Building Mathematical Thinkers: Mini-Activities

Giant Number Lines

Objective: 4th grade Number Sense – Decimal Place Value

Theoretical Foundation: Fourth graders need to experience decimals in a variety of ways. This activity helps students visualize the comparative size of decimals by relating them to one meter. It also encourages collaboration and reasoning as students work to address misconceptions about tenths and hundredths.

Estimated Time: 30-45 minutes

Materials: For each pair: One sheet of large paper (about 2.5 meters long), decimal cards, meter sticks, scissors, glue, base ten blocks

Description:

1. Give each student a flat base ten block (this is the one which usually represents 100)
2. Tell students that this block will now have a value of ONE
3. Ask students what the pieces would look like if they split their ONE into ten equal parts.
4. Distribute a few rods to each student (this is the block which usually represents 10).
5. Have students place these blocks on top of the ONE to show that ten of them would equal one. This block represents one-tenth.
6. Now ask students what the pieces would look like if they split their ONE into 100 equal parts.
7. Distribute a few units to each student (this is the block which usually represents 1).
8. Have students place these blocks on top of the ONE to show that 100 of them would equal one. This block represents one-hundredth.
9. Now give each pair of students a meter stick.
10. Tell the students to line up their tenths along the meter stick. What do they notice? Ten centimeters is the same length as a one tenth block!
11. Ask students what 1 whole would look like (one meter!).
12. Ask students what one-hundredth would look like (one centimeter!).
13. Tell students that they will be making a Giant Number Line in which one meter is one whole.
14. In pairs students should measure two meters on their large paper.
15. Pass out the decimal cards. Students may use any of their materials (base ten blocks, meter stick, etc…) to determine where each card should be placed on the number line.
16. Before gluing the cards down, ask students to raise their hands so that their work can be checked by the teacher.
17. While checking student work, ask probing questions that challenge the placement of the decimal cards.

Differentiation Suggestions:

- Carefully avoid whole number reasoning when working with decimals. For instance, when comparing 0.9 and 0.97 rather than stating that 0.97 is "seven away from 0.9" use place value language: "0.97 is seven *hundredths* greater than 0.9." This distinction helps students avoid common misconceptions.
- Before working with the decimal cards, struggling students may need to use their meter stick to mark 10cm increments. They could, then, label these increments 0.1, 0.2, 0.3, etc…
- Challenge advanced students and early finishers to make their own decimal cards and add them to their completed number line.

Probing Questions:

- Which decimal is larger 0.13 or 0.2? How can you tell?
- How much larger is 0.75 than 0.8? How can you tell?
- How did you deal with 0.3 and 0.30? What makes these two decimals unique?
- Which decimal did you place first? How did you decide where to put it?
- If we wanted to place 0.78 on this number line, where would it go? What if we wanted to place 1.36 on the number line?
- Which decimal did you find the most challenging to place? What made it challenging? What did you do to place this decimal?

Assessment:

- Can students correctly place the decimal cards on the number line with little teacher help?
- Can students justify their placement of the decimals?
- When challenged do students revise their thinking?
- How do students deal with equivalent decimals?
- What misconceptions are present (such as longer decimals are larger)?

Decimal Cards for Giant Number Line

0	1	2	0.3	0.5
0.30	0.05	0.97	0.9	1.5
0.8	0.63	0.2	0.43	0.25
1.2	1.7	0.80	0.13	0.75
1.50	1.38	1.3	1.86	1.9