Understand Equivalent Fractions

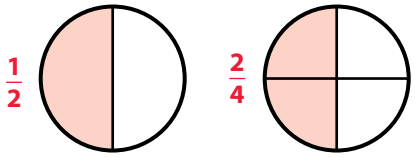
MGSE3.NF.3a

Think It Through

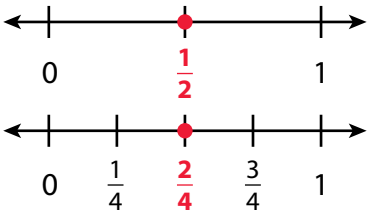
How can two different fractions be equal?

Two fractions are equal if they name the same amount of the whole. Different fractions that name the same amount of the whole are called **equivalent fractions**.

Look at the circles. The same amount is shaded in each circle. Each circle is divided into a different number of equal parts. So, the fractions used to name the shaded parts are different, $\frac{1}{2}$ and $\frac{2}{4}$, but equivalent.

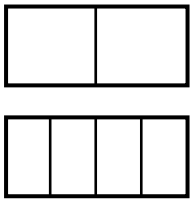


You can also see equivalent fractions using a number line. $\frac{1}{2}$ and $\frac{2}{4}$ are located at the same point on the number line. This shows they are equivalent.

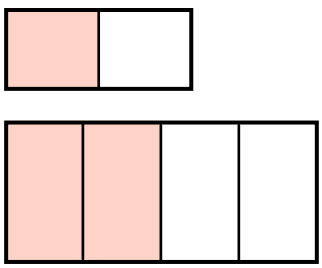


Think **To find equivalent fractions, the size of the wholes must be the same.**

The two rectangles at the right are the same size. One $\frac{1}{2}$ part is the same size as two $\frac{1}{4}$ parts. So, $\frac{1}{2}$ and $\frac{2}{4}$ are equivalent.



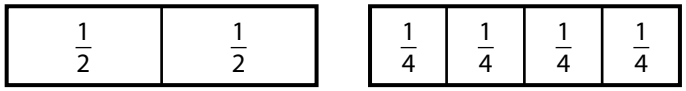
The two rectangles below are not the same size. They show that $\frac{1}{2}$ of a small rectangle is not equivalent to $\frac{2}{4}$ of a large rectangle.



Shade the parts of the first two rectangles to show that $\frac{1}{2}$ and $\frac{2}{4}$ are equivalent.

Think **It takes more than one smaller part to equal one bigger part.**

Once you make sure the wholes are the same size, look at the size of the parts in each whole to name equivalent fractions.

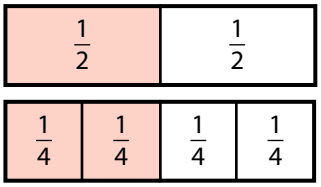


Each part is $\frac{1}{2}$.

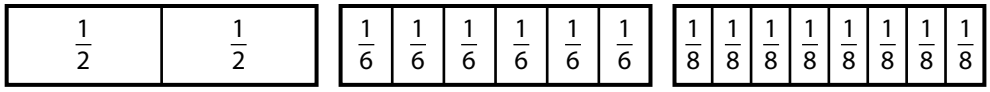
Each part is $\frac{1}{4}$.

Remember,
two $\frac{1}{4}$s are the same as $\frac{2}{4}$,
three $\frac{1}{6}$s are the same as $\frac{3}{6}$,
and four $\frac{1}{8}$s are the same as $\frac{4}{8}$.

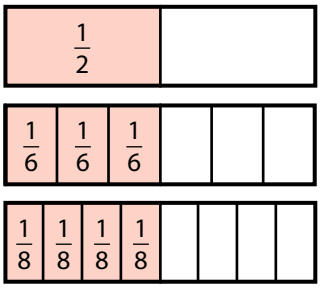
To shade the same amount as $\frac{1}{2}$, you need to shade two $\frac{1}{4}$s.



You can also divide the rectangle into different numbers of equal parts to find other fractions that are equivalent to $\frac{1}{2}$.



To shade the same amount as $\frac{1}{2}$, shade three $\frac{1}{6}$s or four $\frac{1}{8}$s.



So, $\frac{1}{2}$ is equivalent to $\frac{2}{4}$, $\frac{3}{6}$, and $\frac{4}{8}$.

Reflect

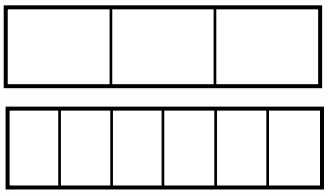
1 Explain why it takes more $\frac{1}{8}$s than $\frac{1}{4}$s to make a fraction equivalent to $\frac{1}{2}$.

Think About Equivalent Fractions

Let's Explore the Idea

Models and number lines are two ways to show equivalent fractions.

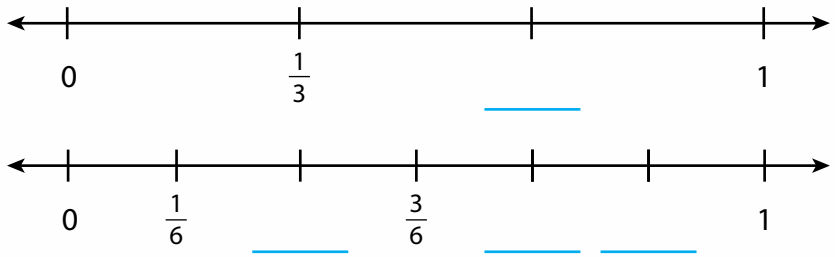
2 Count the equal parts in each model at the right. Then write the unit fraction that names the part in each section of both models.



