



Name: _____

Date: _____

Student Exploration: Ordering Percents, Fractions, and Decimals Greater Than 1

Vocabulary: decimal, equivalent, fraction, percent

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

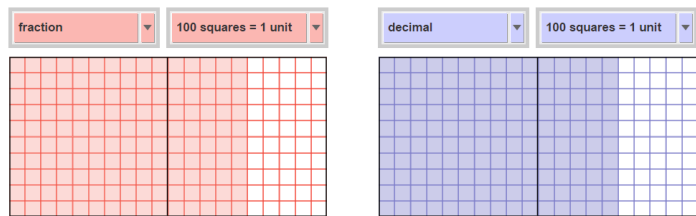
Each blue box holds 10 marbles, each red box 20 marbles, and each green box 25 marbles. Randy has two blue boxes of marbles, Ed has one green box, and Kim has one red box.

1. Randy says he has more marbles than Ed. Is Randy correct? _____ Why? _____

2. Kim says she has fewer marbles than Randy. Is Kim correct? _____ Why? _____

Gizmo Warm-up

In the *Ordering Percents, Fractions, and Decimals Greater Than 1* Gizmo, you can model and compare numbers from 0 to 2.



To model a specific value, highlight the text field, type the new number, and hit **Enter**. To shade the grid directly, just click inside it.

1. A **fraction** is a number that compares a part to a whole. In the Gizmo, be sure that you have **fraction** and **100 squares = 1 unit** selected above the red model. Then shade it as shown above, on the left.

A. What fraction is shown? _____


B. Choose **simplified fraction**. What is this fraction in simplified form? _____

2. A **decimal** is a number written in the base-10 system, usually containing a decimal point. A **percent** is a ratio of a number to 100. Above the blue model in the Gizmo, select **100 squares = 1 unit**. Then shade it as shown above, on the right.

A. Choose **decimal**. What decimal is shown? _____

B. Choose **percent**. What is this decimal written as a percent? _____



Activity A: Comparing numbers	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> • Click Reset. • Set both models to 100 squares = 1 unit. 	<input checked="" type="checkbox"/> Compare numbers 
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The setting **100 squares = 1 unit** divides each large square into 100 smaller squares. Each large square (outlined in black) is one unit or one whole.

1. Shade 100 squares = 1 whole on the red model. From the dropdown menu, choose **decimal**, then **fraction**, then **simplified fraction**, then **percent**. Fill in the equation to show the four **equivalent** (equal in value) numbers modeled.

$$\underline{\hspace{2cm}} = \frac{\boxed{\hspace{1cm}}}{\boxed{\hspace{1cm}}} = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}\%$$

2. Shade 200 squares of the blue model (the whole thing).

A. Fill in the equation to show the four equivalent numbers modeled.

$$\underline{\hspace{2cm}} = \frac{\boxed{\hspace{1cm}}}{\boxed{\hspace{1cm}}} = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}\%$$

B. How many wholes are shown by the blue model?

3. Click **Reset**. Shade 30 squares of the red model. Fill in the equation to show the four equivalent numbers modeled.

$$\underline{\hspace{2cm}} = \frac{\boxed{\hspace{1cm}}}{\boxed{\hspace{1cm}}} = \frac{\boxed{\hspace{1cm}}}{\boxed{\hspace{1cm}}} = \underline{\hspace{2cm}}\%$$

4. Click **Reset**. Set both models to **percent**. Model 12% and 120%.

A. Is 12% greater than or less than 100%? Explain.

B. Is 120% greater than or less than 100%? Explain.

C. Which number is greater, 12% or 120%? How do you know?

(Activity A continued on next page)



Activity A (continued from previous page)

5. Click **Reset**. Set the red model to **decimal** and **200 squares = 1 unit**. Set the blue model to **percent** and **100 squares = 1 unit**. Show 0.600 on the red model and 6% on blue.

A. Which number is less? _____ How do you know? _____

- B. Change the red model to **fraction**. Complete the inequality statement to compare the numbers shown.

_____ < _____

- C. Change both models to **decimal**. Complete the inequality statement to compare the numbers shown.

_____ < _____

- D. Do you think it is easier to compare numbers of the same form? _____

Why or why not? _____

- E. Look at the decimal with more digits. Does the decimal with more digits (not counting the zeros at the end) always have a greater value? _____ Explain. _____

6. Write a statement to compare each pair of numbers. Use less than (<) or equals (=) signs between the numbers. Then check your answers in the Gizmo. (Note: The last one cannot be modeled in the Gizmo.)

A. 23% and 0.32 _____

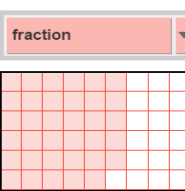
B. 0.9 and $\frac{7}{10}$ _____

C. $\frac{8}{5}$ and 160% _____

D. 1.515 and 153% _____

E. $\frac{5}{2}$ and 225% _____



Activity B: Ordering numbers	<u>Get the Gizmo ready:</u>	
	<ul style="list-style-type: none"> • Click Reset. • Set both models to fraction. • Set the red model to 100 squares = 1 unit. • Set the blue model to 200 squares = 1 unit. 	

