Name _____

Equivalent Fractions

Essential Question How can you use models to show equivalent fractions?

Investigate

Hands On

Materials ■ color pencils

Joe cut a pan of lasagna into third-size pieces. He kept $\frac{1}{3}$ and gave the rest away. Joe will not eat his part all at once. How can he cut his part into smaller, equal-size pieces?

A. Draw on the model to show how Joe could cut his part of the lasagna into 2 equal pieces.

You can rename these 2 equal pieces as a fraction of the original pan of lasagna.

Suppose Joe had cut the original pan of lasagna into equal pieces of this size.

How many pieces would there be? _____

What fraction of the pan is 1 piece? _____

What fraction of the pan is 2 pieces? _____

You can rename $\frac{1}{3}$ as _____.

B. Now draw on the model to show how Joe could cut his part of the lasagna into 4 equal pieces.

You can rename these 4 equal pieces as a fraction of the original pan of lasagna.

Suppose Joe had cut the original pan of lasagna into equal pieces of this size.
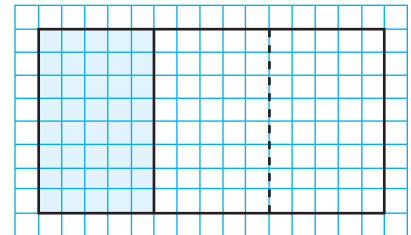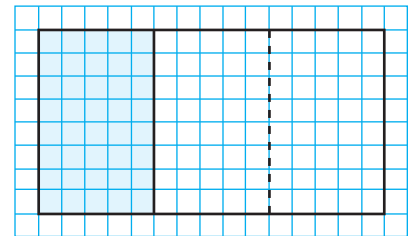
How many pieces would there be? _____

What fraction of the pan is 1 piece? _____

What fraction of the pan is 4 pieces? _____

You can rename $\frac{1}{3}$ as _____.

C. Fractions that name the same amount are **equivalent fractions**. Write the equivalent fractions.

$$\frac{1}{3} = \frac{}{} = \frac{}{}$$

Draw Conclusions

1. Compare the models for $\frac{1}{3}$ and $\frac{2}{6}$. How does the number of parts relate to the sizes of the parts?

_____

_____

2. Describe how the numerators are related and how the denominators are related in $\frac{1}{3} = \frac{2}{6}$.

_____

_____

_____

3. **THINK SMARTER** Does $\frac{1}{3} = \frac{3}{9}$? Explain.

_____

_____

Make Connections

Savannah has $\frac{2}{4}$ yard of ribbon, and Isabel has $\frac{3}{8}$ yard of ribbon. How can you determine whether Savannah and Isabel have the same length of ribbon?

The equal sign ($=$) and not equal to sign ($\neq$) show whether fractions are equivalent.

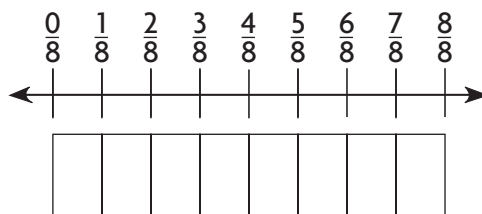Tell whether $\frac{2}{4}$ and $\frac{3}{8}$ are equivalent. Write $=$ or $\neq$.

STEP 1 Shade the amount of ribbon Savannah has.

$$\frac{0}{4} \quad \frac{1}{4} \quad \frac{2}{4} \quad \frac{3}{4} \quad \frac{4}{4}$$
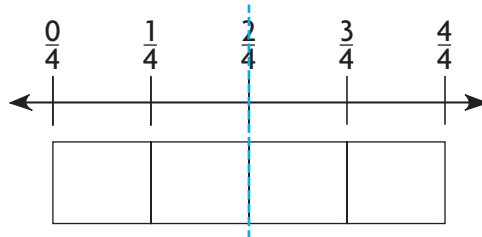
STEP 2 Shade the amount of ribbon Isabel has.

$$\frac{0}{8} \quad \frac{1}{8} \quad \frac{2}{8} \quad \frac{3}{8} \quad \frac{4}{8} \quad \frac{5}{8} \quad \frac{6}{8} \quad \frac{7}{8} \quad \frac{8}{8}$$

Think: $\frac{2}{4}$ yard is not the same amount as $\frac{3}{8}$ yard.
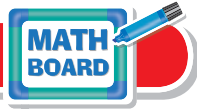
So, $\frac{2}{4} \bigcirc \frac{3}{8}$.

Math Talk

MATHEMATICAL PRACTICES ④
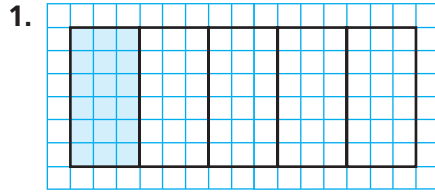
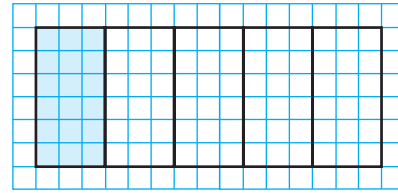**Use Models** How could you use a model to show that $\frac{4}{8} = \frac{1}{2}$?

Share and Show MATH BOARD
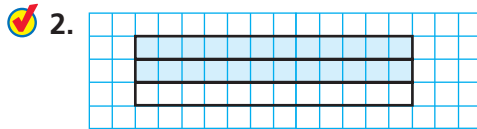
Use the model to write an equivalent fraction.

