

Mathematics: The Language of STEM
Measurement – Choosing the Right Tool – Part One
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CONTENT AND TASK DECISIONS

Grade Level(s): 2-3

Description of the Task: Students will learn how to select the most appropriate tool for measuring various objects

Indiana Mathematics Content Standards: 2.M.2: Estimate and measure the length of an object by selecting and using appropriate tools, such as rulers, yardsticks, meter sticks, and measuring tapes to the nearest inch, foot, yard, centimeter and meter.

Indiana Mathematics Process Standards: PS 1: Make sense of problems and persevere in solving them.
PS.5: Use appropriate tools strategically.

Mathematics Content Goals: Students will learn to choose the most effective tool to measure length, width, or height of selected objects.

Language Objectives: Mathematical language: height, length, width, inch, feet, yards, ruler, yardstick, measuring tape, round/rounding, estimate/estimating.

Materials: 1- 8 ½ x 11 paper , rulers (enough for each student), 4 - yardsticks, 4- 25' or greater measuring tapes,

THE LESSON

Before: This phase of the lesson should be designed to get students ready for problem solving. It also provides an opportunity for you to find out what they already know about the topic. Describe how you will accomplish each of the following in this phase of the lesson:

- **Activate prior knowledge** Introduce the three measuring tools one at a time; the ruler, the yardstick, and the measuring tape. Ask questions. “Which of these have you used? Why did you use it? What did you learn from using it.” Record the answers on a teacher-created chart. The chart could be on a chalkboard, a whiteboard, or chart paper. The Chart will have three rows. Each row is labeled RULER, YARDSTICK, TAPE MEASURE.. Draw a vertical line after the label words. As students come recognize a tool they have used, record the things they have measured in the row of the tool used.
- **Be sure the problem is understood.** Explain that for this lesson, they will be using these tools to measure a variety of objects.
- **Establish clear expectations.** Students are expected to work well together when they are working with each other. Everyone should participate and respect each other throughout the lesson.

During: “Today, we are going to focus on using a ruler. Take your ruler and measure the height of

your desk in inches. Write your answer on the blank piece of paper. Again, we are using the ruler to measure the height of your desk in inches and writing your answer on the blank piece of paper. You may begin.” Some will have questions like: “What is an inch” My ruler isn’t long enough?” “What is height?” Give as little support as possible while still providing worthwhile support. **Secondary Challenge:** “How tall is the desk in feet?” Enjoy the struggle. Be certain to have the students record their answers to this part as well. This phase of the lesson should be designed for students to explore the focus task. Describe specifically what the students will be doing in this phase. Include a description of how the students will record their mathematical thinking in writing or drawing throughout the investigation. Describe how you will accomplish each of the following in this phase of the lesson:

After: Have students share their “inches” answers.. Record them on the board. Select several of the answers and have those students demonstrate how they arrived at their conclusion. Have those students defend their answers. Have class discuss those answers and discuss why the answers are right or wrong. Look for problems with the math; addition issues. Was the measuring hard/difficult? What would have helped make the answer more accurate? Lesson and explore their answers. Examples: “The ruler was not the best tool for the job.” A yardstick? A tape measure? Rulers taped together? “The tools were not vertical.” Why is that important? Demonstrate “vertical” on the chalkboard by connecting dots that are made 30” above the chalk tray. Then, using the yardstick or a 30” string, scribe a line from the center of the chalk tray. By keeping the bottom of the line fixed in the center of the chalk tray, the result will be an arc. The students know that the horizontal line is 30” Measuring vertically from anywhere on the chalk rail, the answer is 30”. Measuring from the center to any point on the arc is also 30”. But, measuring from the center to anywhere on the line besides vertical results in answers that are longer than 30”. Have students measure their desks again using yardsticks or tape measures. Have them record their answers.

Discuss their new answers.

ASSESSMENT

“So, students, What have we learned?

- A ruler is not the best tool for measuring the height of a desk
Why? It’s too short. It is hard to make a vertical measurement.
- A yardstick or a tape measure could be used.
Why? They are longer than the desk is tall.
- What else?