Thermodynamics

Usually I have you start with electricity (dryer room)

We're going to start with Thermodynamics instead.
$\Rightarrow$ Good inductive/deductive skills development.

Thermodynamics – study of Temperature, Internal Energy, Energy
Transfer, State Change $\Rightarrow$ Laws of Thermodynamics

As usual, the fun stuff to study is how quantities change.
- In mechanics $\rightarrow$ could <u>see</u> the changes (position, velocity, etc.)
- In thermo. $\rightarrow$ can't see <u>most</u> changes (1 exception – Vol. of gas)
  - $\Rightarrow$ need to <u>measure</u> quantities indirectly.
    - Thermometers
    - Pressure sensors
  - $\Rightarrow$ or <u>calculate</u> quantities indirectly.
    - Internal Energy
    - Energy Transfer (Work, Heat)

Unit 16.1

Today – Look at:
- – Temperature
- – Temperature scales
- – How to measure temperature
- – Factors that affect accurate temperature measurements
  - $\Rightarrow$ Qualitative look at factors involved in temperature <u>changes</u>.

Unit 16.2

Just need a <u>simple</u> definition of how a glass bulb thermometer works.

Unit 16.3

There are 4 temperature scales in common use.

-     Celsius, Fahrenheit $\Rightarrow$ Relative Scales
-     Kelvin, Rankine $\Rightarrow$ Absolute Scales
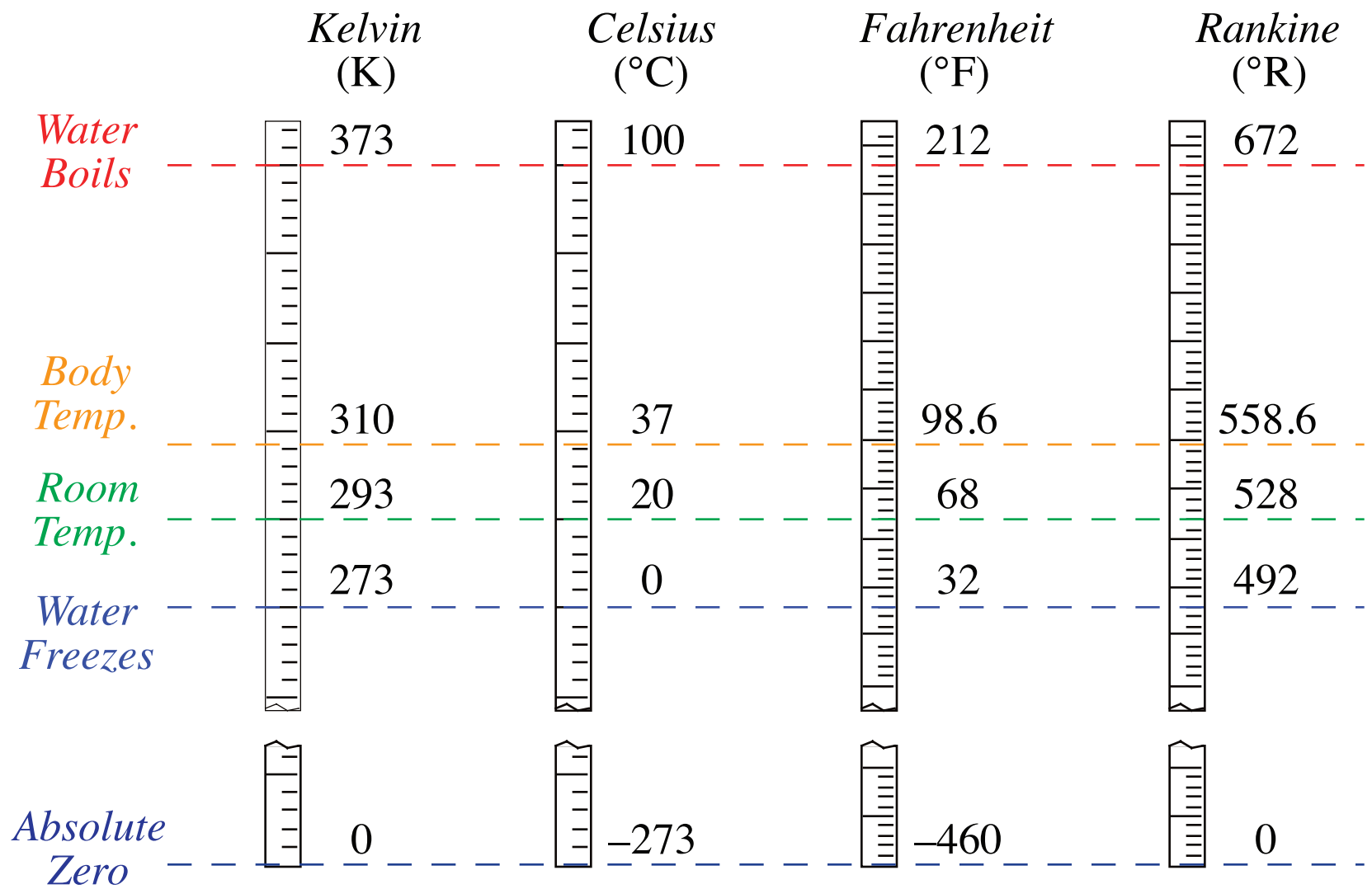
Units for temperature are degrees + scale used.

