



Practice Task: Decimal Line-up

STANDARDS FOR MATHEMATICAL CONTENT

MCC4.NF.5 Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. *For example, express $\frac{3}{10}$ as $\frac{30}{100}$, and add $\frac{3}{10} + \frac{4}{100} = \frac{34}{100}$.*

MCC4.NF.6 Use decimal notation for fractions with denominators 10 or 100. *For example, rewrite $\frac{62}{100}$ as 0.62; describe a length as 0.62 meters; locate 0.62 on a number line diagram.*

MCC4.NF.7 Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of the comparisons with the symbols $>$, $+$, or $<$, and justify the conclusions, e.g. by using a visual model.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make sure of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

Students need to be very familiar with number lines and counting using decimal numbers. One way to give students practice in counting using decimal numbers is to provide students with adding machine tape on which they can list decimal numbers. Give them a starting number and ask them to list the numbers to the hundredths place (or to the tenths place). Students can be given an ending number or they may be asked to fill a strip of adding machine tape. See the two examples shown.

3.00	5.28
3.01	5.29
3.02	5.30
3.03	5.31
3.04	5.32
3.05	5.33
3.06	5.34

ESSENTIAL QUESTIONS

- What models can be used to represent decimals?
- What are the benefits and drawbacks of each of these models?

MATERIALS

- “Decimal Line-up” student recording sheet (2 pages)

GROUPING

Partner/Small Group

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Students will order and then place decimal numbers (tenths and hundredths) on a number line.

Comments

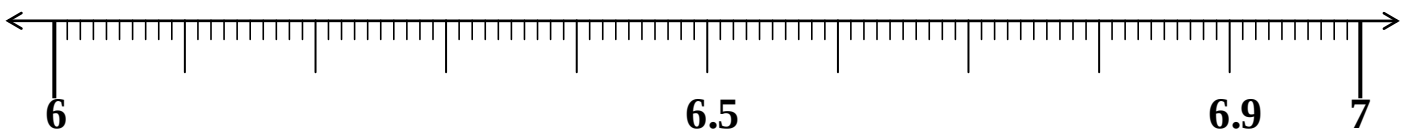
To introduce this task, discuss as a large group the structure of a number line that includes decimals. Students need to recognize that like a ruler, tick marks of different lengths and weights represent different types of numbers.

One way to begin this task is to display the number line shown below:



As a class, discuss where the following decimal numbers would be located on the number line: 6.5, 6.25, 6.36, 6.72, and 6.9. Start by discussing which benchmark whole numbers would be required for the set of numbers to be placed on the number line. Students should recognize that the smallest number is greater than 6, so the number line would need to start at 6. The largest number is less than 7, so the number line would need to go to 7.

Once the benchmark numbers have been labeled, ask students how to place the following decimal numbers: 6.25 and 6.72. Students should be able to place these decimal numbers on the number line as shown below.

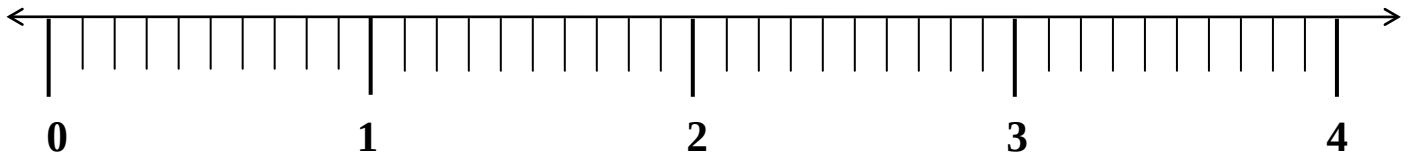


Once the tenths have been labeled work as a class to place the decimal numbers 6.25, 6.36, and 6.72. While placing these decimal numbers on the number line use the “think aloud” strategy to explain how you know it is being placed in the correct location on the number line. Alternatively, ask students to explain where to correctly place these decimal numbers on the number line. Once all of the given decimal numbers are placed, the number line should be similar to the one shown below.



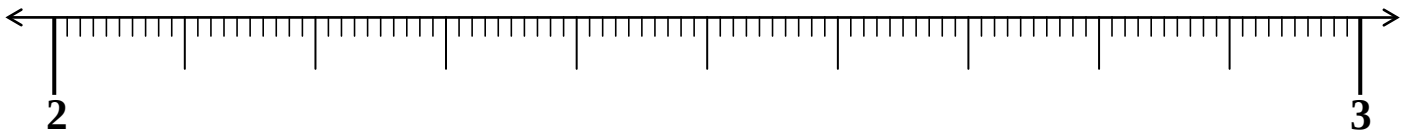
Before students begin to work on this task, help students label the landmark numbers on the number lines of the “Decimal Line-up” student sheet.

