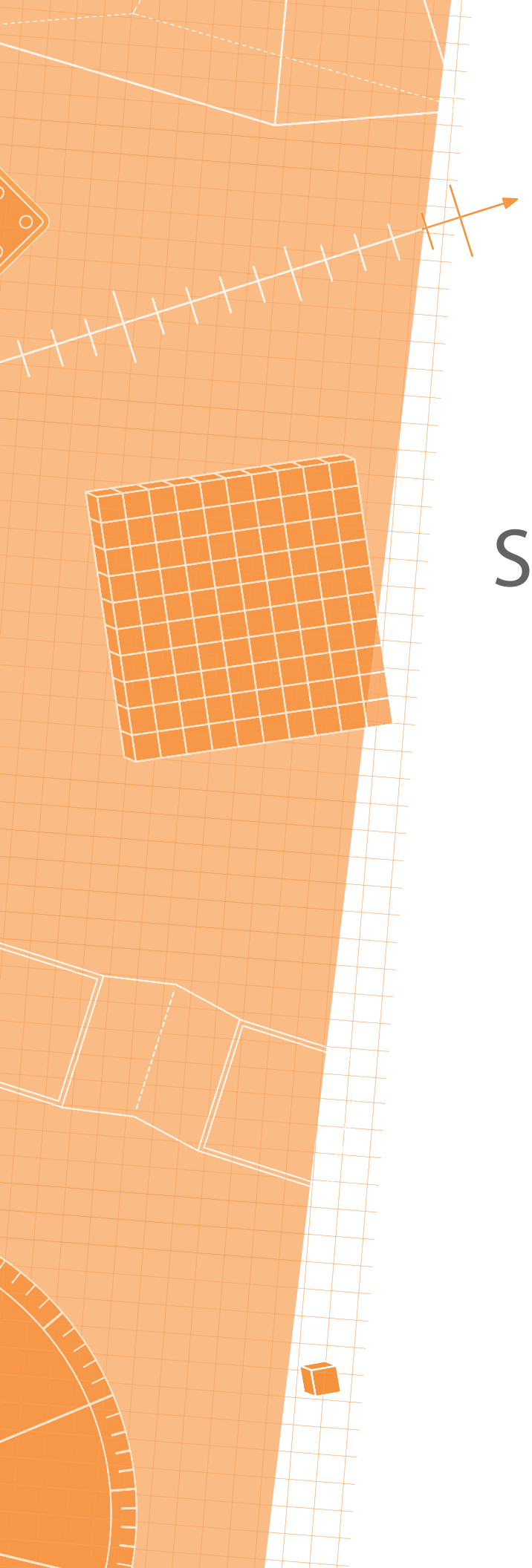


Imagine a Smarter Approach

ORIGO EDUCATION

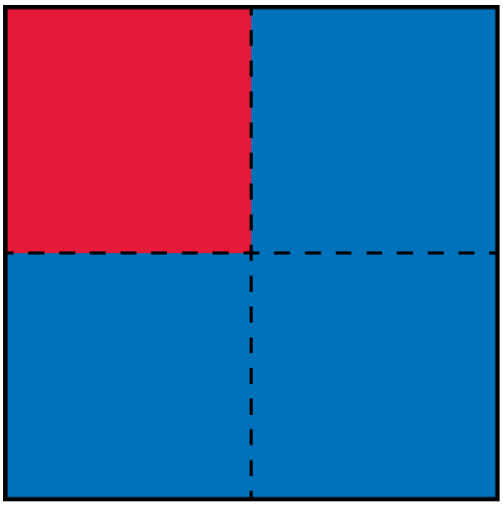
PROFESSIONAL LEARNING
www.origoeducation.com

Four people share one whole pie.
The first person takes $\frac{1}{4}$ of the pie.
The second person takes $\frac{1}{3}$ of the remaining pie. The third person takes $\frac{1}{2}$ of the pie that is left over. The last person takes the last piece. How much of the whole pie does each person have?

Making Equivalent Fractions (Area Model)

In this lesson, students make equivalent fractions by partitioning an area model. Students consider what stays the same and what changes. The mathematical practice *Look for and make use of structure* (SMP7) is embedded in this lesson.

step 1 preparing the lesson



You will need:

- interactive whiteboard (*Note:* Staticware has been provided if not available.)

Each pair of students will need:

- 12 one-inch square tiles or orange pattern blocks

Each student will need:

- Student Journal 5.1

step 2 starting the lesson

Organize students into pairs and distribute several square tiles to each pair of students. Open the *Flare Mats and Manipulatives (a)* teaching tool show one square tile and say, This tile is one-fourth. What does the whole look like? Allow time for partners to use their tiles to model what the whole looks like and encourage students to compare their arrangement to other pairs of students.

