

## The Metric System

A Position of the National Council of Teachers of Mathematics

### Question

What should schools teach about the metric and the customary systems of measure?

#### NCTM Position

Because the metric system is an effective, efficient base-ten measurement system used throughout the world, students need to develop an understanding of its units and their relationships, as well as fluency in applying it to real-world situations. At the same time, since some non-metric units of measure are still widely used in day-to-day life in the United States, American students also need to develop familiarity with these units of measure.

The International System of Units (SI) is the internationally recognized standard metric system. Worldwide, SI is the only measurement system used in science and the predominant system used in commerce. The United States is one of only three countries that have not officially adopted SI. The other two, Myanmar and Liberia, reportedly use SI as the predominant system in daily life and commerce. Among the countries that have officially adopted SI are some, such as the United Kingdom, that have retained some of their non-metric units of measure in everyday life.

Both NCTM Standards and the Common Core State Standards for Mathematics describe the need to organize curriculum to ensure that students become proficient in measurement. Students first need to develop a concept of the attribute to be measured (e.g., length, mass, volume, time, temperature) by comparing and ordering objects solely on the basis of that attribute. Then they should devise and apply nonstandard units to compare and order objects indirectly on the basis of the attribute. Finally, they should be introduced to standard units of measure (both SI units and non-metric units of measure commonly used in the United States) as a matter of (1) communication, ensuring a common understanding of the quantity of the attribute measured by all who use the same system of units, and (2) reliability, ensuring the equivalence of repeated measures of an object's attribute.

The learning goals for students include—

- knowledge of and ability to use referents, or benchmarks, in estimation;
- ability to make a reasonably accurate measurements of an attribute by using standard tools;
- ability to assess and select an appropriate unit for the type and size of the attribute being measured;
- ability to convert flexibly and fluently among commonly used units *within* a measurement system;
- knowledge of the role and implications of accuracy and precision in measurement; and
- ability to apply and operate on units of measure flexibly and fluently in the solution to problems.