

Scaffolding Task: Calculator Decimal Counting

Adapted from Teaching Student Centered Mathematics: Grades 3-5 by John van de Walle and Louann Lovin, 2006

STANDARDS FOR MATHEMATICAL CONTENT

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

BACKGROUND KNOWLEDGE

Often when counting or showing decimals on a number line, it is common for a student to say “seven tenths, eight tenths, nine tenths, ten tenths, eleven tenths..” while writing “0.7, 0.8, 0.9, 0.10, 0.11.” This common misconception can be avoided by showing students a model of what correct decimal notation looks like and pairing it with a visual model.

Before the lesson, make sure students know how to make the calculator “count” by pressing $+ 1 = = \dots$

ESSENTIAL QUESTIONS

- When adding decimals, how does decimal notation show what I expect? How is it different?

MATERIALS

- Calculators
- Pre-made decimal squares or ones students have made

GROUPING

Individual or partner

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Comments

One common misconception that students have when working with decimals is the next number that occurs when moving up from nine tenths to ten tenths or 99 hundredths to 100 hundredths. This calculator activity helps to bring students' attention to what happens when the tenths are joined up to become 1 or when hundredth are combined to make tenths. The purpose of this scaffolding activity is to develop decimal number sense as students explore addition of decimals with a calculator.

TASK:

Students will follow the directions below from the “Calculator Decimal Counting” recording sheet.

- Use the calculator to add 0.1 together until you reach 0.9. Collect base ten blocks as you do this, adding 0.1 to your pile as you add 0.1 in the calculator.
 - What do you predict the calculator will show next? _____
 - What does the calculator show? _____
 - Is this surprising? Why or why not? _____
- Continue to count by 0.1 on your calculator as you collect base ten blocks until you reach 5. Keep track of the numbers on the display below.
_0.1, 0.2, 0.3, _____
 - What patterns do you see? _____
 - How many presses of the = key did it take to get to the next whole number?
- Now use the calculator to count by 0.01. Collect base ten blocks as you do this, adding 0.01 to your pile as you add 0.01 in the calculator.
 - How many presses did it take to reach 0.1? _____
 - How many presses did it take to reach 0.5? _____
 - How many presses did it take to reach 1? _____
- Keep track of the numbers that display as you count from 0.5 to 0.7 by 0.01.

 - What patterns did you notice? _____

FORMATIVE ASSESSMENT QUESTIONS

- What happens to the way the decimal is notated as you move from 9 hundredths to the next hundredth?
- What happens to the way a decimal is notated as you move from 9 tenths to the next tenth?
- When counting by tenths or hundredths on a list or a number lined, what do you think is important to remember?
- Were students able to see the connection between tenths and hundredths as regrouping to the next unit higher happened?
- How did students show connections between tenths and hundredths?

DIFFERENTIATION

Extension

- Have students explore adding by 0.001. Student should predict how many times they must add 0.001 to get to the next 0.01, 0.1, and whole number.

Intervention

- Give students a blank hundreds chart and have them complete it, making it a 1 chart where each square represents 0.01. Have them fill in the chart as they add on the calculator and compare this chart with a regular hundreds chart. What patterns are the same? What patterns are different?

Name _____ Date _____

Calculator Decimal Counting

Use the calculator to add 0.1 together until you reach 0.9. Collect base ten blocks as you do this, adding 0.1 to your pile as you add 0.1 in the calculator.

- What do you predict the calculator will show next? _____
- What does the calculator show? _____
- Is this surprising? Why or why not? _____

Continue to count by 0.1 on your calculator as you collect base ten blocks until you reach 5. Keep track of the numbers on the display below.

What patterns do you see? _____

- How many presses of the = key did it take to get to the next whole number?

Now use the calculator to count by 0.01. Collect base ten blocks as you do this, adding 0.01 to your pile as you add 0.01 in the calculator.

- How many presses did it take to reach 0.1? _____
- How many presses did it take to reach 0.5? _____
- How many presses did it take to reach 1? _____

Keep track of the numbers that display as you count from 0.5 to 0.7 by 0.01.

- What patterns did you notice? _____