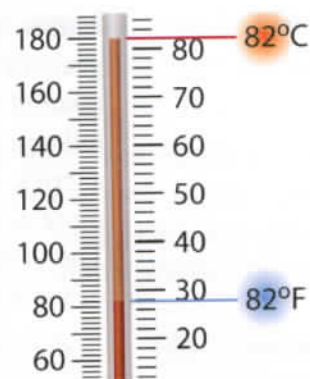




Measurements and units

Why units are necessary

In science, it is often not enough to say, “it’s hot”. Scientists want to communicate precisely how hot. To describe how hot it is you might say 82 degrees Fahrenheit (82°F). The value 82°F has two parts: a number (82) and a unit (°F). The number tells you how much and the unit tells you what the number means. One without the other can lead to big mistakes. If you say 82 degrees without specifying the unit of Celsius or Fahrenheit, a person from Canada might think you mean 82 Celsius (82°C) which is 180°F. 82°C would be fatal, while 82°F is comfortable for the beach!



Kinds of units you use in chemistry

To understand chemistry, you need to speak the language of units. Just about everything that can be measured has its own unit. Below are some of the ones that are most useful.

TABLE 1.1. Some Units in Chemistry

Unit	Used for	Unit	Used for
Celsius degree (°C)	temperature	meter (m)	length
Fahrenheit degree (°F)	temperature	centimeter (cm)	length
kilogram (kg)	mass	mole (M)	counting atoms
gram (g)	mass	joule (J)	energy
liter (L)	volume	watt (W)	power
milliliter (mL)	volume	Pascal (P)	pressure
second (s)	time	atmosphere (atm)	pressure

Quantities have more than one unit

Notice that there is more than one unit for the same quantity. Your laboratory balance will measure mass in grams. A graduated cylinder measures volume in milliliters. A stopwatch measures time in seconds.

Definition of measurement

When you put a substance on a balance, you are making a **measurement** of its mass. A measurement is a specific kind of information that describes a physical quantity with both a number and a unit. The value 105.4 grams is a measurement because it has a number (104.5) and a unit (grams) that describe a real, physical quantity.



Chemistry terms

measurement - information that describes a physical quantity with both a number and a unit.