1. Shade 55 squares of the red model. Shade 225 squares of the blue model.

A. What denominator is shown below each model? red: _____ blue: _____

B. Can you show $\frac{225}{200}$ on the red model? _____ Why or why not? _____

C. Change both to **decimal**. How many decimal places are there? red: ____ blue: ____

D. Can you show 1.125 on the red model? _____ Why or why not? _____

E. Change both to **percent**. How many digits are there? red: ____ blue: ____

F. Can you show 112.5% on the red model? _____ Why or why not? _____

2. You can use the Gizmo to order $\frac{55}{100}$, $\frac{225}{200}$, 125%, and 1.125 from least to greatest. Begin by writing each value as an equivalent decimal, fraction, simplified fraction, and percent. Use the Gizmo to help, as needed.

Decimal	Fraction	Simplified fraction	Percent
	$\frac{55}{100}$		
	$\frac{225}{200}$		
			125%
1.125			

(Activity B continued on next page)



Activity B (continued from previous page)

3. Use the table from question 2 to write $\frac{55}{100}$, $\frac{225}{200}$, 125%, and 1.125 in order from least to greatest. Use less than (<) or equals (=) signs between the numbers.

Click **Compare numbers** to check your answer.

4. Choose four different numbers of your own – two fractions, one decimal, and one percent.
- A. What numbers did you choose? _____
- B. Write each of the four numbers you chose in a separate row in the table below. Then fill in each row with the other equivalent forms. Use the Gizmo to help you.

Decimal	Fraction	Simplified fraction	Percent

- C. Write your original numbers in order from least to greatest.

_____ < _____ < _____ < _____

Click **Compare numbers** to check your answer.

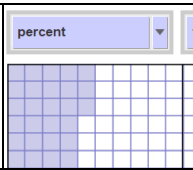
5. Write each set of numbers in order from least to greatest. Then check your answers in the Gizmo. (Note: Some of the numbers in the last one cannot be modeled in the Gizmo.)

A. $\frac{43}{100}$, 143%, $\frac{81}{200}$, 1.34 _____ < _____ < _____ < _____

B. 89%, 0.98, $\frac{98}{50}$, $\frac{7}{8}$ _____ < _____ < _____ < _____

C. $\frac{5}{8}$, 58%, 0.534, $\frac{5}{16}$ _____ < _____ < _____ < _____



Activity C: Finding the number between	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> • Click Reset. • Set both models to percent. • Set both models to 100 squares = 1 unit. 	
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1. Use the red model to show 116%. Use the blue model to find each number in A–C.

A. A fraction between 100% and 116%: _____ How did you find the fraction? _____

B. A decimal between 116% and 150%: _____ How did you find the decimal? _____

C. A percent between the numbers in A and B: _____ How did you find the percent? _____

D. Write 116% and your numbers from A, B, and C in order from least to greatest.

_____ < _____ < _____ < _____

2. Click **Reset**. Set both models to **100 squares = 1 unit**.

A. Set the red model to **fraction** and show $\frac{75}{100}$. How many squares are shaded? _____

B. Change to **simplified fraction**. What is the simplest form of $\frac{75}{100}$? _____

C. Suppose you start with $\frac{3}{4}$ and want to model it. If you find an equivalent fraction with a denominator of 100, what will the numerator of the equivalent fraction tell you?

D. What do you need to do to $\frac{3}{4}$ to find a fraction with a denominator of 100? _____

E. Fill in the equation to show the equivalent fraction. $\frac{3}{4} = \frac{\boxed{}}{\boxed{}}$

(Activity C continued on next page)

Activity C (continued from previous page)

3. Use the blue model to find a simplified fraction between 0 and $\frac{3}{4}$.

A. What fraction did you find? _____

B. How did you find your fraction? _____

4. Set the blue model to **200 squares = 1 unit**.

A. How can you model $\frac{3}{8}$? (Use the Gizmo to check your answer.) _____

B. Use the blue model to find a fraction between 0 and $\frac{3}{8}$. _____

5. Label the number line below so that you can plot $\frac{3}{4}$, $\frac{3}{8}$, and your fractions from questions 3 and 4 on it. Then plot and label the fractions.



6. Write the fractions you plotted in question 5 in order from least to greatest.

_____ < _____ < _____ < _____

7. Complete the inequalities below. (Note: The last two cannot be modeled in the Gizmo.)

A. A fraction between 0.125 and 16% $0.125 < \underline{\hspace{2cm}} < 16\%$

B. A decimal between 124% and $\frac{61}{40}$ $124\% < \underline{\hspace{2cm}} < \frac{61}{40}$

C. A percent between $\frac{7}{8}$ and 1.09 $\frac{7}{8} < \underline{\hspace{2cm}} < 1.09$

D. A decimal between $\frac{5}{9}$ and 59% $\frac{5}{9} < \underline{\hspace{2cm}} < 59\%$

E. A percent between 0.605 and $\frac{2}{3}$ $0.605 < \underline{\hspace{2cm}} < \frac{2}{3}$

