



Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Student Exploration: Comparing and Ordering Decimals

**Vocabulary:** compound inequality, decimal, decimal point, equivalent, hundredth, inequality, tenth

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

For these questions, assume that there are 3 tennis balls in a can, and 4 cans (12 balls) in a box.

1. Jake has 10 tennis balls. Juan has 3 cans of tennis balls. Julia has 1 box of tennis balls.

Who has the most tennis balls? \_\_\_\_\_

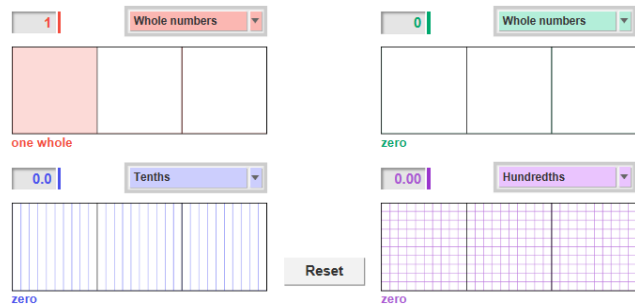
2. Jake puts his 10 tennis balls into cans. How many cans does he use? \_\_\_\_\_

How many balls will be left over? \_\_\_\_\_

### Gizmo Warm-up

In the *Comparing and Ordering Decimals* Gizmo, you can compare and order decimals from 0 to 3, using area models.

A **decimal** is a number written in a standard, base-10 system. It usually contains a **decimal point** which separates the ones place from **tenths**, **hundredths**, etc.



1. With the red model set to **Whole numbers**, shade one whole. You can shade a model by clicking in it or by typing a number in the text field (in this case, 1) and hitting **Enter**.

A. Click **Reset**. Change to **Tenths**. Shade one whole again. How many tenths are in one whole? \_\_\_\_\_ What decimal is shown? \_\_\_\_\_

B. Click **Reset**. Change to **Hundredths**. Shade one whole again. How many hundredths are in one whole? \_\_\_\_\_ What decimal is shown? \_\_\_\_\_

2. **Equivalent** decimals are equal in value. Are the decimals in question 1 equivalent? \_\_\_\_\_

How do you know? \_\_\_\_\_



<b>Activity A:</b> <b>Ordering from least to greatest</b>	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> <li>• Click <b>Reset</b>.</li> <li>• Set the red model to <b>Whole numbers</b>.</li> <li>• Set the green model to <b>Tenths</b>.</li> <li>• Set the blue and purple models to <b>Hundredths</b>.</li> </ul>	<input type="text" value="0.03"/>

In this activity, you will be shading grid models to represent decimals. You can then use the shaded region of the models to compare decimals. A larger shaded region means a greater number.

1. Model the numbers 3, 0.3, 0.03, and 0.33 in the Gizmo by clicking to shade them as shown below.

- A. Which number is the least? \_\_\_\_\_ How do the area models show this? \_\_\_\_\_  
\_\_\_\_\_
- B. Which number is the greatest? \_\_\_\_\_ How do the area models show this? \_\_\_\_\_  
\_\_\_\_\_
- C. Write the four numbers in order from least to greatest.  
\_\_\_\_\_
- D. Check your answer by turning on **Show number line** and **Compare numbers**. How does the number line show you the correct order of these four numbers?  
\_\_\_\_\_  
\_\_\_\_\_

(Activity A continued on next page)



**Activity A (continued from previous page)**

2. Click **Reset**. Change the red model to **Hundredths** and the blue model to **Tenths**. Shade 0.68 on the red model, 1.8 on green, 0.8 on blue, and 1.86 on purple.

A. Write the four decimals in order from least to greatest.

\_\_\_\_\_

B. How did you use the models and number line to order the decimals? \_\_\_\_\_

\_\_\_\_\_

3. The red model currently represents 0.68, and the blue model represents 0.8.

A. Which model has more parts shaded? \_\_\_\_\_

B. Which model has more area shaded? \_\_\_\_\_

C. Which number is greater, 0.68 or 0.8? \_\_\_\_\_

D. Which shows the greater number, more parts or more area shaded? \_\_\_\_\_

Explain. \_\_\_\_\_

\_\_\_\_\_

4. Write each set of numbers in order from least to greatest. Use less than (<) or equals (=) signs between the numbers. Then check your answers in the Gizmo. (Note: The last three cannot be modeled in the Gizmo.)

