COMMON CORE COLLABORATIVE FRACTION CARDS

Grades 3–5

MEANINGFUL TASKS

by Kit Norris

TEACHER'S PAGE

GRADE LEVEL	3
TASK	It Depends on the Whole
COMMON CORE STATE STANDARDS ADDRESSED	3.G.2, 3.NF.3d
STANDARDS FOR MATHEMATICAL PRACTICE	1. Make sense of problems and persevere in solving them. 4. Model with mathematics. 7. Look for and make use of structure.

LAUNCH

Begin by providing groups with their own tangram pieces. Two students can share if necessary, or provide students with two copies of the student activity sheet and they can cut out one of the puzzles.

Allow time for students to play with the pieces. Ask them what they notice about the relationships among the different-sized pieces.

TASK

Knowing that the original large square equals one whole, the students determine the size of all the other shapes. Team members must verify the size of each piece by showing various relationships. Encourage students to record these relationships on their worksheets.

In the closure discussion, ask the groups whether or not the small square and the medium-sized triangle are equal parts of the whole. (*Yes*) Challenge students' thinking to verify this fact. Ask students to find a third shape that has the same-size area as the small square and medium triangle. What conclusions can they draw as a result?

EXTENSIONS

- Students can return to the original large square. This square now has an area of ½. What are the sizes of all the other pieces?
- Have students research tangram puzzles on line and then try to create some of the interesting shapes presented using all seven tangram pieces.

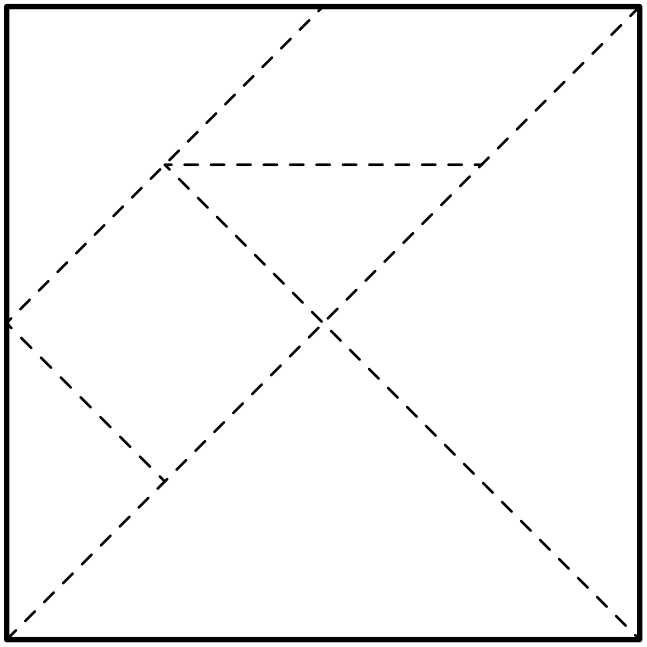
POSSIBLE SOLUTIONS

If the large square is 1 (one whole):

- Two large triangles make up ½ of the shape, so each large triangle is ¼ of the whole.
- The medium triangle is ½ of the large triangle and therefore it is ⅛ of the whole.
- Two small triangles compose the medium triangle, so the small triangles are half of the medium triangle, or $\frac{1}{16}$ of the whole
- Two small triangles also make a small square, so the small square is ⅛ of the whole.
- Two small triangles also make the parallelogram, so the parallelogram is ⅛ of the whole.

IT DEPENDS ON THE WHOLE

NAME _____



This tangram puzzle is the basis for your group task. Suppose the entire square you see is one whole. Now, work together to find the size of each smaller piece in terms of the whole.

When you have found the size of a piece, record it in the table below and explain your reasoning. You may use pictures or words or BOTH!

SHAPE	SIZE	JUSTIFY YOUR THINKING
SMALLEST TRIANGLE		
SMALL SQUARE		
MEDIUM TRIANGLE		
PARALLELOGRAM		
LARGE TRIANGLE		

Find the total value of all the pieces. What must the sum be? _____

TEACHER'S PAGE

GRADE LEVEL	4
TASK	Folding Fractions
COMMON CORE STATE STANDARDS ADDRESSED	4.NF.5, 4.NF.6
STANDARDS FOR MATHEMATICAL PRACTICE	1. Make sense of problems and persevere in solving them. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics.

