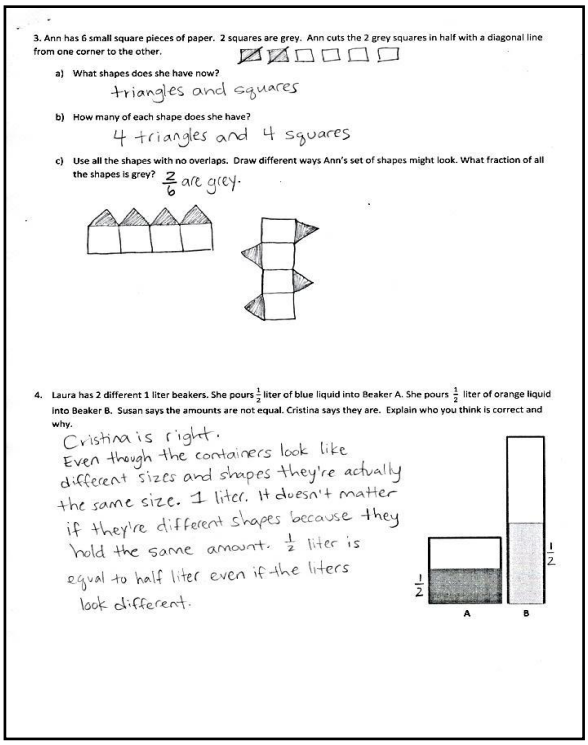
B $\frac{2}{5}$ $\frac{1}{5}$ $\frac{2}{5}$ $\frac{2}{5}$

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

2. Label the fraction. Then draw 2 different shapes that have the same number of shaded and un-shaded parts as the given figure.

A $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$

B $\frac{1}{7}$ $\frac{1}{7}$ $\frac{1}{7}$



3. Ann has 6 small square pieces of paper. 2 squares are grey. Ann cuts the 2 grey squares in half with a diagonal line from one corner to the other.

a) What shapes does she have now?
triangles and squares

b) How many of each shape does she have?
4 triangles and 4 squares

c) Use all the shapes with no overlaps. Draw different ways Ann's set of shapes might look. What fraction of all the shapes is grey? $\frac{2}{6}$ are grey.

4. Laura has 2 different 1 liter beakers. She pours $\frac{1}{2}$ liter of blue liquid into Beaker A. She pours $\frac{1}{2}$ liter of orange liquid into Beaker B. Susan says the amounts are not equal. Cristina says they are. Explain who you think is correct and why.

Cristina is right. Even though the containers look like different sizes and shapes they're actually the same size. 1 liter. It doesn't matter if they're different shapes because they hold the same amount. $\frac{1}{2}$ liter is equal to half liter even if the liters look different.

$\frac{1}{2}$ $\frac{1}{2}$ A B

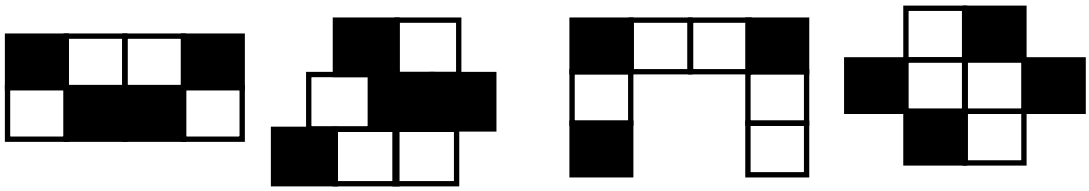
7 x 1 = _____	7 x 2 = _____	7 x 3 = _____	7 x 4 = _____
7 x 5 = _____	7 x 1 = _____	7 x 2 = _____	7 x 1 = _____
7 x 3 = _____	7 x 1 = _____	7 x 4 = _____	7 x 1 = _____
7 x 5 = _____	7 x 1 = _____	7 x 2 = _____	7 x 3 = _____
7 x 2 = _____	7 x 4 = _____	7 x 2 = _____	7 x 5 = _____
7 x 2 = _____	7 x 1 = _____	7 x 2 = _____	7 x 3 = _____
7 x 1 = _____	7 x 3 = _____	7 x 2 = _____	7 x 3 = _____
7 x 4 = _____	7 x 3 = _____	7 x 5 = _____	7 x 3 = _____
7 x 4 = _____	7 x 1 = _____	7 x 4 = _____	7 x 2 = _____
7 x 4 = _____	7 x 3 = _____	7 x 4 = _____	7 x 5 = _____
7 x 4 = _____	7 x 5 = _____	7 x 1 = _____	7 x 5 = _____
7 x 2 = _____	7 x 5 = _____	7 x 3 = _____	7 x 5 = _____
7 x 4 = _____	7 x 2 = _____	7 x 4 = _____	7 x 3 = _____
7 x 5 = _____	7 x 3 = _____	7 x 2 = _____	7 x 4 = _____
7 x 3 = _____	7 x 5 = _____	7 x 2 = _____	7 x 4 = _____

