

Building Mathematical Thinkers: Mini-Activities

Which is Larger?

Objective: Measurement – Customary Measures

Theoretical Foundation: Third graders should be able to reason about the size of measurement units without needing to rely on algorithms. For instance, they should be able to determine that 5 feet is much shorter than 5 yards *without* using the algorithm 3 feet=1 yard. Rather, third graders should recognize that one yard is much larger than one foot, therefore 5 yards are larger than 5 feet. In this activity students will rely on this type of reasoning to compare measurements.

Estimated Time: 60 minutes

Materials: Ruler, Yardstick, Containers that hold 1 cup, 1 pint, and 1 quart, material for measuring capacity such as rice (at least 9 cups), funnel (helpful, but not necessary), a large bowl (helpful, but not necessary)

Directions:

1. **DO NOT** use equivalencies at this time such as “3 feet equal one yard.” The students will reason about size more authentically if they don't know/use these references.
2. Use the materials to visually remind students about how large the following measurements are: inch, foot, yard, cup, pint, and quart. You might also ask students to use their hands to show the size of each.
3. On the board write two measurements: 22in 2ft.
4. Ask, which do you think is larger?
5. Allow students to share their predictions and explain their reasoning. Encourage them to agree or disagree with one another, always supporting their thinking.
6. **DO NOT** reveal the answer at this time.
7. Beneath the first pair of measures write these: 3 cups 4 pints
8. Again, engage the students in discussion about which of these measurements is the largest.
9. Continue this process of predicting and reasoning with the remaining pairs:

36in	1yd
9 cups	2 quarts
6yds	11ft
10. After thoroughly discussing all of the pairs the students will test their theories to determine which measure in each pair really is the largest.
11. Because all of the students need to feel comfortable with both length and capacity measures they should work with both types in this activity. Ideally, each student will have the opportunity to explore each of the 5 pairs of measurements.
12. The easiest way for each student to test all 5 pairs is to set up 5 stations. Simply place 1 yardstick and 1 ruler at each of the 3 length stations. Place 1 cup, 1 pint, 1 quart, some rice, a funnel, and a large bowl at each capacity station.
13. Before splitting the class into 5 groups for the stations be sure you demonstrate how to use the materials at each station.
14. After all students have rotated through the stations engage the class in discussion about the results. For each pair, which measurement really is larger?

Differentiation Suggestions:

- If most of your students have solid background knowledge of common measurement equivalencies, the length pairs in this activity may be too simple. If this is the case the students will not benefit as much from

reasoning about unit size. To remedy this, use more unusual length measures.

- Challenge early finishers at each station to determine how many of the “small measurement” it would take to equal the larger measurement. For instance, at the station that compares 6 yards and 11 feet the challenge would be, “How many feet are equivalent to 6 yards?”
- It may be helpful to place struggling students in a group with others who will be helpful without taking over the work. As you circulate among the stations be sure that struggling students are participating in the actual measurement tasks.

Probing Questions:

- What makes you think this one will be the largest?
- How does knowing the size of one inch/foot/cup etc... help you predict which measurement is the largest?
- Which pairs surprised you? Why were they surprising?
- How does thinking about small and large units help you estimate measurements?

Assessment:

- How do students justify their reasoning during the prediction phase of the activity?
- How does student reasoning about measurement change after testing the measurements?
- Can students effectively and accurately use the measurement tools?

Name _____

For each pair, circle the largest measurement.

22in or 2ft

How can you tell? _____

3 cups or 4 pints

How can you tell? _____

36in or 1yd

How can you tell? _____

9 cups or 2 quarts

How can you tell? _____

6yds or 11ft

How can you tell? _____