LAUNCH

This activity begins with the whole class participating. Hand each student the worksheet showing two blank number lines, labeled "fractions" and "decimals." These number lines are intentionally not centered on the page. Tell the class:

We are going to use these number lines to look for relationships.
We are going to fold the lines several times and label the units that are created by the folds.

TASK

Tell students that both number lines begin at 0 and end at 1. Students should label these end points. Have the students fold the paper so that one end point rests on top of the other end point on each number line. When they are certain that they have lined up the end points, they can crease the paper. Have the students open the worksheet and label the fold on the fraction and decimal number lines "½" and "0.5," respectively.

What can we now say as a result of folding these number lines?

At this point, the students should realize that ½ and 0.5 are different ways of representing the same distance on the number line and that they represent the same value.

Have the students fold the paper again on the same crease, matching end point to end point, like they did before. Next, have them take the fold they created and place it on the end points showing through the paper.

Before we open the sheet, what size units do you think we have just made?

Have the student label the two number lines with the values positioned on the new folds (¼, 0.25; 3/4, 0.75). Then, have them fold the paper one more time in the same manner so they are now working with eighths.

Now it is time to put the groups to work. Students are to look for relationships between the two number lines and within each number line. What conclusions can they draw? How might they verify their conclusions?

Remind students to listen carefully to and support one another in this work. Students build their understanding through the discussion process. The group's Recorder should write down the connections the group has discovered, and all group members should be ready to share their understandings. Encourage students to verify that the connections between the two number lines are true. Doing so encourages students to create mathematical arguments.

EXTENSIONS

Consider asking some students to create a poster-sized version of "Folding Fractions." Then ask students to locate various fractions on the two number lines. In some cases, they will have to find approximate locations. Encourage students to discover equivalent fractions by asking them to connect the two number lines. If one number line scale is in fourths and the other scale is in eighths, what fractions are equivalent? How do they know?

FOLDING FRACTIONS

NAME _____

FRACTIONS

DECIMALS

TEACHER'S PAGE

GRADE LEVEL	5
TASK	Pizza Party Predicament
COMMON CORE STATE STANDARDS ADDRESSED	5.NF.2
STANDARDS FOR MATHEMATICAL PRACTICE	1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 6. Attend to precision.

LAUNCH

Ask the students a series of questions involving fair shares.

If there are three of us and we have one pizza, how much of the pizza will we each get to eat?

Suppose there are 5 friends and 3 pizzas. How much pizza might each person have to eat?

Allow students time to work with these ideas. Unless they automatically understand that students will get ⅓ of the pizza in the first question and ⅗ of the pizzas in the second question, have them continue to work with this idea. Suggest that they make a diagram to show the shares of pizza. Using rectangular-shaped pizzas will make partitioning the shapes easier.

TASK

Five girls are to share three pizzas, but the pizzas are divided into different fractional parts: fourths, sixths, and eighths, respectively. Students are asked to decide how to share these pizzas so that everyone gets the same amount.

