Measurement Lesson Plan
2nd Grade
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Standards:
Goal 2.1: Understand and use U.S. customary and metric measurements
2.M.2.1.1 Select a tool that can measure a given attribute (ruler – length, cup – volume, balance – weight, clock – time, thermometer – temperature).
2.M.2.1.2 Estimate length and time using standard units

Objectives

Students will

1. understand how to measure and estimate lengths;
2. understand the difference between measuring and estimating; and
3. become more aware of linear measurements in the world and communicate better about the significance of these measurements.

Warm-up:
7 Minutes
The lesson will begin with showing pictures and objects used to measure different attributes. A picture of a clock, "What do you think a clock measures?" A ruler, "What kinds of things would we measure with a ruler?" The same inquiry questions will also be used with a tape measure, scale and thermometer. I will also show paper clips, blocks, string and other random objects and ask if we could use these as tools for measurement. Explain how anything can be used as a unit of measurement.

Students will begin to understand that there are many tools for measurement and anything can be measured.
Students will also understand before moving on that some units of measurement work better for different objects. It all depends on what you are measuring.

Activity:

1. Begin the lesson by briefly reviewing measuring and estimating length. Direct students' attention to a long object in the classroom. Ask students to suggest different ways to estimate its length. Possible strategies include estimating the length of part of the object and using this to estimate the whole length, comparing the length with a length they know, and estimating the shortest and the longest possible lengths and using these to estimate the range of the length.
2. Have two students measure the object. What unit should they use to measure it? Why, for example, would you use feet, not inches, to measure the length of a chalkboard? If students need additional practice, have them select a few more objects to estimate and measure. Emphasize that estimates are approximate, not exact, measurements.
3. Group students into teams of four. Provide students with measuring tools, such as rulers, yardsticks, tape measures, and trundle wheels. Also provide some non-standard units of measurement such as paperclips and blocks. Students may also make their own "yardsticks"

by cutting a piece of string 1 yard long.

4. Distribute the Classroom Activity Sheet: Measurement Scavenger Hunt to each student. Have students work in teams to answer all the questions on the sheet. Each student, however, should fill in his or her own sheet. Students should try to finish the sheet during one class period. As you observe students measuring in class, encourage them to estimate to help them find appropriate objects.
5. At the beginning of the next class, go over the answers to the questions on the Classroom Activity Sheet. Discuss with the class when it is useful to estimate and when it is important to know the exact measurement. For example, if you were trying to determine whether a chair would fit through a doorway, an estimate would probably be sufficient, but if you were cutting lumber for a house you were building, you would need to know exactly how long to cut the pieces.

Instruction:
Possible misconceptions:
Students may not know how to estimate or what a "unit" of measurement consists of. Keep prompting students to use the most appropriate unit for each thing they measure.

Questions to prompt students after the scavenger hunt:

1. Suppose there were no units for measuring length. Hypothesize how lengths might be described. Then discuss how measuring length would be different without inches. Finally, discuss why having a range of units for measuring length, such as inches and feet, to choose from is necessary.
2. Would you measure a pencil in feet? A hallway in inches? Discuss whether these approaches make sense or whether using different units would be better.
3. Hypothesize about the possibility of developing a new standard unit for measuring length. Plan the unit. Explain whether the unit would be shorter than 1 inch, between 1 inch and 1 foot, between 1 foot and 1 yard, between 1 yard and 1 mile, or longer than 1 mile. Express the unit in terms of inches, feet, yards, or miles. Debate the advantages of the new unit.
4. Discuss some careers in which being able to measure or estimate length is essential. Some examples are jobs in architecture and construction, interior design, and medicine.
5. Suppose you were asked to design a room for young people in a neighborhood community center. You would need to tell the planners how big the room should be, whether a basketball hoop should be installed, whether the room should be divided into different sections, how many gallons of paint would be needed to paint the space, and how many sheets of flooring would be needed. How would you go about making these decisions? Would you use estimation, measuring, or both? What would your plan look like?
6. State whether you agree or disagree with each of the following, and defend your position.

    - An estimate is not a guess.
    - If you can measure, why estimate?
    - Linear measurements are not useful in everyday life.

- Unless a measurement is exact, what good is it?

Assessment:
Use the following three-point rubric to evaluate how well students measure, how well they estimate, and how well they describe the strategies they used to solve the problems. Observing, the scavenger sheet and discussion will all be used to determine the number of points received.

- **Three points:** accurate measurements, sound judgment, and good understanding of linear relationships; reasonable estimates; communication of decisions about measuring or estimating length
- **Two points:** mostly accurate measurements, some judgment, and some understanding of linear relationships; somewhat reasonable estimates; some communication of decisions about measuring or estimating length
- **One point:** some accurate measurements and a basic understanding of linear relationships; a few reasonable estimates; communication of a few aspects of measuring or estimating length

References:

Bush, H. (2009). Assessing Children's Understanding of Length Measurement . *Teaching Children Mathematics* , 29 - 32.

L.Haury, D. (2003). Fundamental Skills in Science: Measurement. *ERIC Clearinghouse for Science Mathematics and Environmental Education* , 237-239.

Mailley, P. S. (2004). Inchworm and a Half: Developing Fraction and Measurement Concepts Using Mathematical Representations. *Teaching Children Mathematics* , 244 - 252.

Thompson, R. P. (April 2004, Volume 9, Issue 8). Integrating Measurement across the Curriculum. *Mathematics Teaching in the Middle School* , 436 - 441.