A. 2.3, 1.63, 3, 0.36 \_\_\_\_\_

B. 1.50, 2.15, 1.25, 0.9 \_\_\_\_\_

C. 0.1, 1.0, 1, 0.10 \_\_\_\_\_

D. 0.6, 0.65, 0.60, 0.56 \_\_\_\_\_

E. 2.28, 1.2, 2.1, 2.2 \_\_\_\_\_

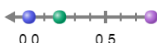
F. 0.02, 0.2, 2, 2.02 \_\_\_\_\_

G. 6.9, 9.6, 6.09, 9.06 \_\_\_\_\_

H. 4.45, 5.5, 5.45, 4.54 \_\_\_\_\_

I. 7.76, 6.77, 7.7, 6.7 \_\_\_\_\_



<b>Activity B:</b> <b>Finding the decimal between</b>	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> <li>Click <b>Reset</b>.</li> </ul>	<input checked="" type="checkbox"/> Show number line 
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1. You are going to use the Gizmo to find a decimal of the form  $\underline{\quad} . \underline{\quad} \underline{\quad}$ . Should you use the **Tenths** or **Hundredths** setting to do this? \_\_\_\_\_ Explain. \_\_\_\_\_

A. Use the red model to find the least decimal containing the digits 0, 1, and 2.

\_\_\_\_\_ . \_\_\_\_\_

B. Use the green model to find the greatest decimal containing the digits 0, 1, and 2.

\_\_\_\_\_ . \_\_\_\_\_

C. Now use the blue and purple models find two different decimals containing the digits 0, 1, and 2 between the least and greatest decimals.

\_\_\_\_\_ . \_\_\_\_\_      \_\_\_\_\_ . \_\_\_\_\_

Turn on **Show number line** and **Compare numbers** to check your answers.

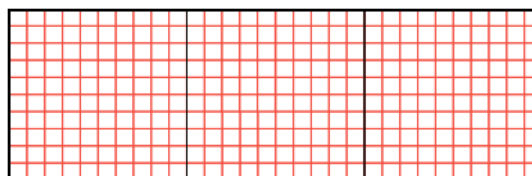
D. Write the four decimals in order from least to greatest.

\_\_\_\_\_

2. Use the Gizmo to model (shade) a decimal between 1 and 2.

A. Write your decimal in the blank below.  
Also shade it on the grid to the right.

$1 < \underline{\hspace{2cm}} < 2$



B. The inequality above is called a **compound inequality** because it shows two inequalities combined into one. Write the two inequalities that have been combined.

\_\_\_\_\_ < \_\_\_\_\_      and      \_\_\_\_\_ < \_\_\_\_\_

C. How do the area models show you that your decimal is between 1 and 2? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**(Activity B continued on next page)**



**Activity B (continued from previous page)**

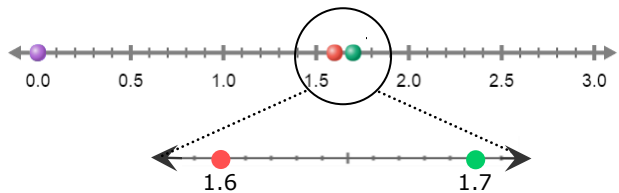
3. Use the Gizmo to help you find a decimal between 1.6 and 1.7.

A. Is there a decimal with one decimal place that is between 1.6 and 1.7? \_\_\_\_\_

How do you know? \_\_\_\_\_

B. Write your decimal in the blank to the right.  $1.6 < \underline{\hspace{2cm}} < 1.7$

C. If you zoom in on the number line, you would see that there are many numbers between 1.6 and 1.7. Plot your decimal on the zoomed number line here:



D. How does the number line show you that your decimal is between 1.6 and 1.7?

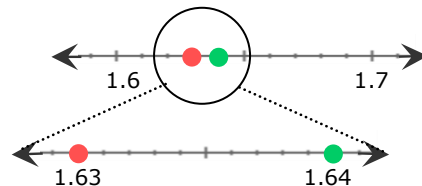
\_\_\_\_\_

\_\_\_\_\_

4. Now try to find a decimal between 1.63 and 1.64.

A. How many decimal places will your decimal have? \_\_\_\_\_

B. Plot your decimal on the number line to the right. Then write a compound inequality below.



\_\_\_\_\_

5. Find a decimal between each pair of numbers. Then write a compound inequality using all three values. (Note: The last two cannot be modeled in the Gizmo.)

A. 2 and 3 \_\_\_\_\_

B. 0.8 and 0.9 \_\_\_\_\_

C. 0 and 0.1 \_\_\_\_\_

D. 2.4 and 2.5 \_\_\_\_\_

E. 50.87 and 50.88 \_\_\_\_\_

F. 4256.03 and 4256.04 \_\_\_\_\_