

Thermal Energy and Heat

Temperature and Temperature Scales





What is temperature??



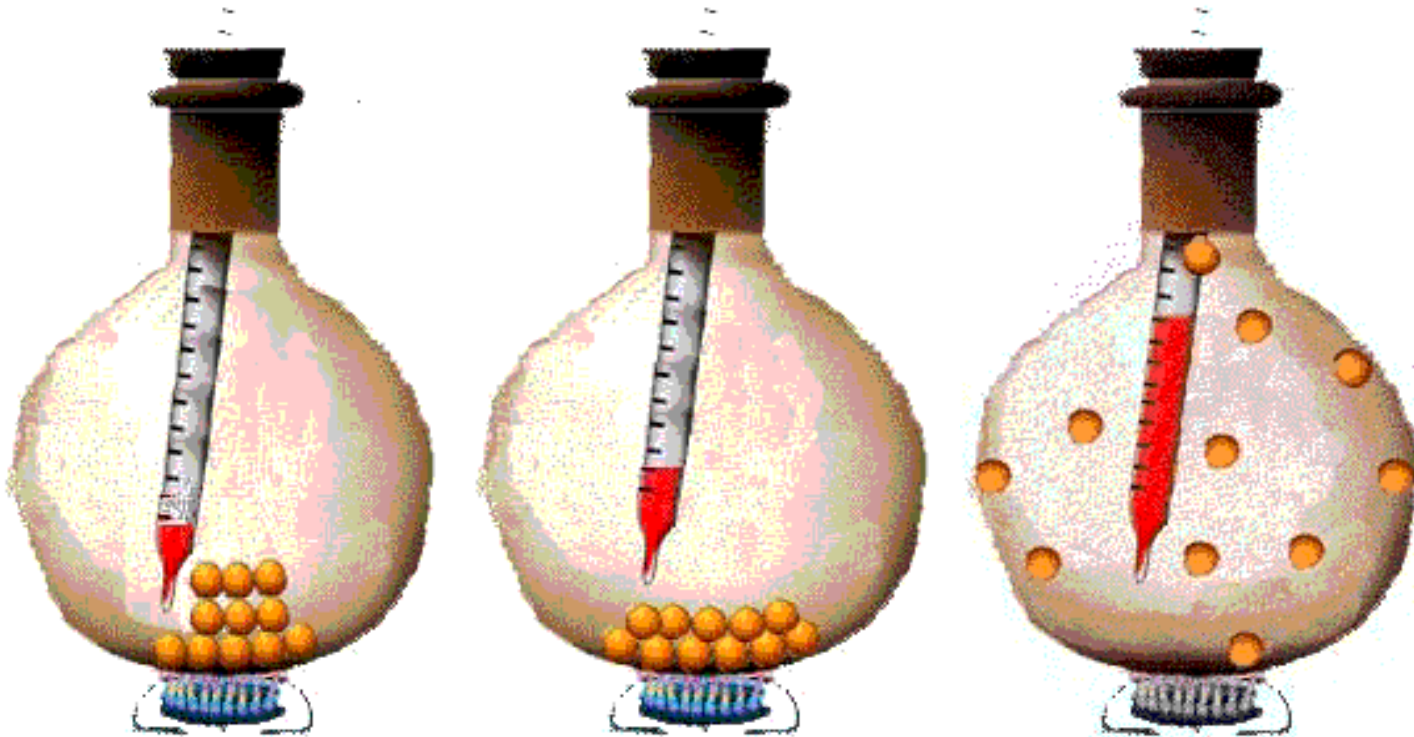
Temperature – the measure of the *average* energy of the particles in a substance.



In a warm drink like hot chocolate...

- some of the particles have a lot of *energy* and are moving *fast*
- some of the particles have very little energy and are moving *slowly*
- most of the particles are somewhere in between

The actual temperature will be an average of all of that energy in the substance.

