

Measurement

How do we measure, with accuracy, in science?



Phenomenon: Measurement



Measurement

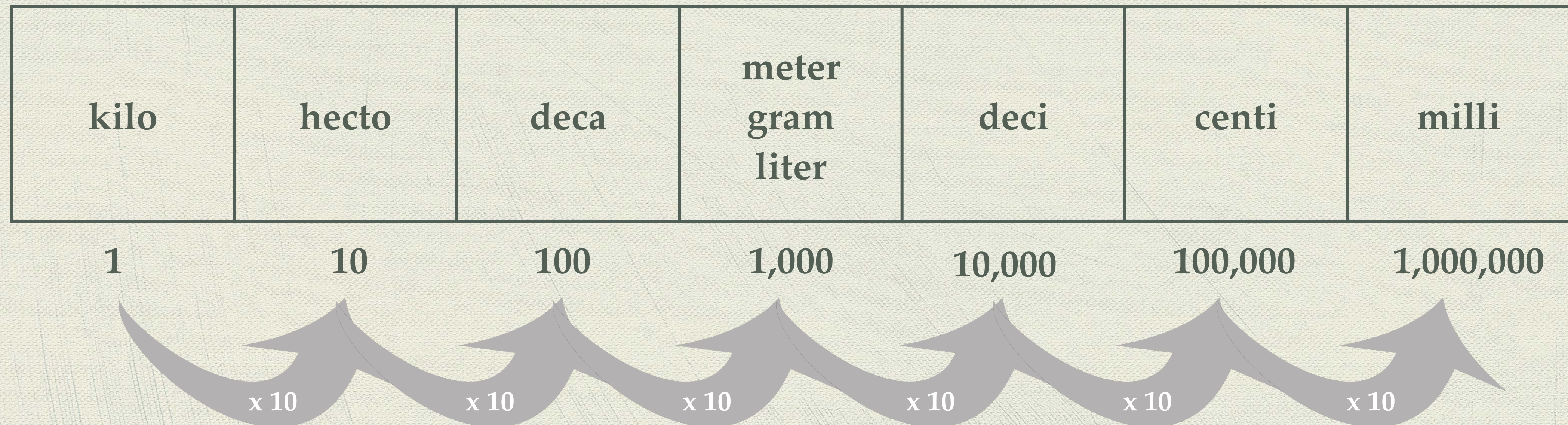
- ◆ Measurement - a comparison with a known standard which has the same meaning to everyone
 - ◆ Must include a number and a unit

Measurement

- ◆ US Customary Measure - system of measure used in the US that uses inches, feet, pounds and fluid ounces for units
- ◆ Metric System - international decimal system for measure that uses meters, grams and liters for units

Measurement

- ◆ Prefixes of the metric system are based on powers of 10
- ◆ Each step is either 10 times larger or ten times smaller