How many $\frac{1}{6}$s does it take to name the same amount as $\frac{1}{3}$? _____

How many $\frac{1}{6}$s does it take to name the same amount as two $\frac{1}{3}$s? _____

3 Fill in the missing fractions on each number line below.

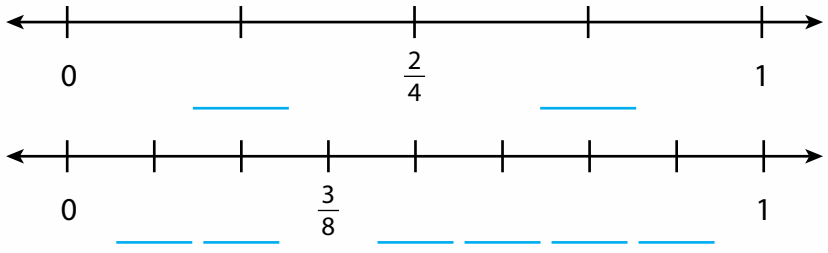


Use the models and number lines above to answer problem 4.

4 Write the equivalent fractions: $\frac{1}{3}$ = _____ $\frac{2}{3}$ = _____

Now try these problems.

5 Fill in the missing fractions on each number line below.



6 Write the equivalent fractions: $\frac{1}{4}$ = _____ $\frac{6}{8}$ = _____

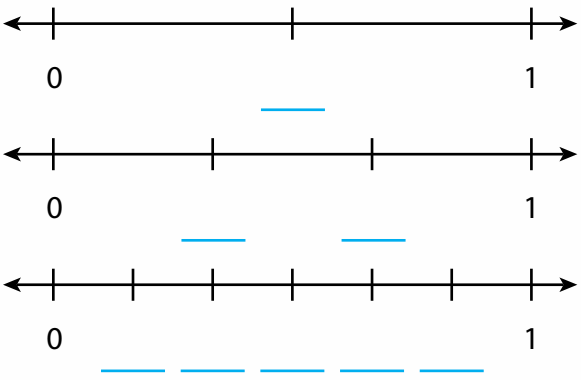
Let's Talk About It

Solve the problems below as a group.

7 You have used models and number lines to find equivalent fractions. How are the two ways alike?

How are the two ways different?

8 Mila thinks $\frac{1}{2}$ is equivalent to $\frac{2}{3}$ and to $\frac{3}{6}$. Label the number lines below and use them to explain whether Mila is correct or not.



Try It Another Way

Work with your group to use the fraction strips to show equivalent fractions.

9 $\frac{2}{3}$ is shaded on one strip. Shade an equivalent amount on the other strip.

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

$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$

What fraction did you shade? _____

10 $\frac{4}{8}$ is shaded on one strip. Shade an equivalent amount on the other strip.

$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$

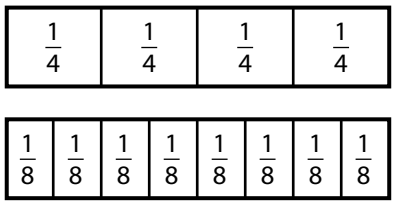
$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$

What fraction did you shade? _____

Connect Ideas About Equivalent Fractions

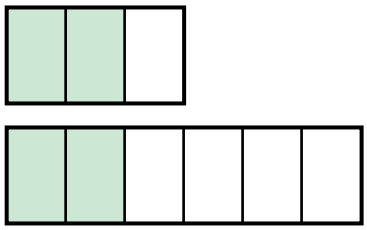
Talk through these problems as a class, then write your answers below.

11 Demonstrate Use the fraction strips below to show $\frac{1}{4} = \frac{2}{8}$.

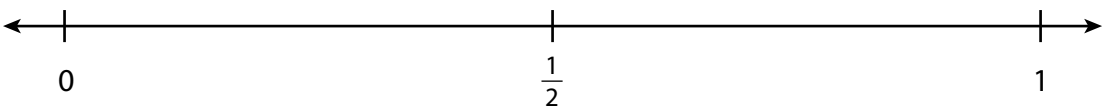


12 Explain Cooper drew the models below. He says they show $\frac{2}{3} = \frac{2}{6}$.

What did Cooper do wrong?



13 Illustrate The number line below is marked to show halves. Draw marks on the number line to show eighths. Above each mark you make, write the fraction it shows.



Which fraction on the number line above is equivalent to $\frac{1}{2}$? _____

Apply Ideas About Equivalent Fractions

14 Put It Together Use what you have learned to complete this task.

Four friends each ate a part of their own granola bar. All the granola bars were the same size. The table at the right shows what part of a granola bar was eaten by each friend.

Friend	Part of Granola Bar Eaten
Meg	$\frac{4}{6}$
Joe	$\frac{4}{8}$
Beth	$\frac{6}{8}$
Amy	$\frac{2}{3}$

Part A Which two friends ate the same amount of a granola bar? Circle those two names in the table. Draw models to show that your answer is correct.

Meg

Joe

Beth

Amy

Part B Fred also had a granola bar. He divided it into fourths. He ate the same amount as Beth.

Draw a number line to show Beth's granola bar. Label it to show the fraction of the bar she ate. Draw another number line to show Fred's granola bar. Mark it to show how Fred divided his granola bar. Label the fraction of his granola bar Fred ate.

What fraction of his granola bar did Fred eat? _____