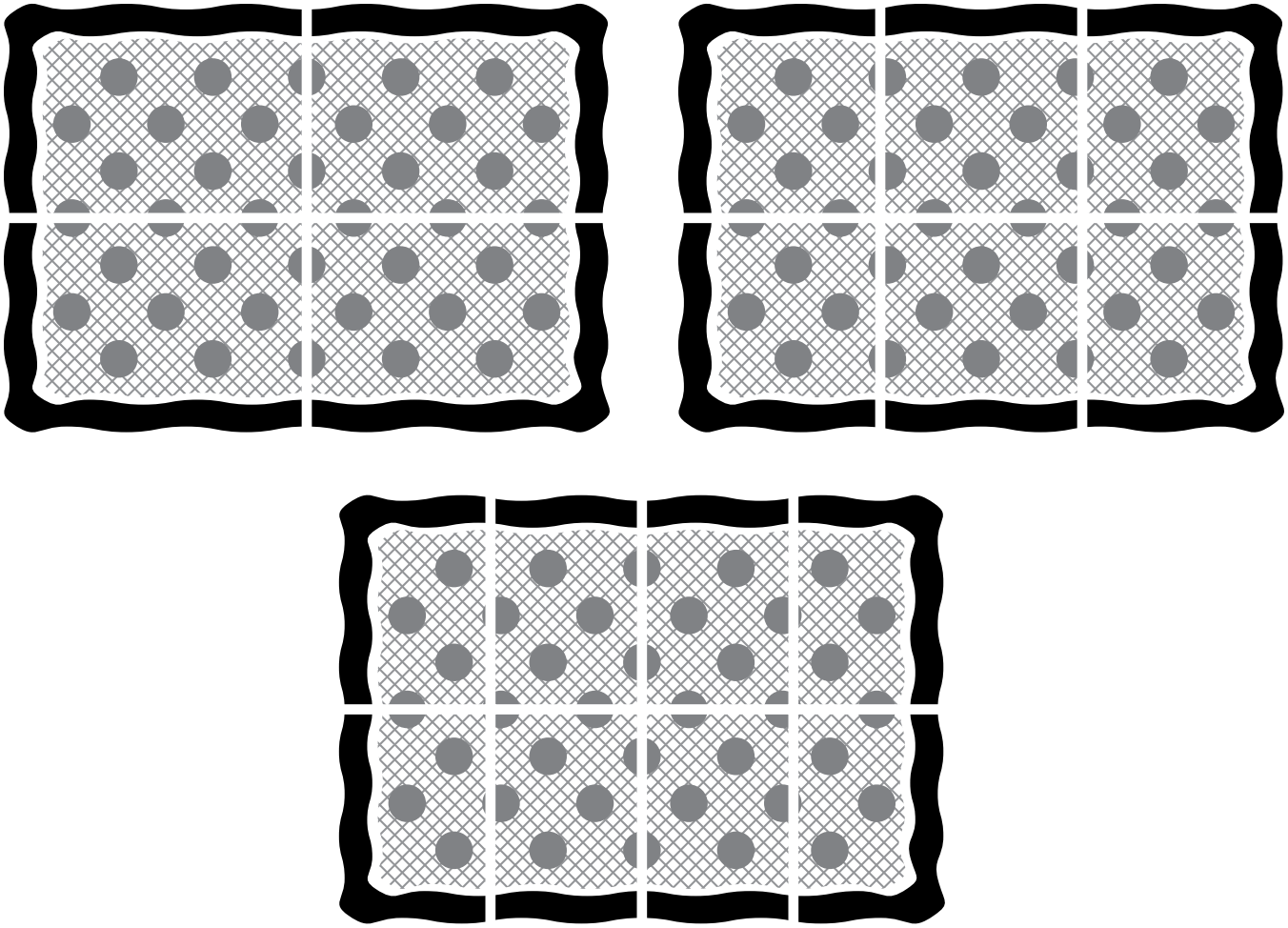
POSSIBLE SOLUTIONS

Students might sketch each of the pizzas with the appropriate-size pieces indicated. They then can divide the pieces among the five girls, realizing that the fifth girl will get ⅜ for her equivalent piece of ¼. All of the girls get one piece the size of one-sixth and one-eighth. This leaves ⅙ and ⅛ remaining. Students can combine these to make $\frac{7}{24}$. Thus, each girl would get another piece the size of $\frac{1}{24}$. This leaves $\frac{2}{24}$, or $\frac{1}{12}$, of the pizza, which students can decide to throw away (or give to Amy's mother!).

Each girl receives $\frac{1}{4}+\frac{1}{6}+\frac{1}{24}=\frac{11}{24}$

PIZZA PARTY PREDICAMENT

NAME _____



Amy has invited four of her close friends over for a pizza party. Her mom has ordered 3 pizzas from the local pizza shop. When the pizza arrived, Amy and her friends noticed that the pizzas were cut differently. The first pizza was cut into fourths, the second pizza was cut into sixths, and the third pizza was cut into eighths.

How can the 5 girls share the pizzas so that each girl gets the same amount of pizza?