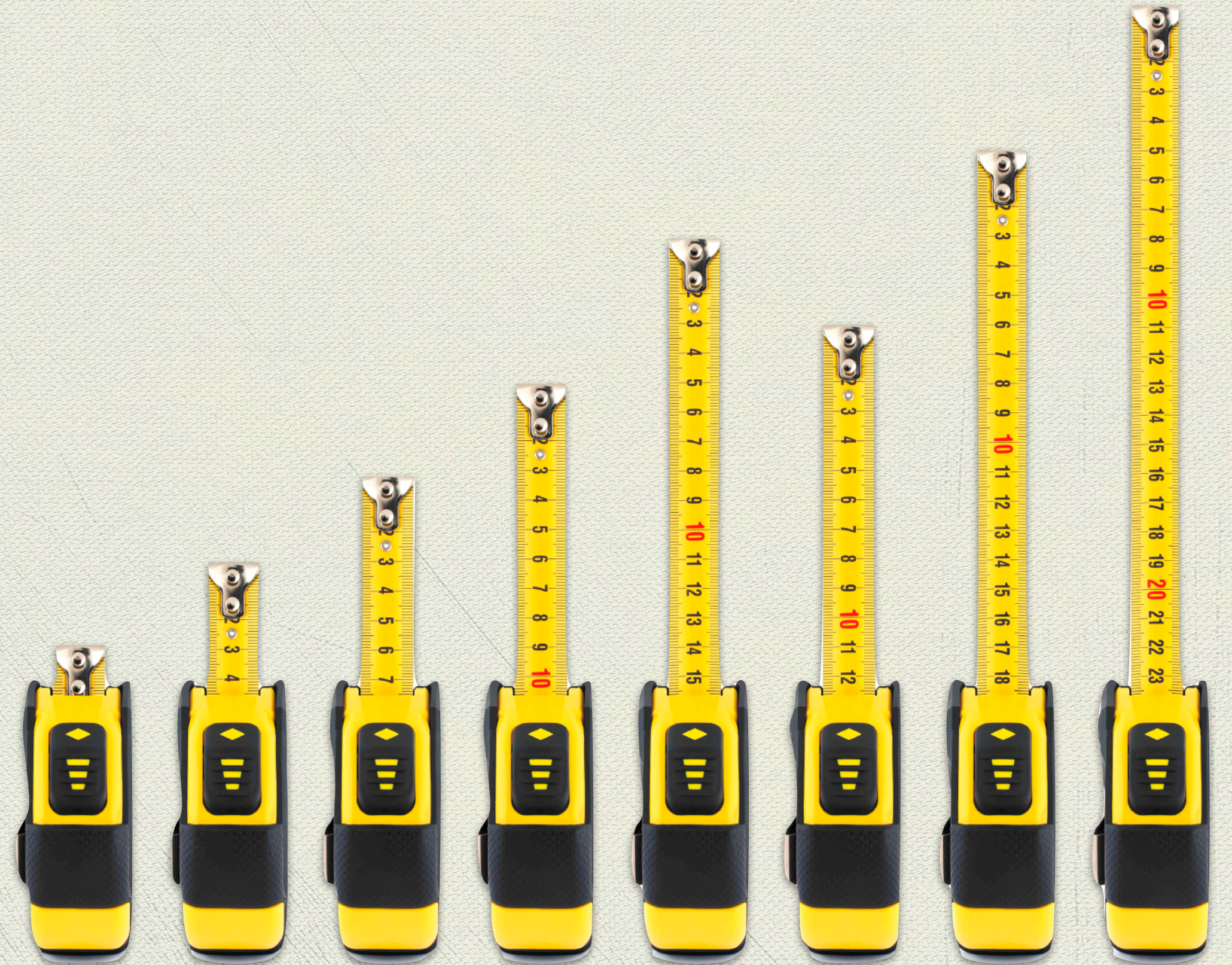
Measurement

- When using the Metric System for all conversions, each “step” you move is either 1 decimal point to the right or one decimal point to the left

kilo	hecto	deca	meter gram liter	deci	centi	milli
0.001	0.01	0.1	1	10	100	1000

Measurement

- ◆ Length - extent of something from end to end
 - ◆ Instrument: ruler
 - ◆ Units: meter [m]



Measurement

- ◆ Mass - amount of matter in an object
 - ◆ Instrument: electronic balance
 - ◆ Units: grams [g]
 - ◆ Rounding: tenths place

43.8 g



Measurement

- ◆ Weight - the force that gravity exerts upon a body
 - ◆ Instrument: scale
 - ◆ Units: pounds [lbs.]



Measurement

◆ Measuring Weight

Mr. Leigh's Weight Around Our Solar System				
Earth	Moon	Mars	Saturn	Jupiter
185 lbs.	30 lbs.	70 lbs.	196 lbs.	437 lbs.

