Name: _____   Date: _____

Student Exploration: Modeling Decimals

Vocabulary: decimal, decimal point, equivalent, hundredth, tenth, whole number

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

1. You are buying fruit at the corner store. Which costs more, an apple that costs 4 dimes or a pear that costs 32 pennies? _____

   Explain. _____

   _____

2. Sally's pencil is 15 hundredths of a meter long (0.15 m). Edward's pencil is 2 tenths of a meter long (0.2 m). Whose pencil is longer? _____

   Explain. _____

   _____

Gizmo Warm-up

A **decimal** is a number written in a standard, base-10 system. It usually means a number with a **decimal point**. In the *Modeling Decimals* Gizmo, you can explore decimals between 0 and 1.

Each model is a square, representing one whole. You can shade the model by clicking in it, by typing a number in the text field and hitting **Enter**, or by clicking the up and down arrows.

Check that the first (red) model in the Gizmo is set to **Whole number**, the second (green) is set to **Tenths**, and the third (blue) is set to **Hundredths**.

1. Shade the entire red model as shown to the right. What number does this

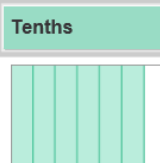   represent?   Number: _____   Number in words: _____

2. Shade half of the green model as shown. What number does this represent?

   Number: _____   Number in words: _____
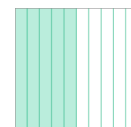
3. Shade half of the blue model as shown. What number does this represent?

   Number: _____   Number in words: _____

Activity A: **Models of decimals**	<u>Get the Gizmo ready</u>: • Click **Reset**.	Tenths

When you see the price of an item, such as $5.49, the decimal point separates the whole numbers (5 dollars) from the decimal part (49 cents, or 49 hundredths of a dollar).

1. Set all three area models to **Tenths**. How many sections are in each model? _____

2. Shade 3 sections in the first model, 4 sections in the second, and 5 sections in the third.

    A. What three numbers are modeled? First: _____ Second: _____ Third: _____

    B. How would you model 0.1? _____

    C. How would you model 0.9? _____

3. Click **Reset**. Set the models to **Hundredths**. How many sections are in each model? _____

4. Shade 77 sections in the first model, 36 sections in the second, and 51 sections in the third.

    A. What three numbers are modeled? First: _____ Second: _____ Third: _____

    B. How would you model 0.17? _____

    C. How would you model 0.81? _____

5. How many hundredths are equal to 4 tenths (0.4)?
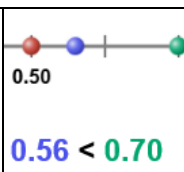Shade in the models to the right and explain below.

    _____

    _____
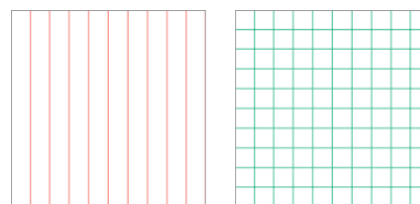
6. **Equivalent** decimals have different numbers of digits but are equal in value. Fill in the blanks with equivalent decimals in the examples below. Use the Gizmo to check your work.

    9 tenths (0.9) = _____ hundredths (0._____)   40 hundredths (0.40) = _____ tenths (0.___)

    3 tenths (0.3) = _____ hundredths (0._____)   70 hundredths (0.70) = _____ tenths (0.___)

Activity B: Comparing decimals	Get the Gizmo ready: • Click **Reset**. • Make sure **Show number line** and **Show comparison** are turned off.	0.50 0.56 < 0.70

It is easy to compare the values of two numbers like 0.21 and 0.75. But how would you compare a number written in tenths, such as 0.8, to a number like 0.18 that is written in hundredths?

1. Check that the first model is set to **Tenths** and the second model is set to **Hundredths**.

   In the Gizmo, shade the grids to model 0.8 and 0.18. Then do the same (by hand) in the grids to the right.
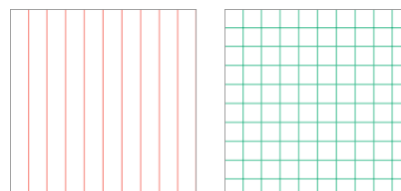
   Which number is greater, 0.8 or 0.18? _____

   Turn on **Show number line** and **Show comparison** to check your answer.

2. For each set of numbers, write them in order from least to greatest in the blanks below. For the first two sets, use the Gizmo to check your answers.

   0.3, 0.46, 0.29 _____ < _____ < _____

   0.50, 0.15, 0.05 _____ < _____ < _____

   Challenge: 0.44, 0.7, 0.155 _____ < _____ < _____

3. Turn on **Show number line** and **Show comparison**. Set all three models to **Tenths**. Model 0.2 on the first (red) model, and 0.3 on the third (blue) model.

   A. With the second (green) model set to **Tenths**, is there any way to model a number

      between 0.2 and 0.3? _____ Explain. _____

      _____

   B. Now set the second model to **Hundredths**. Try to model a number between 0.2 and

      0.3. What number did you find? _____

4. Write a decimal that is between each of the pairs of decimals below. Check your first three answers in the Gizmo. (The last three cannot be directly shown in the Gizmo. Can you figure them out anyway?)

   0.4 < _____ < 0.5   0.9 < _____ < 1.0   0.0 < _____ < 0.1

   1.7 < _____ < 1.8   72.1 < _____ < 72.2   0.67 < _____ < 0.68