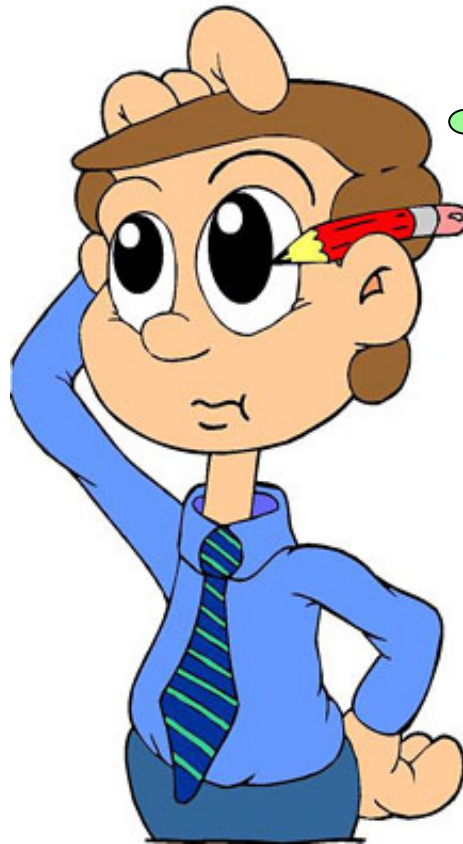




Why is temperature important?

What is the temperature outside right now?

Could I describe the temperature without numbers?





Three Buckets Challenge



Warm Water



Cold Tap Water



Ice Water



Three Buckets Challenge

Step 1

Place your right hand in the ice water and your left hand in the warm water for 30 seconds.

What are you feeling in relation to temperature in your right hand?

What are you feeling in relation to temperature in your left hand?

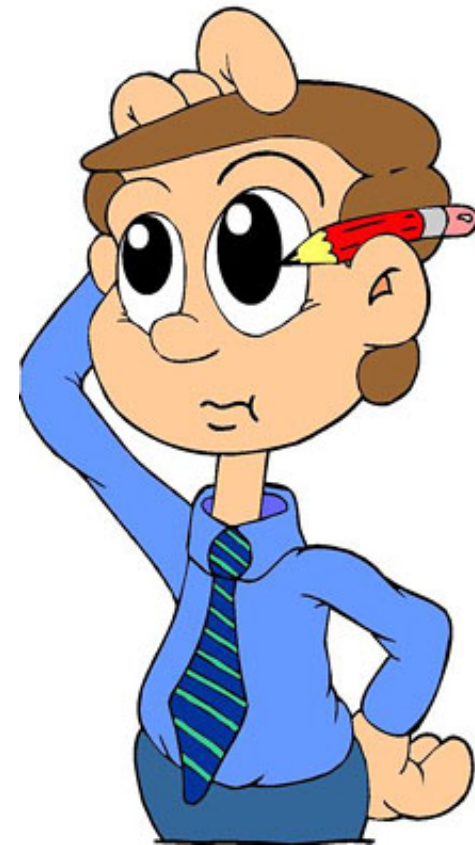
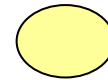
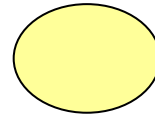
Step 2 place both hands in the cold tap water for 30 seconds.