Measurement

- ◆ Volume - amount of space an object occupies
- ◆ Displacement - the volume of fluid that is displaced when an object is submerged

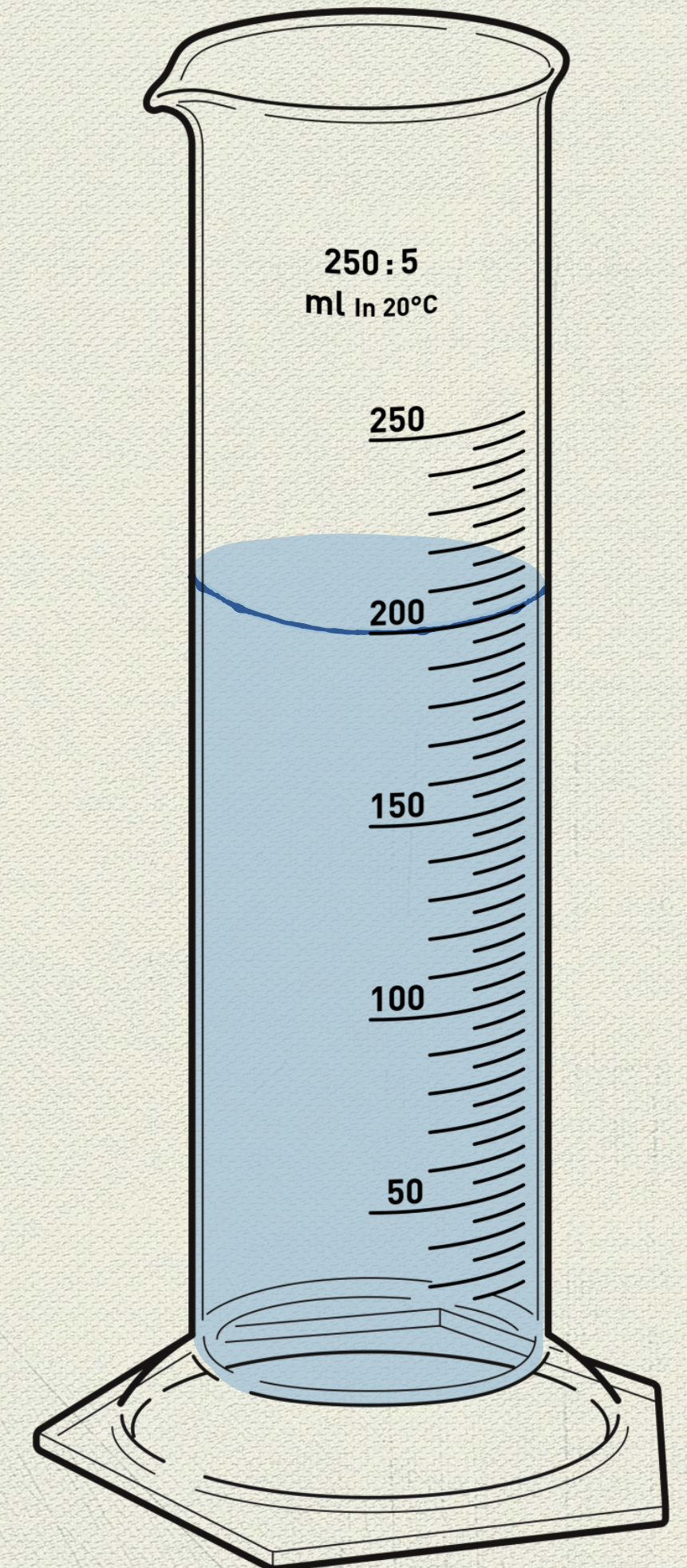


Archimedes

Measurement

◆ Measuring Volume

- ◆ Instruments: graduated cylinder
- ◆ Units: milliliters [ml]