Ask students to consider the benchmark numbers that they will need to place on the number line. For example, the first problem asks students to place the following decimal numbers on the number line: 3.7, 2.3, 1.6, 0.9, and 1.2. Ask students what whole numbers these decimal numbers fall between. Students should recognize that the smallest number is less than 1, so the number line would need to start at zero. The largest number is greater than 3, so the number line would need to go to at least 4. As a large group, have the students label the number line on their student recording sheets correctly (see below).



Continue working as a large group to label the number line in the second problem. This number line has three different types of tick marks on it. The longest and heaviest tick marks indicate whole numbers, the next heaviest indicate decimal numbers to the tenths, and the shortest and lightest tick marks indicate decimal numbers to the hundredths.

Ask students to consider the benchmark numbers that they will need to place on the number line. Students are asked to place the following decimal numbers on the number line: 2.53, 2.19, 2.46, 2.02, and 2.85. Ask students what whole numbers these decimal numbers fall between. Students should recognize that the smallest number is greater than 2, so the number line would need to start at 2. The largest number is smaller than 3, so the number line would need to go to 3. As a large group, have the students label the number line on their student recording sheets correctly as shown below.



Next, ask students which decimal numbers to the tenths come between 2 and 3. Help students recognize and label the number line with 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9. Ask students to label the number line on their student recording sheets (see below).



Task Directions

Students will follow directions on the “Decimal Line-up” student recording sheet.

To complete this task, students will need to correctly label one number line with decimal numbers to the tenths and a second number line with decimal numbers to the hundredths. Finally, students will be asked to create their own decimal numbers and use their numbers to correctly label a number line.

FORMATIVE ASSESSMENT QUESTIONS

- What are the whole number benchmark numbers for your decimals? How do you know?
- What are the benchmark numbers to the tenths place? How do you know?
- What is the largest/smallest decimal number? How will you use that information?
- Which tick marks will be used to represent decimal numbers to the tenths? Hundredths?
- Which students are able to identify benchmark numbers for the decimal numbers they need to place on a number line?
- Which students are able to place decimal numbers to the tenths on a number line?
- Which students are able to place decimal numbers to the hundredths on a number line?

DIFFERENTIATION

Extension

- Give students two numbers, for example 3.2 and 3.3. Ask students to list at least 9 numbers that come between these two numbers (3.21, 3.22, 3.23, 3.24...3.29). Ask students if they think there are numbers between 3.21 and 3.22.

Intervention

- Allow students to refer to a meter stick while working on number lines. Each decimeter is one tenth of a meter and each centimeter is one hundredth of a meter.

Name _____ Date _____

Decimal Line-up



1. Ordering tenths.

- a. Order the following decimals from least to greatest.

3.7

2.3

1.6

0.9

1.2

- b. Next, place the decimal numbers on the number line below. Add whole numbers as needed to the number line.



- c. Write to explain how you know the decimal numbers are placed correctly.

2. Ordering hundredths.

- a. Order the following decimals from least to greatest.

2.53

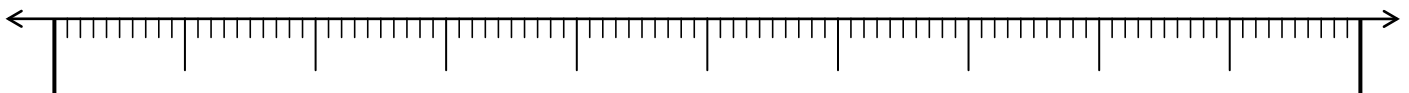
2.19

2.46

2.02

2.85

- b. Next, place the decimal numbers on the number line below. Add whole numbers as needed to the number line.

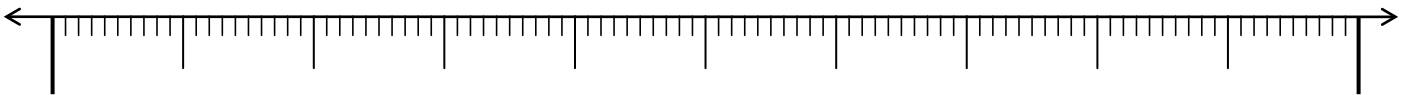


Write to explain how you know the decimal numbers are placed correctly.

3. Ordering decimals.

- a. Write five decimals that you will be able to place on the number line below. Then order your decimals from least to most.

- b. Next, place your decimal numbers on the number line below. Add whole numbers as needed to the number line.



- c. Write to explain how you know your decimals are placed correctly.
