Math Background

Metric Units of Measurement

Do as much of this unit as is necessary to meet important state and district goals. You may choose to just focus on a few core concepts like metric length and area.

Base Units of Measurement Metric units are derived from the base units meters, liters, and grams. Prefixes are used to name bigger and smaller units. Emphasis is placed on the metric units that are most commonly used in everyday life around the world and units with which students may already be familiar. For example, students may know about 2-L bottles or 10-km Olympic races or outdoor thermometers that display temperatures in Celsius degrees.

Units of Length or Distance and Derived Units Common benchmarks can help students have a feel for the sizes of metric units. One meter is a little more than one yard. Things that are typically measured in yards, such as lengths of rope and heights of mountains, are also measured in meters. Bigger lengths, such as distances between cities, are measured in kilometers. Smaller lengths, such as the length of a pencil, are measured in centimeters, and very small lengths are measured in millimeters.

Just as area can be measured in square inches, square feet, square yards, and square miles, area in the metric system can be measured in square centimeters, square meters, and square kilometers. Volume in the metric system is measured in cubic units such as cubic centimeters or cubic meters.

Units of Capacity Capacity is a measure of volume usually associated with liquids or with containers that hold liquids. One liter is a little more than one quart. Bottled water, juices, and carbonated drinks often come in one-liter or two-liter containers. Smaller quantities of liquids are typically labeled in milliliters. Milliliters and grams are used in this country for prescriptions.

Units of Mass (or Weight) Weight is dependent on the effects of gravity, but mass is a measurement independent of gravity. A person who weighs 150 pounds on Earth weighs less on the moon, but still has the same mass. Because we all live on Earth, we can talk in everyday terms about something "weighing 100 grams." One gram is a very small unit. A paper clip or peanut weighs about one gram.

The metric system unifies all of these units. One milliliter of water has a mass of one gram and occupies a volume of one cubic centimeter.

Units of Temperature By definition, water boils at 100°C and freezes at 0°C. There are conversion equations for changing Fahrenheit temperatures to Celsius and vice versa. However, they are not easy to calculate mentally. A rough estimate can be made by multiplying a Celsius temperature by two and adding 30.

The best way for students to become comfortable with both scales is to relate them to common experiences. For example, a hot day of about 95°F is about 35°C. Sweater or light jacket weather of about 60°F is about 16°C. Snow is likely to fall and stay on the ground at about 25°F or –4°C.