



Lesson Time: 15–20 minutes

How Do We Measure?

Objectives & Outcomes

Lesson Objectives: Students will explore the concept of measurement by creating their own measuring device for length and using it to make simple measurements. Students will understand the importance of standardization of measurement.

Lesson Outcomes: *Students will be able to...*

- use ordinary objects to make length measurements.
- devise conversions between systems of measurement.

Subject Area Connection: Math, Science

Background

Measurements are a part of our daily lives. We measure time, distance, mass, and volume several times a day. We use a variety of instruments to make these measurements: clocks, rulers, scales, and measuring cups. In this lesson, students will think deeply about a ruler, a measuring device most people take for granted. Students will collect data with their own measuring device. Through this exercise, they will become more aware of units and their significance.

“Measurements are a part of our daily lives.”

Introduction and Modeling

Begin the lesson by showing students a ruler. A ruler will typically have markings in both inches and centimeters. Discuss the units that they are familiar with when making length measurements. Tell students that in the past, measurements were made using a king’s foot as a “ruler.” Put students in pairs and have each group choose an object (such as a pen, pencil, piece of chalk) that they can use as their “ruler” to make measurements.

Getting Ready

Teacher Preparation: To prepare for this lesson, be sure there is room for students to move around the room so they can measure its length.

Materials Required:

- pen, pencil, chalk, or marker
- notebook or textbook
- paper to record measurements
- ruler with centimeter and inch markings

Key Vocabulary

SI System: (International System of Units) modern form of the metric system.

Procedure

1. Students create a name for their unit of measurement.
2. Students use their measuring device to find the length of a notebook or textbook. They should record their measurement on paper.
3. Students use their measuring device to find the length of the classroom. They should record their measurement on paper.
4. Encourage students to use various strategies to increase the accuracy of their measurements.
5. Students should use their measuring device to measure another group's book. They can then state a conversion between the two units of measurement. (This is similar to a conversion between inches and centimeters.)
6. Students can estimate the length of the room in the other group's units by using their length measurement and the conversion factor they determined in step 5.

Discussion Questions

- What difficulties did you encounter when measuring the notebook/textbook or the length of the room?
- What happens when you try to convert one unit of measurement to another?
- Why is it important to have standards in measurement?
- What advantages can you see to the SI measurement system?

Evaluation

Ask students to convert between the metric and Imperial system of units with the conversion $2.54 \text{ cm} = 1 \text{ inch}$. Provide them with rulers and ask them to measure the length of their index finger in inches and convert to centimeters. Then, ask them to measure their height in centimeters and convert it to inches.

Tips for Tailoring this Lesson

For Higher Grade Levels

- Students may repeat their measurements and take the average to improve accuracy.
- Students may use a set of paper rulers with an increasing number of increments to reflect upon the idea of accuracy when measuring.

For Lower Grade Levels

- Rather than use an ordinary object as a measuring device, students can work with a paper ruler that has fewer markings than a traditional ruler.
- Students can use a traditional ruler to see the comparison between centimeters and inches when making their measurements.

Alignment to Standards and Frameworks

Common Core State Standards: College & Career Readiness

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Anchor Standards for Speaking and Listening

CCRA.SL.1 Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

Anchor Standards for Writing

CCRA.W.7 Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.