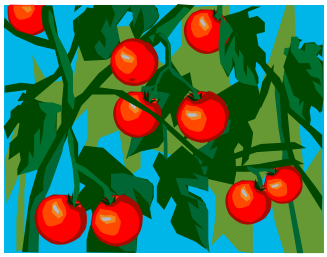
PERFORMANCE TASK: Decimal Garden



Adapted from Florida

STANDARDS FOR MATHEMATICAL CONTENT

MCC5.NBT.3 Read, write, and compare decimals to thousandths.

a. **Read and write decimals to thousandths using base ten numerals, number names, and expanded form, e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000).**
b. **Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.**

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 use of structure.**
8. **Look for and express regularity in repeated reasoning.**

BACKGROUND KNOWLEDGE

Draw a large rectangle on the board. Divide it into ten equal sections. Shade inside two sections and draw stripes inside one section. Ask students how many sections in all. (10) Ask how many sections have stripes. (1/10) Show them how to write this as a fraction (1/10) and decimal (0.1) above the striped section. Next ask the students how many sections are shaded. (2/10). Write the fraction above this section. Ask them how to write it as a decimal. (0.2) Write the decimal above this section beside the fraction. Ask how many sections do not contain stripes or shading. (7/10) Write the answer as a fraction and decimal.

Common Misconceptions

A common misconception that students have when trying to extend their understanding of whole number place value to decimal place value is that as you move to the left of the decimal point, the number increases in value. Reinforcing the concept of powers of ten is essential for addressing this issue.

A second misconception that is directly related to comparing whole numbers is the idea that the longer the number, the greater the number. With whole numbers, a 5-digit number is always greater that a 1-, 2-, 3-, or 4-digit number. However, with decimals a number with one decimal place may be greater than a number with two or three decimal places. For example, 0.5 is greater than 0.12, 0.009 or 0.499. One method for comparing decimals it to make all numbers have the same number of digits to the right of the decimal point by adding zeros to the number, such as

0.500, 0.120, 0.009 and 0.499. A second method is to use a place-value chart to place the numerals for comparison.

ESSENTIAL QUESTIONS

- What is a fraction and how can it be represented?
- When is it appropriate to use fractions?
- How are decimal numbers and fractions related?
- How can decimal numbers be compared?

MATERIALS

- "Decimal Garden" task sheet
- Grid paper (graph paper)
- Unifix cubes
- crayons, colored pencils, or markers

GROUPING

Individual Task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

In this task, students will work to determine the fraction and decimal number represented by each type of vegetable in a garden. Then students will create their own garden and identify the fraction and decimal number represented by each color of flower.

Comments

This task can be introduced by showing the class a dime and asking how many pennies it takes to equal one dime. (10) What fraction of a dime is a penny? (1/10) Review how to write it as a decimal. (0.1)

Task Directions

Students will follow the directions below from the "Decimal Garden" task sheet.

1. Use 10 unifix cubes to make a design for a vegetable garden. Use red for tomatoes, yellow for corn, and green for watermelons, for example.
2. Draw and color the design on the task sheet.
3. Label each vegetable in the garden with the correct fraction and decimal number.
4. Next design a 10 x 10 garden on graph paper using colors to represent vegetables in the garden.
5. You may use as many different colors as you like to represent vegetables.
6. Be sure you label each vegetable with a fraction and a decimal number.
7. Write a number sentence comparing 2 vegetables. Use >, < or =.
8. Be ready to display and explain your decimal garden.

FORMATIVE ASSESSMENT QUESITONS

- How would you write that as fraction? How do you know?
- How would you write that as a decimal number? How do you know?
- How do you read this fraction? Decimal number? How do you know?
- How are these numbers (fraction, decimal number) alike? Different?
- How will your fractions change when you change from 10 cubes to a 10 x 10 grid?
- Which vegetable section is the largest? Smallest? How do you know?

DIFFERENTIATION

Extension

- Ask students to write a fraction/decimal number to represent a combination of 2 vegetables.

Intervention

- When working on the "Decimal Garden" student recording sheet, allow students to work on the same design with a partner or in a small group.

Name _____ Date _____

Decimal Garden

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2. Draw and color the design on the task sheet.
3. Label each vegetable in the garden with the correct fraction and decimal number.

Color	Vegetable	Fraction	Decimal Number

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4. Next design a 10 x 10 garden on graph paper using colors to represent vegetables in the garden.
5. You may use as many different colors as you like to represent vegetables.
6. Be sure you label each vegetable with a fraction and a decimal number.
7. Write a number sentence comparing 2 vegetables. Use >, < or =.
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