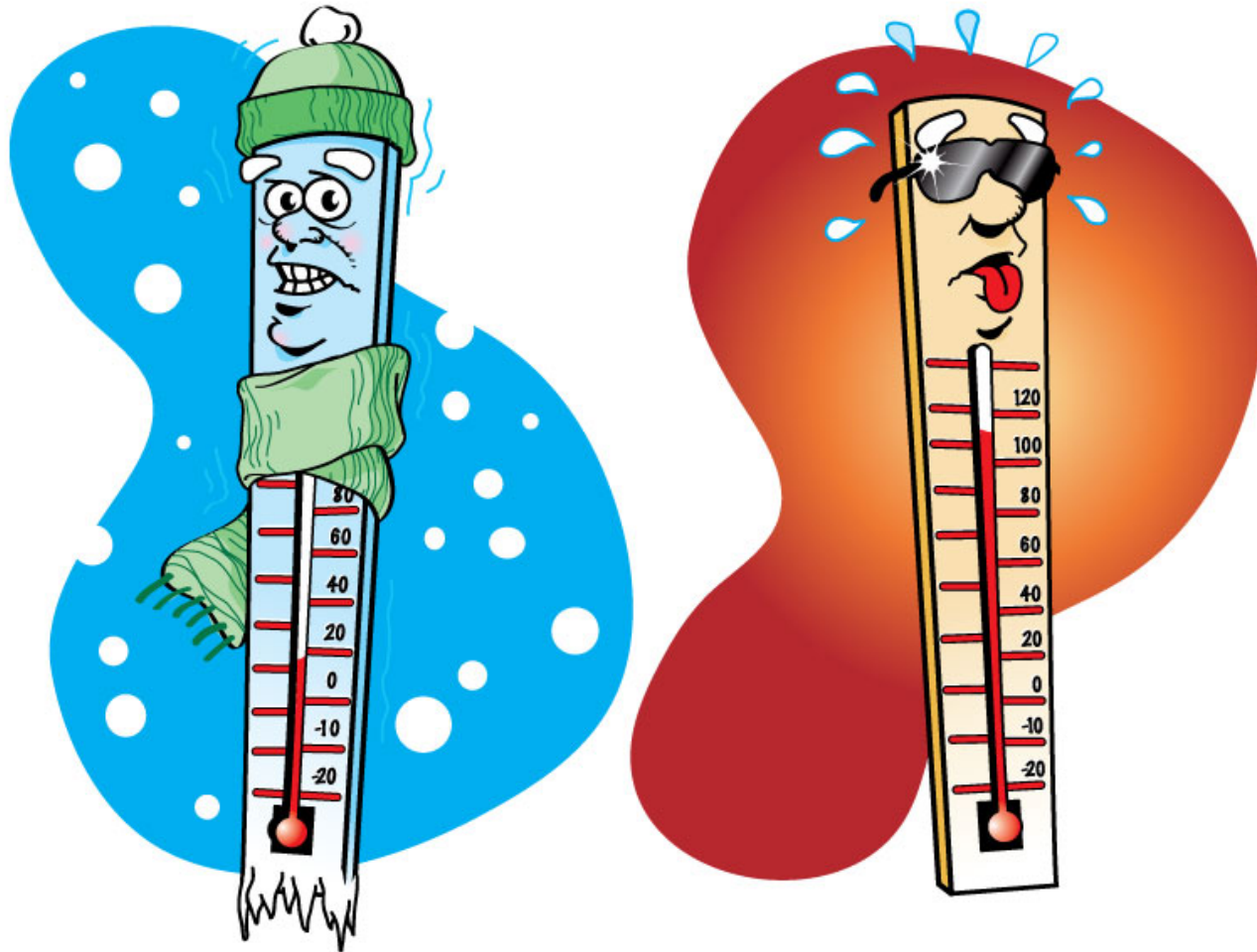
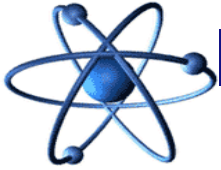
What are you feeling in relation to temperature in your right hand?

What are you feeling in relation to temperature in your left hand?



**How can we
remove the
confusion?**





A Thermometer is a device used to measure temperature.