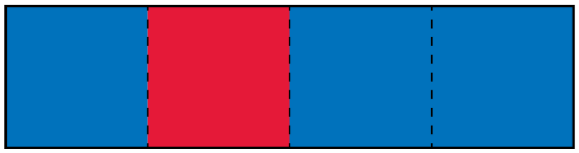
step 3 teaching the lesson

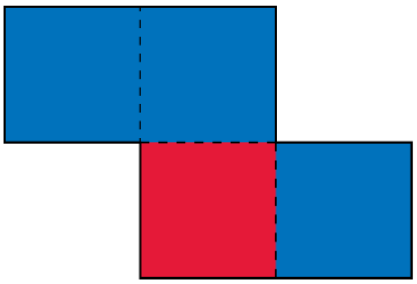
- Refer to the students' tile model from Step 2 and ask, Does everyone's pictures look the same? Can the whole look different? How do you know that your picture shows one whole? Project the fraction $^1/_4$ on the board and ask, What does the denominator tell us? (The number of unit fractions that are needed to fill the whole.) What does the numerator tell us? (The number of unit fractions that are already included.) What unit fraction are we using? (One-fourth.) Display the tile and ask, If this is one-fourth, how many of these do we need to make the whole? (Four.)

- Open *Flare Mats and Manipulatives (b)* showing the scattered arrangement of tiles and ask, Does this picture show one whole? Bring out that each tile represents one-fourth. As you point to each tile say, One-fourth, two-fourths, three-fourths, four-fourths. Four-fourths is the same amount as one whole.

- Move the tiles into a square arrangement and ask, Does this picture show one whole? Bring out that four one-fourth tiles were used to make the whole. Highlight how the tiles have been moved together and the picture looks like an area model. Ask, Does the red tile show one-fourth of the area of the whole? How do you know? Encourage students to imagine copying or stamping out the red tile three more times to make the whole. Have students focus on the area that is covered and not on the number or count of the tiles. Say, One-fourth, two-fourths, three-fourths, four-fourths. Four-fourths is the same area as one whole.

- Repeat the discussion for the arrangements of tiles shown below. Emphasize that when using an area model the focus should be on the unit fraction compared to the area of the whole and not on the shape of the whole. Encourage pairs of students to create other tile arrangements that also show one whole.





- Project the fraction $^{3}/_{12}$ with three square tiles on the board and say, If this is three-twelfths, what does the whole look like. Ask, What does the 12 in the denominator tell us? (It takes 12 one-twelfths to fill the whole.) What does the 3 in the denominator tell us? (3 one-twelfths are already included.) What unit fraction are we using? (One-twelfth.) What does one-twelfth look like? (One tile.) Have the students work with their partner to make the whole and compare their work with other pairs of students.

- Project the Step In discussion from Student Journal 5.1 and work through the questions with the whole class. Read the Step Up and Step Ahead instructions with the students. Make sure they know what to do and then have them work independently to complete the task. As you walk around the room, have students identify both fractions in the picture. For example ask, How can $^{1}/_{5}$ and $^{2}/_{10}$ both show up in the same picture? What is the same? (The area of the shaded region compared to the whole.) What is different? (How it is

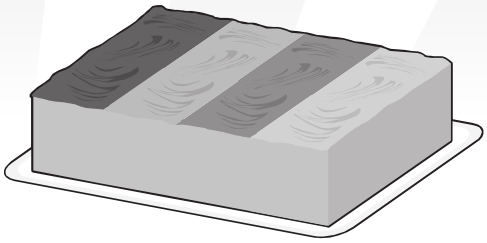
partitioned and named.)

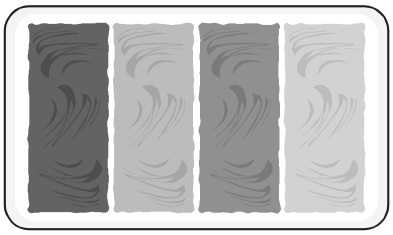
step 4 reflecting on the work

Discuss the students' answers to Student Journal 5.1. Refer to Question a in the Step Ahead section. Project a loaf of bread that has been partitioned into ten pieces and ask, What size of parts are shown? (One-tenth.) Daniel ate two-fifths of the loaf. Where is two-fifths in the picture? How does that show 2 one-fifths? How did you figure out how many one-tenths he ate? (*Note:* These are only problems in the lesson that require students to visualize a fraction by grouping parts together. All other problems have students find an equivalent fraction by subdividing the shape into additional parts.)

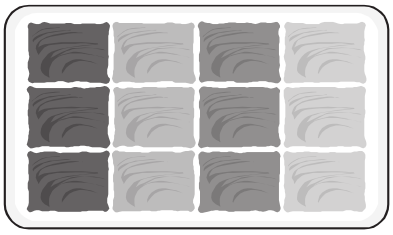
5.1 Making Equivalent Fractions (Area Model)

Four families are at a picnic.
They cut a cake to share it equally among the families.





