Warm Up – Dimensional analysis

- Convert 5820 hours into weeks using the Picket Fence Method

$$24 hr = 1 day$$
$$7 days = 1 week$$

$$\frac{5820\ hr\ \vert\ 1\ day\ \vert\ 1\ week\ \vert}{\quad\quad\ \vert\ 24\ hr\ \vert\ 7\ days\ \vert}$$

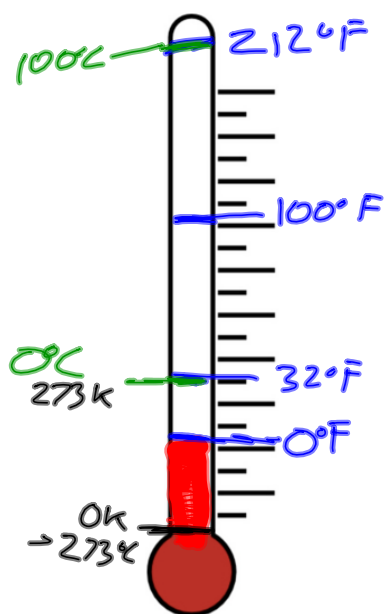$$= \frac{5820 \cdot 1 \cdot 1 \cdot week}{24 \cdot 7} = \boxed{34.6\ weeks}$$

Temperature

Thermal Energy: Movement of Molecules, Kinetic Energy

Temperature: the <u>measurement</u> of the average kinetic
energy of the matter in a substance

High temp = more movement

low temp = less movement

Thermometer:

Heat → molecules move
faster. → take up
more space and expand
up the thermometer

100C — 212°F

0C
273k — 32°F

— 100°F

— 0F

0k
→273c

<u>Fahrenheit</u>: Based on weather

coldest day of winter = 0°F

hottest day of summer = 100°F

Water freezes at 32 °F

water boils at 212 °F

Celsius: is based on water

water freezes = 0

Water boils = 100

Absolute Zero:

-273 C = 0K

Kelvin: temperature scale based on absolute zero

Conversions

$$F = 9/5\ C + 32$$

$$C = 5/9\ (F - 32)$$

$$K = {}^\circ C + 273$$

- You are doing a science experiment with a Fahrenheit thermometer. Your data must be in degrees Celsius. If you measure a temperature of 125°F, what is this temperature in degrees Celsius?
  - « 57.1 ˚C

- The temperature on the Moon varies from 230°C at night to 120°C during the day. What is the range in temperatures on the Moon in degrees Fahrenheit?
  - « -382 ˚F to 248°F

Warm up:
- Find the average and uncertainty of the temperature in degrees Fahrenheit, then convert the average to Kelvin.
  - $> \dfrac{65.4°F, + 72.9°F, + 68.1°F, + 67.3°F}{4}$

$= 68.425$

$\dfrac{72.9°F - 65.4°F}{2} = 3.75 \Rightarrow\ 4$

$68.\cancel{425} \pm 4$

$\rightarrow 68°F \pm 4°F$
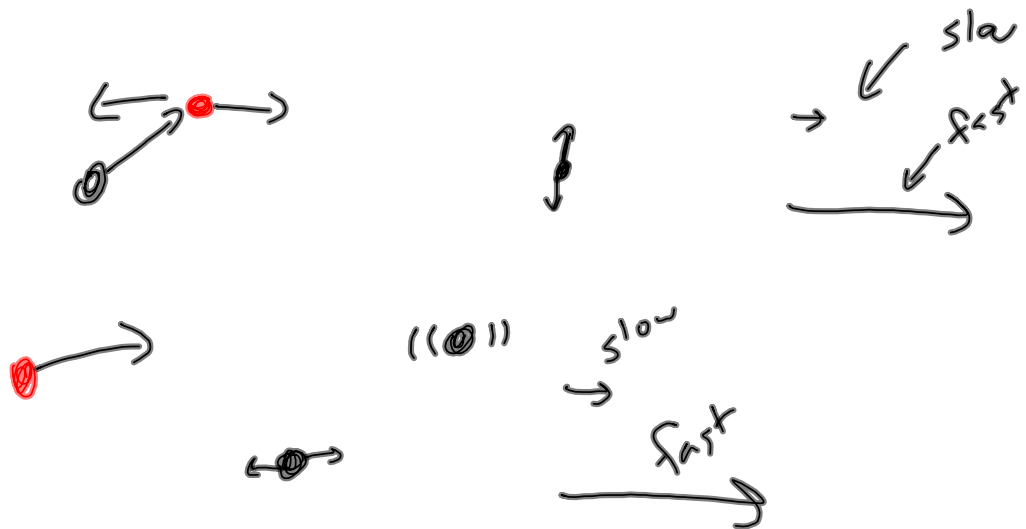
$F \rightarrow C$

$C = (68 - 32)\left(\dfrac{5}{9}\right)$

$C = 20°C$

$C \rightarrow K$

$K = 20°C + 273$

$K = 293\ K$

Kinetic Molecular Theory:

The way we describe the motion of individual particles and how they interact with one another in a substance.

- Topics
    - > 1. Kinetic Theory of Solids
    - > 2. Kinetic Theory of Liquids
    - > 3. Kinetic Theory of Gasses
    - > 4. Plasma
    - > 5. Oobleck

- Info to Organize on your white board:
    - > Position/organization of the particles
    - > Movement of the particles (individually and/or relative to one another)
    - > Compressibility
    - > Shape