Building Mathematical Thinkers: Mini-Activities

Building Decimals

Objective: 4th grade Number Sense – Prime & Composite Numbers, Factors & Multiples

Theoretical Foundation: Fourth grade students practice 3 important concepts in this activity: recognizing prime and composite numbers, determining factors and multiples, and representing decimal values. In addition students benefit from working with numbers of their own creation.

Estimated Time: 20-40 minutes

Materials: Copy of "Build A Decimal" for each student, place value blocks for each student (or pairs of students if necessary). Works best with at least 6 flats, 11 rods, and 12 units for each student or pair.

Description:
1. For this activity students will be building decimal numbers using place value blocks. **Students should have basic understandings of prime, composite, square, factor, and multiple.**
2. Review the terms listed above by asking the students to name some examples. Write these examples on the board for visual learners.
3. Review how place value blocks can be used to represent decimals: If the flat represents 1 whole then the rod represents 0.1 and the unit represents 0.01
4. Distribute the "Build a Decimal" sheet and guide students to complete the steps for Decimal A. They should follow the directions to build a number with their blocks, sketch the blocks, then determine the value of their blocks.
     For example: 11 rods, 4 flats, and 6 units represents 5.16
5. After students create Decimal A allow them to share their work with a neighbor.
6. Invite several students to share the decimal they created. Challenge the class to prove that the shared decimal either does or doesn't meet the requirements listed. A number such as 5.16 is especially challenging because it appears to have a prime number of flats, however five wholes were created using 4 flats and 10 rods.
7. Allow students to complete Decimal B independently.
8. Again, have students share their work with a partner, justifying their choices and explaining how they determined the value of the blocks.
9. Again, several students should share with the class so that others are challenged to determine if the shared decimals really meet the requirements listed for Decimal B.
10. Finally, direct students to the directions for Decimal C, which are slightly different. For this decimal students will start by creating a number with blocks then determine whether the number of units, rods, and flats are prime, composite, or neither (the number 1 is neither). The students will also look for factors and multiples in the number of blocks used.
11. Once again students should share and justify their work to a partner and the entire class.

Differentiation Suggestions:
- Pair struggling students with someone of similar ability so that they can reason together about how to approach the tasks.
- Advanced students can be challenged to create their own set of rules for other students to complete.
- Challenge advanced students by using more blocks and requiring them to use more than ten of the rods and/or units when composing their numbers. This challenge requires students to be more flexible with regrouping.

Probing Questions:
- How did you figure out if that number is prime? How did you figure out if that number is composite?
- How did you know that is a factor of ___? How did you know that number is a multiple of ____?
- What did you do to figure out the decimal represented by your blocks?
- How could that number be changed so that it meets the requirements?
- If the rods were changed to ____ would the number still meet the requirements?

Assessment:
- Can students confidently identify numbers that meet the requirements? Can they easily differentiate the meanings of prime and composite? Factor and multiple?
- How do students approach the task of determining the value of the decimal represented by the blocks? Do they complete this task accurately?
- Do students understand what happens when there are 10 or more tenths and/or hundredths?

Name _____

Build A Decimal

For this activity, the flat represents 1.

<u>Decimal A must have:</u>

A prime number of rods: _____ rods

A composite number of flats: _____ flats

A number of units that is a factor of 24: _____ units

Sketch of decimal A:

Decimal A: _____

<u>Decimal B must have:</u>

A square number of units: _____ units

A prime number of flats: _____ flats

A number of rods that is a multiple of 6: _____ rods

Sketch of decimal B:

Decimal B: _____

<u>Decimal C:</u> Create a structure of your own using the place value blocks.

Sketch of decimal C:

My structure has _____ flats. Prime, composite, or neither? _____

My structure has _____ rods. Prime, composite, or neither? _____

My structure has _____ units. Prime, composite, or neither? _____

Decimal C: _____

The number of _____ in my structure is a factor of _____

The number of _____ in my structure is a multiple of _____