Rita's family has the the first part on the left.
What fraction of the cake do they have?



Each family has three people so their piece of cake is then cut into thirds to share it equally in each family.

What fraction of the cake does Rita's family have now?

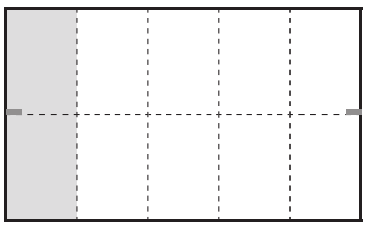
Think about the amount of cake that Rita's family has each time the cake is cut.

Does the amount of cake change? Why?

Step Up

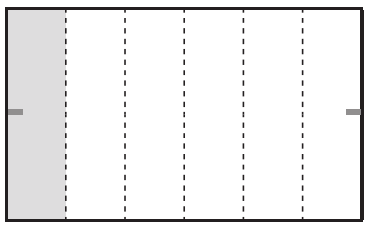
1. Each large rectangle is one whole. Write how much is shaded in each rectangle. Then draw extra lines to figure out an equivalent fraction. The first one has been partly done for you.

a.



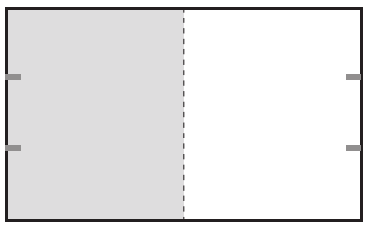
$\frac{\vdots}{5} = \frac{\quad}{10}$

b.



$\frac{\quad}{6} = \frac{\quad}{12}$

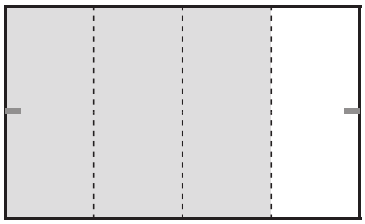
c.



$\frac{\quad}{2} = \frac{\quad}{6}$

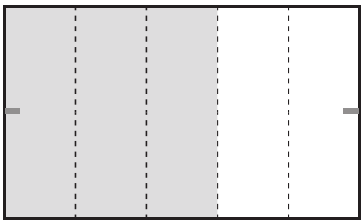
2. Each large rectangle is one whole. Write how much is shaded in each rectangle. Then draw extra lines to figure out an equivalent fraction.

a.



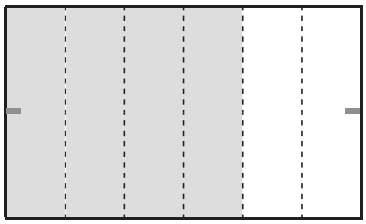
$\frac{\square}{4} = \frac{\square}{8}$

b.



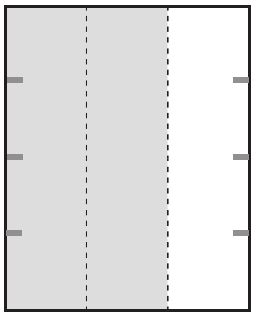
$\frac{\square}{5} = \frac{\square}{10}$

c



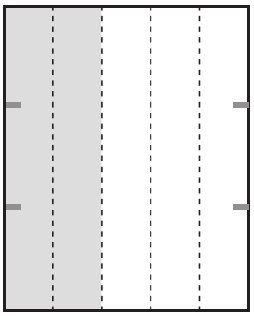
$\frac{\square}{6} = \frac{\square}{12}$

d.



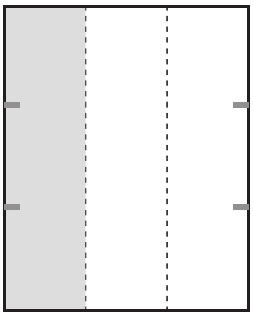
$\frac{\square}{3} = \frac{\square}{}$

e.



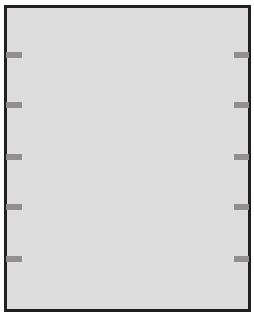
$\frac{\square}{5} = \frac{\square}{}$

f.



$\frac{\square}{3} = \frac{\square}{}$

g.



$\frac{\square}{1} = \frac{\square}{}$

Step Ahead

Solve these problems. You can draw diagrams to help you.

a. A loaf of garlic bread was cut into tenths and Daniel ate two-fifths of the loaf. How much did he eat?

$\frac{\square}{10}$

b. A large pie was cut into 12 pieces. Two-sixths of the pie was eaten. How much is left over?

$\frac{\square}{12}$