

Name: _____

Date: _____

Student Exploration: Modeling Fractions

Vocabulary: denominator, difference, equivalent, fraction, least common denominator, numerator

Prior Knowledge Questions (Do these BEFORE using the Gizmo.)

- Suppose you were splitting a candy bar equally between yourself and two friends. Where would you cut the bar? (Show your cuts on the diagram below.)

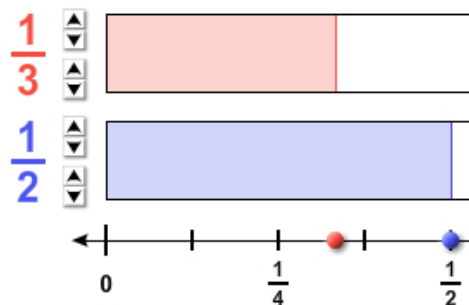


- Now suppose you were splitting the candy bar with just one friend, but she wanted *twice* as much candy as you. How would you split up the candy bar this time?



Gizmo Warm-up

A **fraction** shows the relationship between a part and a whole. The *Modeling Fractions Gizmo*TM represents fractions with area models. In each model, the whole is represented by the large rectangle, and the part is represented by the red or blue shaded portion.




- The **numerator** is the top number in a fraction. Click the arrows to change the numerator of the top (red) fraction.

How does changing the numerator affect the model? _____

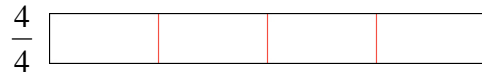
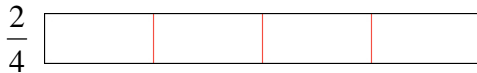
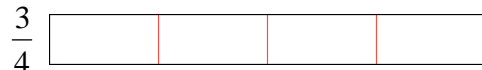
- The **denominator** is the bottom number in a fraction. Click the arrows to change the denominator of the bottom (blue) fraction.

How does changing the denominator affect the model? _____

Activity A: Fraction parts	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> Click Clear to set both fractions to $\frac{0}{1}$. 	
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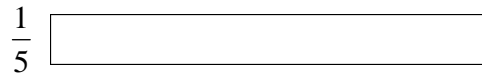
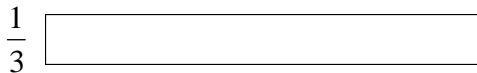
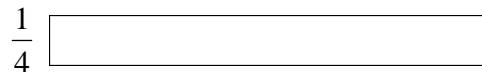
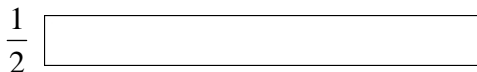
If you and your friends were dividing up a candy bar, each friend would get a fraction of the bar. The denominator of the fraction is how many equal parts you divide the bar into. The numerator is the number of those equal parts that a person gets.

1. In the Gizmo, set the denominator of the top (red) model to 4. In the space below, shade the models to show $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$, and $\frac{4}{4}$. Use the Gizmo to guide your work.



2. How does increasing the numerator affect the value of the fraction? _____

3. In the Gizmo, set the numerator of the bottom (blue) model to 1. In the space below, shade the models to show $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, and $\frac{1}{5}$.



4. How does increasing the denominator affect the value of the fraction? _____

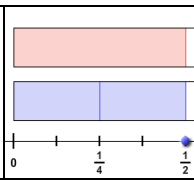
5. Place a < (“is less than”) or > (“is greater than”) sign between each pair of fractions to indicate which is greater. Use the Gizmo to check your answers.

$\frac{4}{7} \square \frac{2}{7}$

$\frac{5}{8} \square \frac{7}{8}$

$\frac{3}{4} \square \frac{3}{5}$

$\frac{2}{6} \square \frac{2}{3}$

Activity B: Equivalent fractions	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> Click Clear to set both fractions to $\frac{0}{1}$. 	
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1. You cut a candy bar into two equal pieces, and eat one. Your friend cuts his candy bar into four equal pieces, and eats two pieces. Who ate more candy? _____
 Why do you think so? _____

2. Model this situation in the Gizmo by setting the top model to $\frac{1}{2}$ and the bottom model to $\frac{2}{4}$.
 What do you notice? _____

Because they represent the same amount, $\frac{1}{2}$ and $\frac{2}{4}$ are equal or **equivalent** fractions.

3. Experiment with the Gizmo to find other equivalent fractions. Find a fraction that is equivalent to each of the following fractions. (The first is done for you.)

$$\frac{1}{2} = \frac{2}{4}$$

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

$$\frac{3}{4} = \frac{\boxed{}}{\boxed{}}$$

$$\frac{2}{8} = \frac{\boxed{}}{\boxed{}}$$

4. Without using the Gizmo, how can you find a fraction that is equivalent to $\frac{2}{3}$?

5. Given a starting fraction such as $\frac{6}{8}$, how can you create an equivalent fraction with a *smaller* denominator? _____

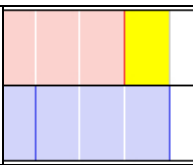
6. Challenge: Create fractions equivalent to each of the following. (Hint: You may not be able to model some of these in the Gizmo.)

$$\frac{3}{5} = \frac{\boxed{}}{\boxed{}}$$

$$\frac{6}{9} = \frac{\boxed{}}{\boxed{}}$$

$$\frac{2}{7} = \frac{\boxed{}}{\boxed{}}$$

$$\frac{4}{12} = \frac{\boxed{}}{\boxed{}}$$

Activity C: Comparing fractions	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> Click Clear to set both fractions to $\frac{0}{1}$. 	
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1. You eat $\frac{1}{2}$ of a candy bar, and your friend eats $\frac{3}{8}$ of a bar. Who ate more? _____


Without using the Gizmo, why is it hard to compare these fractions? _____

2. Model $\frac{1}{2}$ and $\frac{3}{8}$. Which fraction is greater? _____ Who ate more candy? _____


3. It is hard to compare fractions when they have different denominators, but it is easy to compare fractions with the same denominator. The **least common denominator** (LCD) of a pair of fractions is the smallest whole number that is a multiple of both denominators.

Turn on **Compare fractions using LCD** and look at the resulting display:


A. What is the LCD of $\frac{1}{2}$ and $\frac{3}{8}$? _____

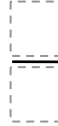
B. What fraction has a denominator of 8 and is equivalent to $\frac{1}{2}$? 


4. You might wonder how much more candy you ate than your friend. The **difference** between two numbers is how much one number is greater than the other.

What is the difference between $\frac{4}{8}$ and $\frac{3}{8}$?  Turn on **Show difference** to check.

5. Practice: Answer the questions below. Use the LCD of each pair to help. Use the Gizmo to check your answers.

Which fraction is greater $\frac{5}{6}$ or $\frac{2}{3}$? 

Which is greater, $\frac{2}{5}$ or $\frac{3}{8}$? 

Find the difference: $\frac{5}{6} - \frac{3}{4} =$ 

Find the difference: $\frac{1}{3} - \frac{2}{7} =$ 