-     1 exception: Kelvin $\rightarrow$ no degrees, just the scale.

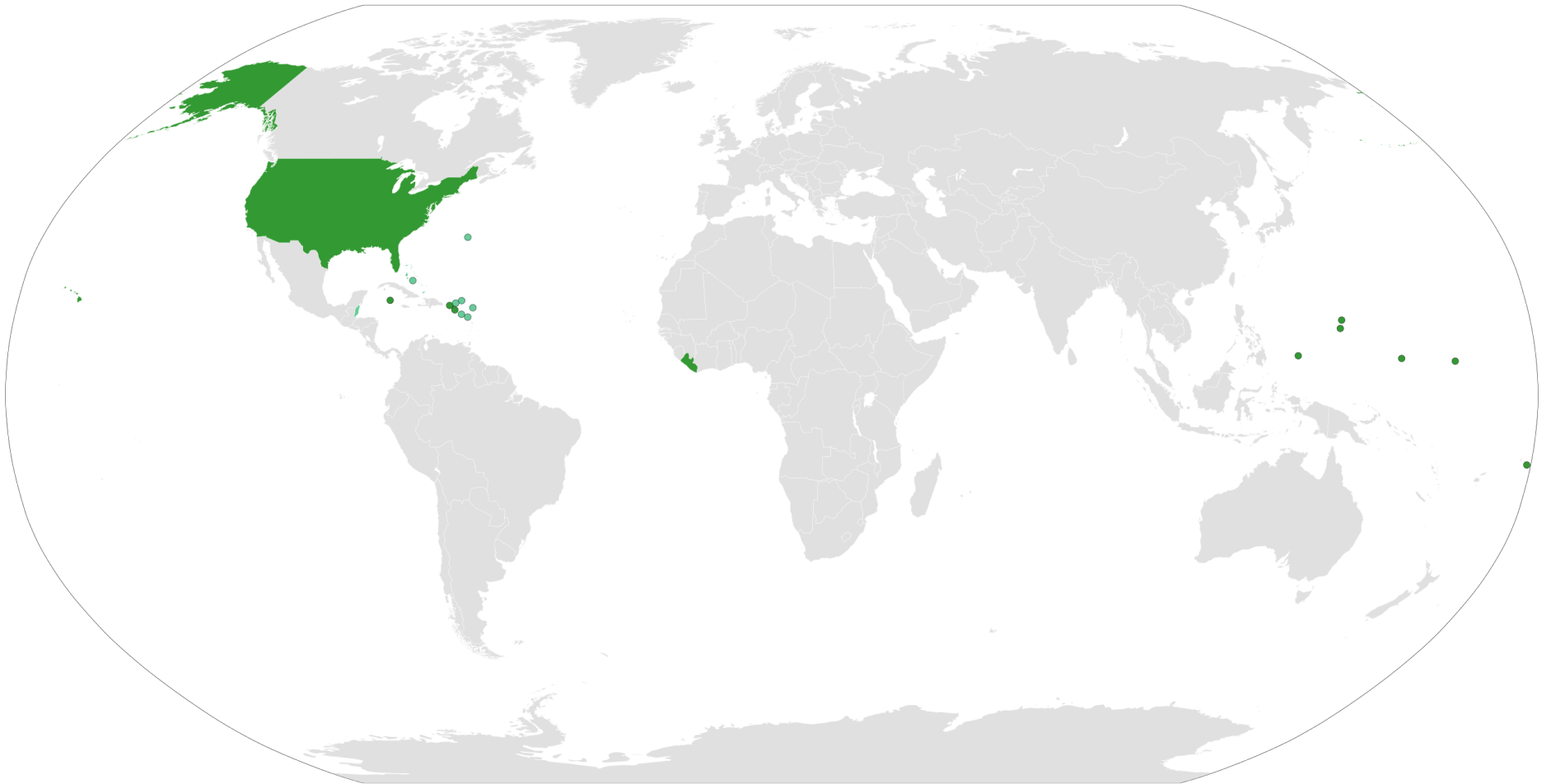Defining a temperature scale is somewhat arbitrary, but the fixed points must be repeatable.

-     You will define and create your own temperature scale.

Conversions between scales:

-     °F & °C are relative scales – slope and constant term.
-     Be careful to include units of slope and constant term.

	Kelvin (K)	Celsius (°C)	Fahrenheit (°F)	Rankine (°R)
Water Boils	373	100	212	672
Body Temp.	310	37	98.6	558.6
Room Temp.	293	20	68	528
Water Freezes	273	0	32	492
Absolute Zero	0	−273	−460	0

Most of the world is metric and uses the Celsius temperature scale.

Unit 16.4, 16.5

We want the most accurate temperature measurements we can get.

- Good calibration of an electronic temperature sensor.

- Look at factors that affect temperature measurements.