1.

$$\frac{1}{5} \qquad = \qquad \underline{}$$

✅ 2.

$$\frac{2}{3} \qquad = \qquad \underline{}$$
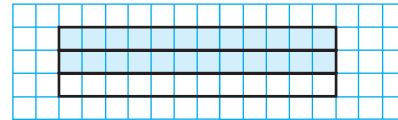
Tell whether the fractions are equivalent. Write = or ≠.

3. $\frac{1}{6} \bigcirc \frac{2}{12}$

4. $\frac{2}{5} \bigcirc \frac{6}{10}$

5. $\frac{4}{12} \bigcirc \frac{1}{3}$

✅ 6. $\frac{5}{8} \bigcirc \frac{2}{4}$

7. $\frac{5}{6} \bigcirc \frac{10}{12}$

8. $\frac{1}{2} \bigcirc \frac{5}{10}$

Problem Solving • Applications

9. **GO DEEPER** Manny used 8 tenth-size parts to model $\frac{8}{10}$. Ana used fewer parts to model an equivalent fraction. How does the size of a part in Ana's model compare to the size of a tenth-size part? What size part did Ana use?

10. **MATHEMATICAL PRACTICE ❺ Use a Concrete Model** How many eighth-size parts do you need to model $\frac{3}{4}$? Explain.

What's the Error?

11. **THINK** SMARTER   Ben brought two pizzas to a party. He says that since $\frac{1}{4}$ of each pizza is left, the same amount of each pizza is left. What is his error?

Describe Ben's error.

Draw models of 2 pizzas with a different number of equal pieces. Use shading to show $\frac{1}{4}$ of each pizza.

12. **THINK** SMARTER   For numbers 12a–12d, tell whether the fractions are equivalent by selecting the correct symbol.

12a. $\frac{3}{15}$ $\boxed{\begin{array}{c} = \\ \neq \end{array}}$ $\frac{1}{6}$

12b. $\frac{3}{4}$ $\boxed{\begin{array}{c} = \\ \neq \end{array}}$ $\frac{16}{20}$

12c. $\frac{2}{3}$ $\boxed{\begin{array}{c} = \\ \neq \end{array}}$ $\frac{8}{12}$

12d. $\frac{8}{10}$ $\boxed{\begin{array}{c} = \\ \neq \end{array}}$ $\frac{4}{5}$

Equivalent Fractions

Use the model to write an equivalent fraction.

1.

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

2.
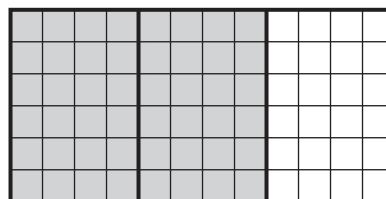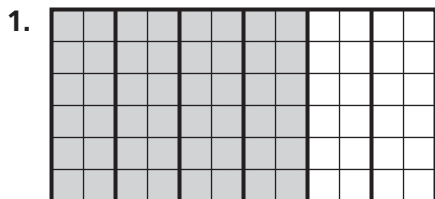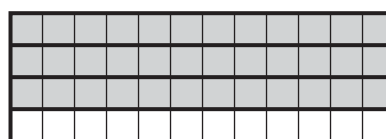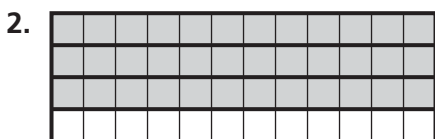
$$\frac{3}{4} \qquad = \qquad \underline{\hspace{2cm}}$$

Tell whether the fractions are equivalent. Write = or ≠.

3. $\frac{8}{10} \bigcirc \frac{4}{5}$ **4.** $\frac{1}{2} \bigcirc \frac{7}{12}$ **5.** $\frac{3}{4} \bigcirc \frac{8}{12}$ **6.** $\frac{2}{3} \bigcirc \frac{4}{6}$

Problem Solving Real World

7. Jamal finished $\frac{5}{6}$ of his homework. Margaret finished $\frac{3}{4}$ of her homework, and Steve finished $\frac{10}{12}$ of his homework. Which two students finished the same amount of homework?

8. Sophia's vegetable garden is divided into 12 equal sections. She plants carrots in 8 of the sections. Write two fractions that are equivalent to the part of Sophia's garden that is planted with carrots.

9. **WRITE** *Math* Draw a model to show a fraction that is equivalent to $\frac{1}{3}$ and a fraction that is not equivalent to $\frac{1}{3}$.

Lesson Check

1. A rectangle is divided into 8 equal parts. Two parts are shaded. What fraction is equivalent to the shaded area of the rectangle?

2. Jeff uses 3 fifth-size strips to model $\frac{3}{5}$. He wants to use tenth-size strips to model an equivalent fraction. How many tenth-size strips will he need?

Spiral Review

3. Cassidy places 40 stamps on each of 8 album pages. How many stamps does she place?

4. Maria and 3 friends have 1,200 soccer cards. If they share the soccer cards equally, how many will each person receive?

5. Six groups of students sell 162 balloons at the school carnival. There are 3 students in each group. If each student sells the same number of balloons, how many balloons does each student sell?

6. Four students each made a list of prime numbers.

     Eric: 5, 7, 17, 23
     Maya: 3, 5, 13, 17
     Bella: 2, 3, 17, 19
     Jordan: 7, 11, 13, 21

Who made an error and included a composite number? Write the composite number from his or her list.

**FOR MORE PRACTICE
GO TO THE
Personal Math Trainer**