Measurement

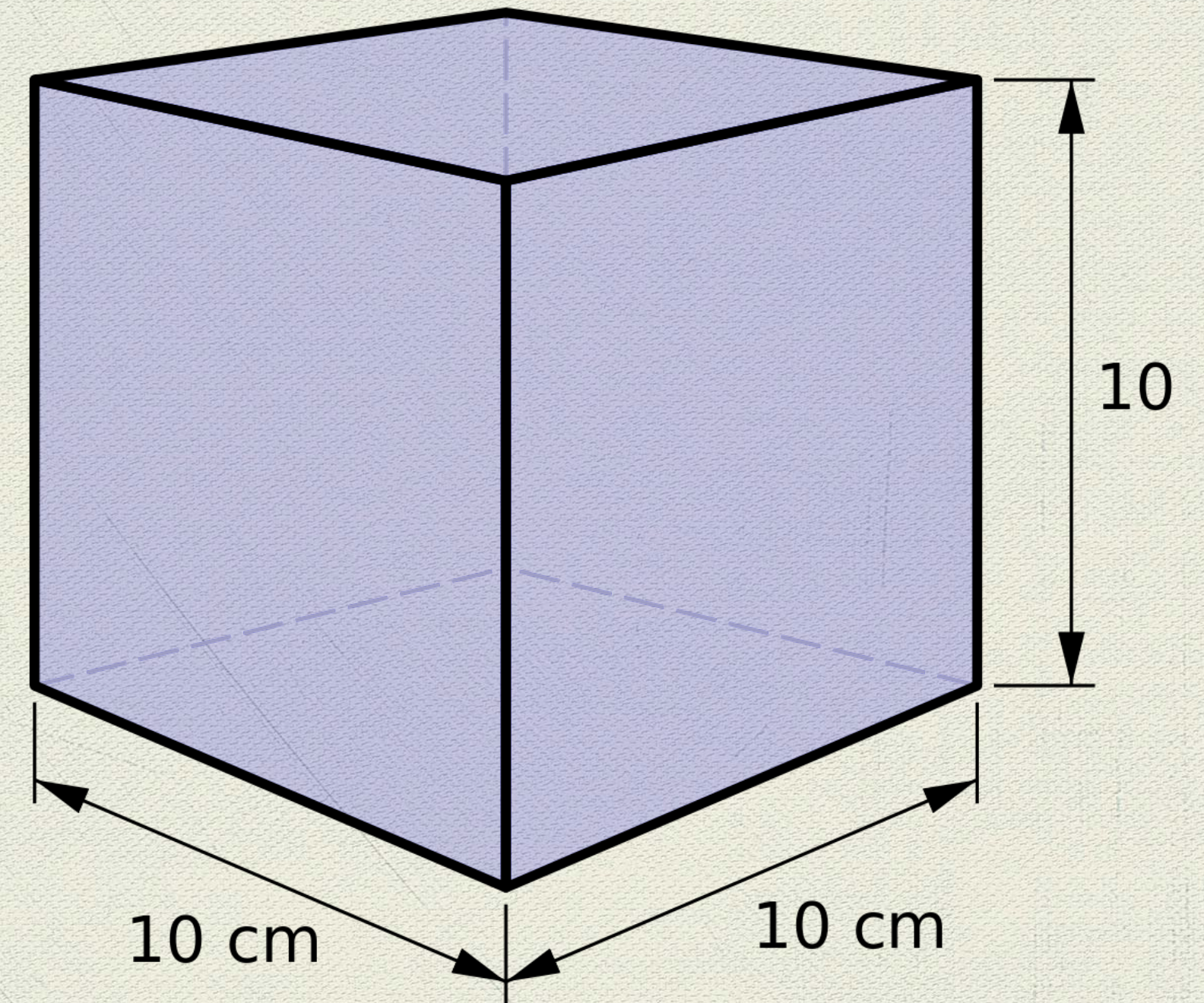
◆ Calculating Volume

◆ Formula: $V = L \times W \times H$

◆ Units: cm^3

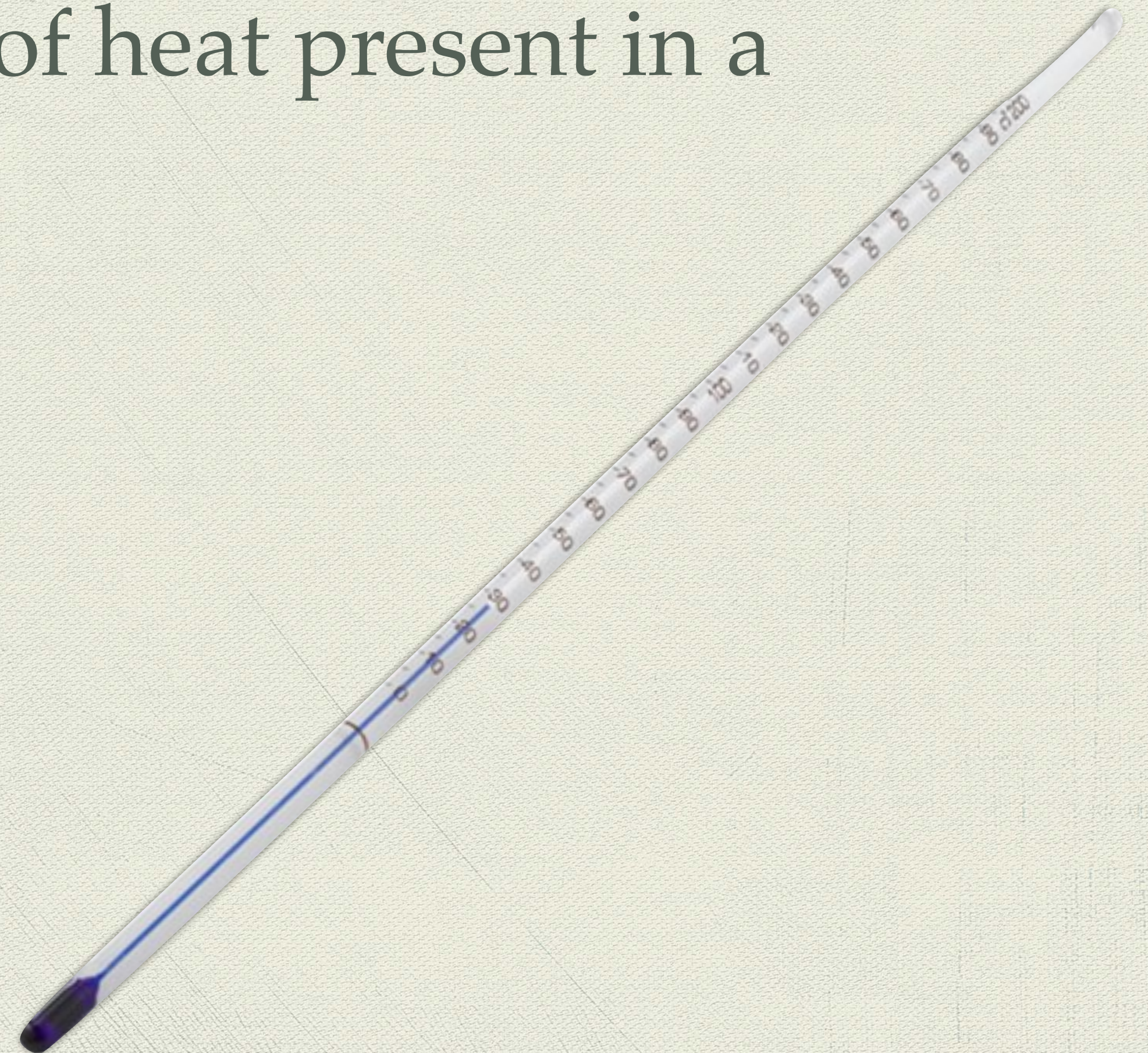
◆ Rounding: tenths place

1000.0 cm^3



Measurement

- ◆ Temperature - degree or intensity of heat present in a substance or object
 - ◆ Instrument: thermometer
 - ◆ Units: Celsius [$^{\circ}\text{C}$]



Measurement

- ◆ Air Pressure - force exerted by air
 - ◆ Instrument: barometer
 - ◆ Units: millibars [mb]



earthtoleigh.com