First Thermometers





Temperature Scales

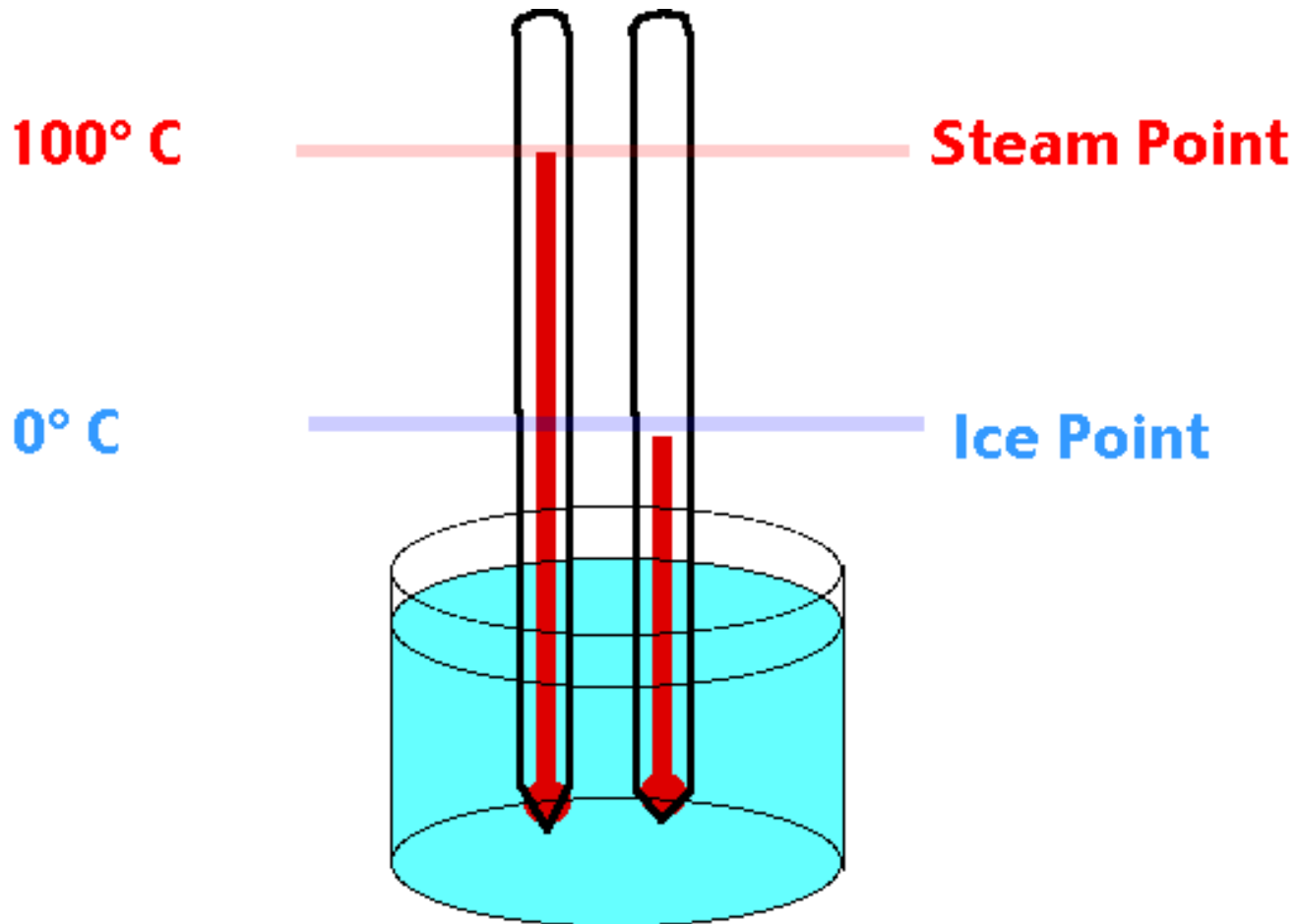
The temperature scale used in Canada to measure temperature is the Celsius Scale (symbol °C).

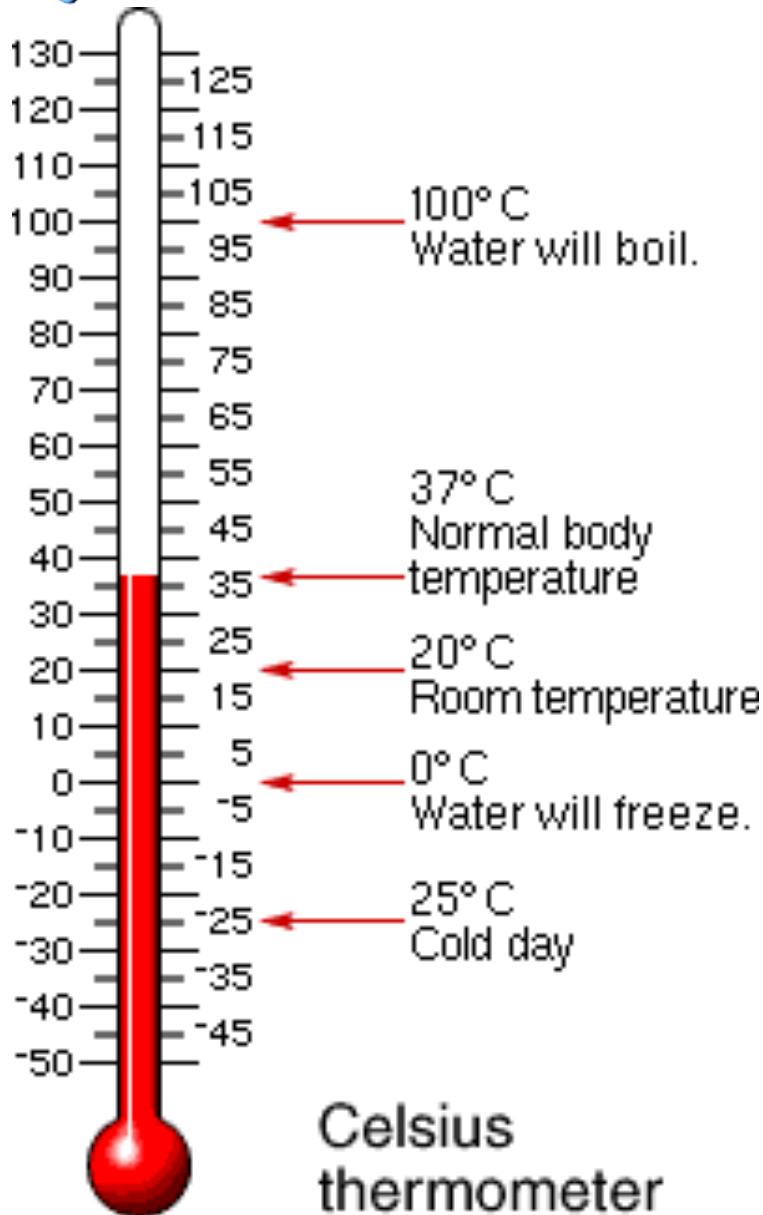
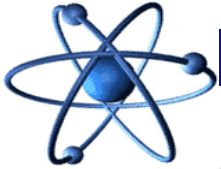
It is named after Anders Celsius, the Swedish scientist who invented it.





