LESSON 2

Number and Operations in Base Ten

Comparing Decimals

Objective

Compare decimals to the thousandths place.

Common Core State Standards

- **5.NBT.1** Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.
- **5.NBT.3b** Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.

Proficiency in comparing decimal values is an important building block for future mathematical learning and problem solving. Yet, decimal order can be challenging to students, because unlike the case with whole numbers, place values increase as they approach the decimal point. This lesson will help students learn to evaluate the sizes of decimals by working from the decimal point to the thousandths place.

Try It! *Perform the Try It! activity on the next page.*

Talk About It

Discuss the Try It! activity.

- **Ask:** *Can you name the place values in decimals? Which place do we look at first?*
- **Ask:** *How many thousandths are in one hundredth? How many hundredths are in one tenth?*
- Discuss that a digit in one place represents 10 times as much as it represents in the place to its right and $\frac{1}{10}$ of what it represents in the place to its left. Have students make a place value chart if necessary.

Solve It

Reread the problem with students. Have students look over their labeled number lines and discuss the order of the weights in terms of place value. Have them compare pairs of weights using the symbols < and >.

More Ideas

For other ways to teach about comparing decimals—

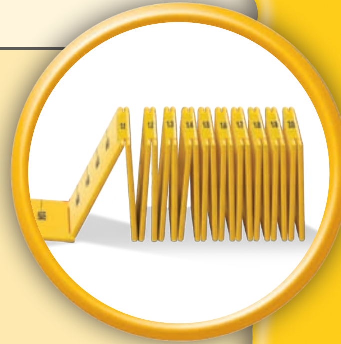
- Have students use Base Ten Blocks to model decimals. Show them the 1,000 cube and tell them it represents 1. Then elicit that a flat is $\frac{1}{10}$, a rod is $\frac{1}{100}$, and a unit is $\frac{1}{1,000}$. Have students record the decimals they model on Decimal Models (BLM 1).
- Have students create place value charts for decimals. Explain that there is no "oneths" place because decimals represent parts of wholes.

Formative Assessment

Have students try the following problem.

Which of the following decimals is greatest?

A. 0.509 **B.** 0.059 **C.** 0.905 **D.** 0.950



Try It! 15 minutes | Groups of 4

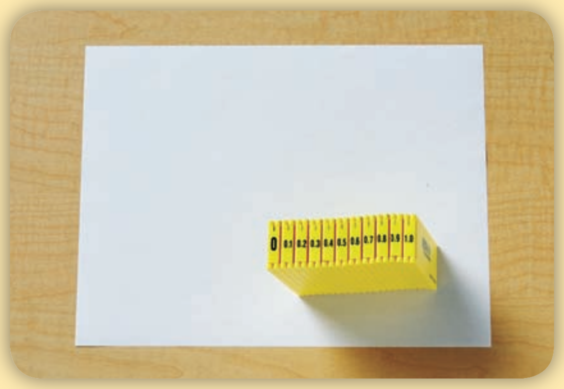
Here is a problem about comparing decimal numbers.

Lena is weighing rocks for a science experiment. The weights are 0.098 kg, 0.028 kg, 0.150 kg, and 0.095 kg. Help her arrange the rocks from least weight to greatest.

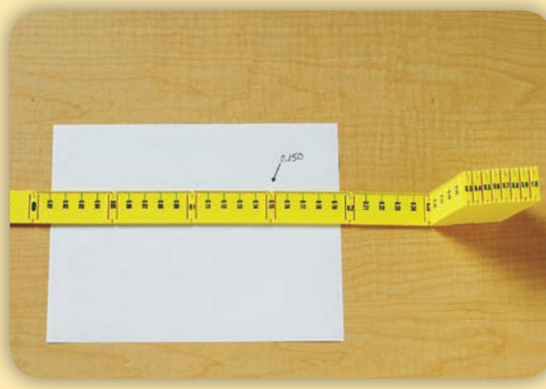
Introduce the problem. Then have students do the activity to solve the problem. Distribute Folding Number Lines, paper, and pencils to students.

Materials

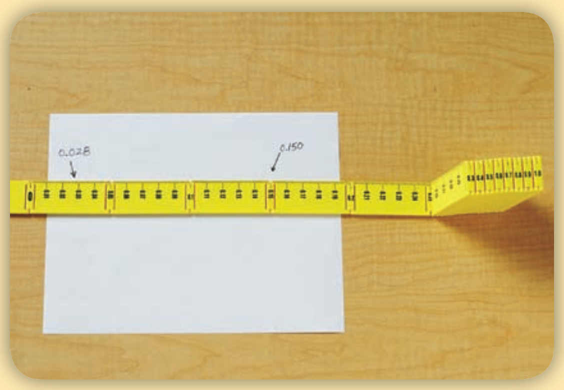
- Folding Number Line (1 per group)
- paper (1 sheet per group)
- pencils



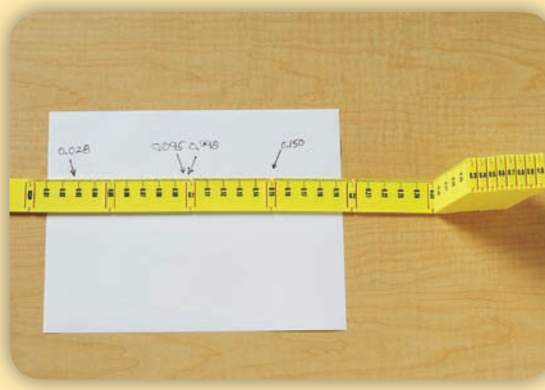
1. Write 0.098, 0.028, 0.150, and 0.095 on the board. **Ask:** *Are these numbers greater than or less than 1? Which number line should you use to locate these numbers?* Elicit from students that they should use the 0–1 line.



