

Best Practices for Teaching Measurement Concepts

Summary: Measurement is difficult to teach conceptually – only 20% of 4th graders were able to successfully measure a toothpick on a ruler as part of the National Assessment of Education Progress. In an article for *Teaching Children Mathematics*, a trio of Michigan State University researchers details concrete ways to teach measurement so students grasp the underlying concepts.

Practical Applications

The authors detail three specific tasks drawn from different curricula that are highly effective:

- **The Buttons Task.** In this, students are asked to consider drawings of fake work of four hypothetical students who tried to measure the width of a sheet of paper using buttons. One student did it correctly, a second did a diagonal row of buttons, a third did buttons with space in between them and a fourth used a snaking pattern of buttons (in an extension, a fifth student could be added who used different sized buttons). Students are asked which hypothetical student made the best measurement and why. This forces them to reckon not only with the correct way to measure but with why the other methods are incorrect, such as why it's not OK to have gaps when measuring.
- **The Foot Task.** In this, “students are only given one length unit (a tracing of their foot) and asked to measure a span, such as a table. The Foot Task requires students to iterate their single foot cutout to measure length. If the span is not marked with a line (such as floor tiles) students must also choose a path that will produce an accurate measurement.” Through this task, the teacher can ask many conceptual questions, such as pushing students to think about gaps between iterations or to consider the effectiveness of measuring in a non-straight line.
- **The One-Inch Squares Task.** This is a way to get students to understand that rulers are simply repeated units of length. The teacher uses 1-inch squares (either cut out from paper or from a manipulatives kit) to measure an object, then measures the same object with a ruler. The teacher then leads the class in a discussion of why the two measurements were the same, and has students pair up to measure objects using both the 1-inch squares and the rulers and then compare answers.

In general, the authors recommend that when planning measurement activities teachers think about “Does the task offer the opportunity for students to think about:

- Whether units need to have equal length?
- Why units cannot have gaps or overlap?
- What quantity is being measured? (e.g. what does “width of the table” really mean?)
- How rulers represent iterated units of length?”

Conclusion and Citation

A teacher can enhance students’ understanding of measurement by being deliberate about the design of the tasks they are asked to do.

Smith, J., et. al. “Understanding Linear Measure.” *Teaching Children Mathematics* (Nov. 2011). <http://bit.ly/vuaWHc> (temporarily free).