He used the freezing point and boiling point of water at sea level for his measurements of zero and 100. He then divided the area between these two points equally.



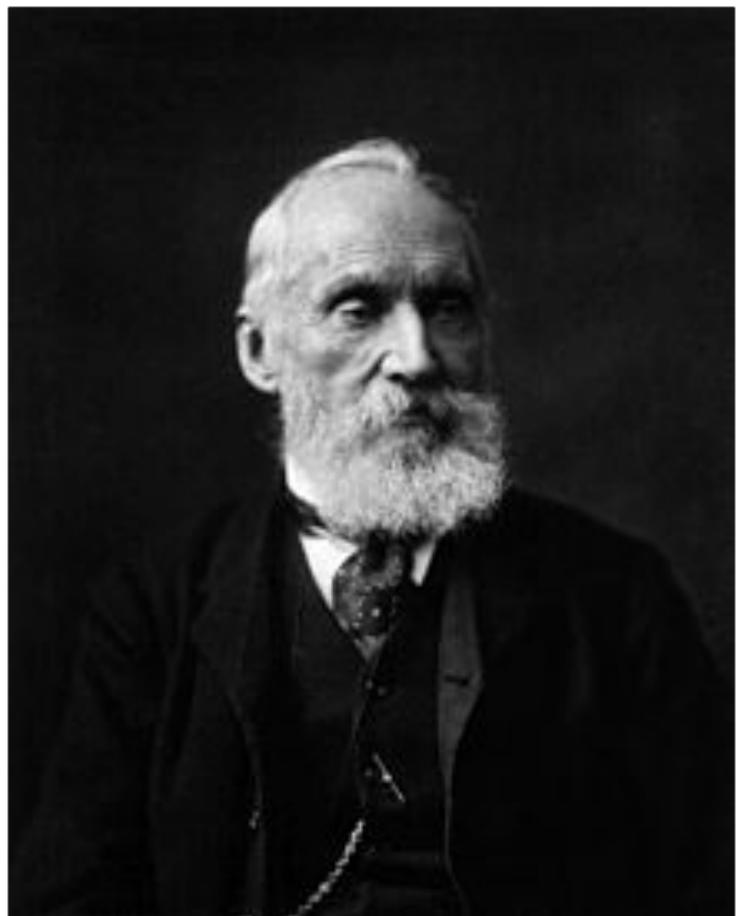


He calibrated, or set, his thermometer this way so that he, and others, could accurately and repeatably measure temperature.



The temperature scale used in the United States is the Fahrenheit scale (symbol $^{\circ}\text{F}$) which is calibrated differently.

The Fahrenheit scale based on one proposed in 1724 by the German physicist Daniel Gabriel Fahrenheit (1686–1736), after whom the scale is named. He chose 0°F based on the coldest day in his home town.



The Kelvin scale (symbol K) is a temperature scale that use absolute zero as its lowest measuring point, the temperature at which all motion stops.

The Kelvin scale is named after the Belfast-born, Glasgow University engineer and physicist William Thomson, 1st Baron Kelvin (1824–1907).



Temperature Scales Compared