2. Have students look at the tenths place of each number and decide where to open the number line. Ask them to expose a range that includes all the numbers and lay it on a piece of paper. **Ask:** *By comparing tenths, can you tell which number is greatest?* Elicit that 0.150 is the greatest. Have students locate 0.150, draw an arrow pointing to it, and label the arrow.



3. Say: *Look at the other numbers. Compare the hundredths place.* **Ask:** *Which one is different? Is that number greater than or less than the other two?* Elicit that the hundredths place of 0.028 is different and that 0.028 is less than 0.095 and 0.098. Have students locate 0.028, draw an arrow pointing to it, and label the arrow.

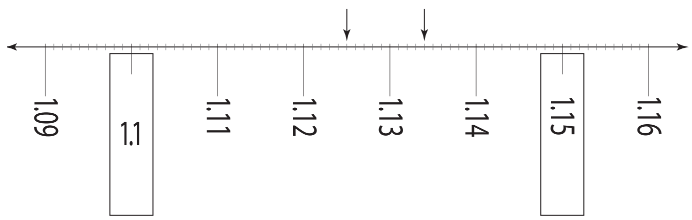


4. Say: *Compare 0.095 and 0.098.* **Ask:** *Which place do you need to compare?* Elicit from students that they need to compare the thousandths place. Have students locate and label 0.095. **Ask:** *Should 0.098 be to the left or right of 0.095?* Have students locate and label 0.098. Elicit that it is to the right.

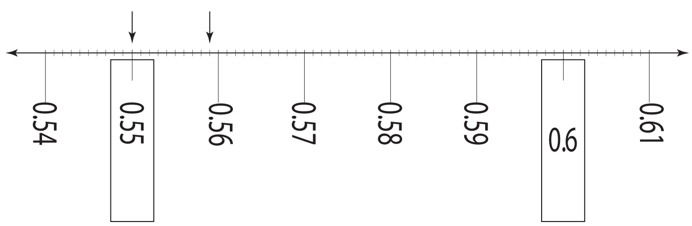
Answer Key

Use a Folding Number Line to model and compare the decimals. Insert a <, >, or = symbol in the circle. (Check students' work.)

1. 1.134 > 1.125



2. 0.550 < 0.559



Using a Folding Number Line, model and compare the decimals. Sketch the model on a number line. Insert a <, >, or = symbol in the circle.

(Check students' models.)

3. 0.895 < 0.990

4. 1.111 > 1.099

Use a <, >, or = symbol to compare the decimals.

5. 3.001 > 2.995

6. 0.009 < 0.010

7. 0.999 < 1.001

8. 2.540 < 2.550

9. 0.030 > 0.029

10. 0.001 < 0.100

Answer Key

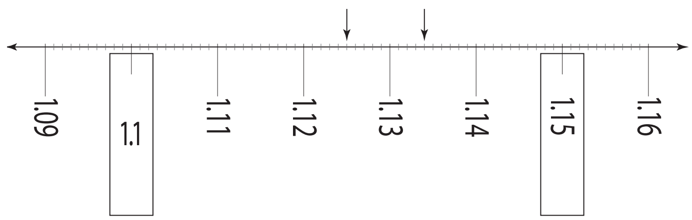
Challenge! How many times bigger is 0.050 than 0.005? Explain how you know.

Challenge: 10; a digit in one place represents 10 times as much as it represents in the place to its right.

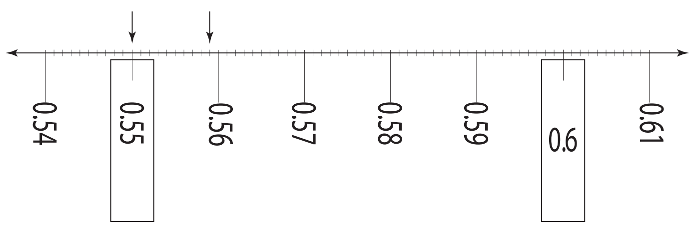
Name ______________________________

Use a Folding Number Line to model and compare the decimals.
Insert a <, >, or = symbol in the circle.

1. 1.134 ◯ 1.125



2. 0.550 ◯ 0.559



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10. 0.001 ◯ 0.100

Name ___________________________________

Challenge! How many times bigger is 0.050 than 0.005? Explain how you know.