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

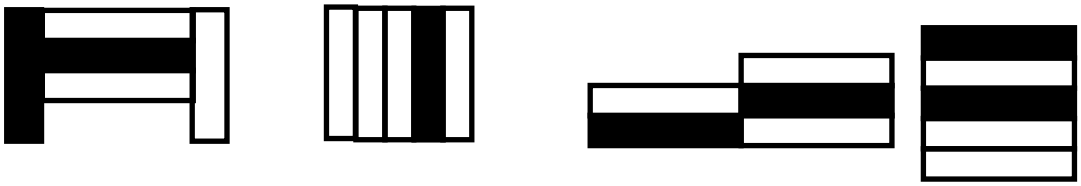
Name _____ Date _____

1. Label what fraction of each shape is shaded. Then circle the fractions that are equal.

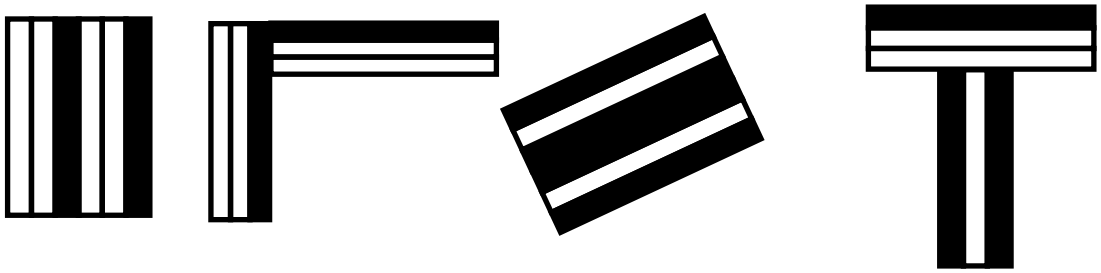
A.



B.



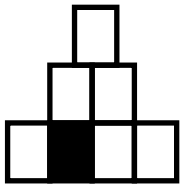
C.



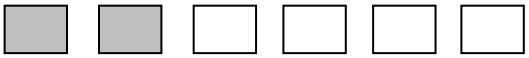
2. Label the fraction. Then draw 2 different shapes that have the same number of shaded and unshaded parts as the given figure.

A.

B.



3. Ann has 6 small square pieces of paper. 2 squares are grey. Ann cuts the 2 grey squares in half with a diagonal line from one corner to the other.

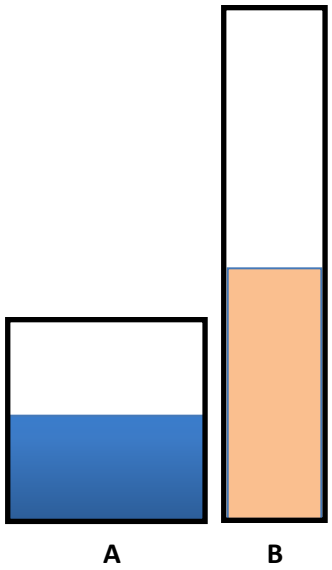


   a. What shapes does she have now?

   b. How many of each shape does she have?

   c. Use all the shapes with no overlaps. Draw different ways Ann's set of shapes might look. What fraction of the figure is grey?

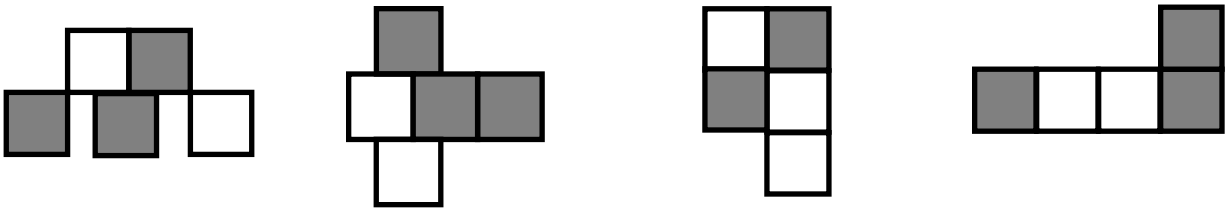
4. Laura has 2 different beakers that hold exactly 1 liter. She pours $\frac{1}{2}$ liter of blue liquid into Beaker A. She pours $\frac{1}{2}$ liter of orange liquid into Beaker B. Susan says the amounts are not equal. Cristina says they are. Explain who you think is correct and why.



Name _____ Date _____

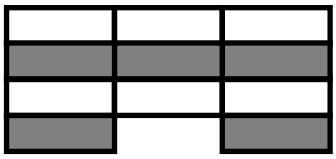
1. Label what fraction of the figure is shaded. Then circle the fractions that are equal.

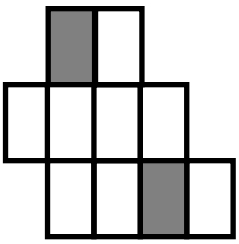
A.



2. What fraction of the figures are shaded? Draw 2 different representations of the same fractional amount.

A.



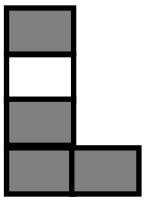


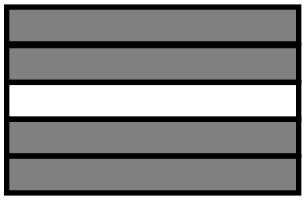
Name _____ Date _____

1. What fraction of the figure is shaded? Draw 2 different representations of the same fractional amount.

2.

a. These two shapes both show $\frac{4}{5}$. Are they equivalent? Why or why not?





b. Draw two different representations of $\frac{4}{5}$ that are equivalent.

3. Diana ran a quarter mile straight down the street. Becky ran a quarter mile on a track. Who ran more? Explain your thinking.

Diana _____

Becky ◯