

## Gas Laws

**Particle Model**—see separate note sheet—and understand!

You should not overinflate a bicycle tire or discard an aerosol can in an incinerator because...

\_\_\_\_\_ because \_\_\_\_\_

\_\_\_\_\_

### **Kinetic Molecular Theory (KMT) Postulates for *Ideal* Gases**

1. Gases are composed of a large number of particles that behave like hard, spherical objects in a state of **constant, random motion**.
2. These particles move in a **straight line** until they collide with another particle or the walls of the container-- \_\_\_\_\_
3. These particles are much smaller than the huge distances between particles--therefore we ignore the volume of the particles themselves--and say they occupy no volume-- \_\_\_\_\_

Most of the volume of a gas is therefore empty space.

4. There is **no force of attraction** between gas particles or between the particles and the walls of the container-- \_\_\_\_\_
5. **Collisions** between gas particles or collisions with the walls of the container are perfectly **elastic**. None of the energy of a gas particle is lost when it collides with another particle or with the walls of the container--ask Ms. Cormier.

## Air

- 78 % \_\_\_\_\_ and 21 % \_\_\_\_\_ and
- Supposed to be a homogeneous mixture ( \_\_\_\_\_ )

## **\*\*Air Pressure\*\***

- is caused by \_\_\_\_\_

\_\_\_\_\_

Why does this room not collapse into itself? \_\_\_\_\_

\_\_\_\_\_

**Butter Demo—sketch!** Ms. McRae's arm with 1 square inch (2.54 cm x 2.54 cm)

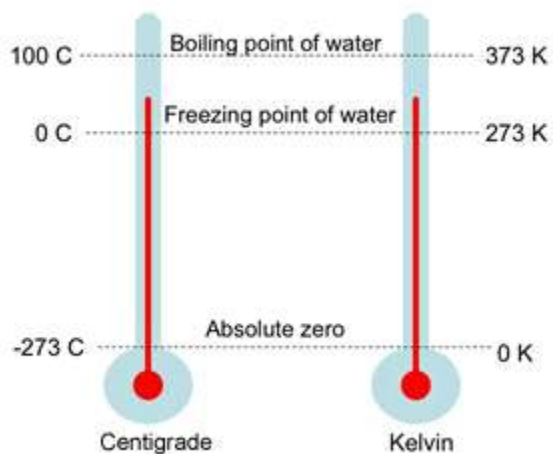
**Sea Level Air Pressure and Units—memorize**

\_\_\_\_\_ = \_\_\_\_\_ = \_\_\_\_\_ = \_\_\_\_\_ = \_\_\_\_\_

## **\*\*Temperature\*\***

- is a measure of \_\_\_\_\_
- 

### **Converting °C to K**



### **Formula**

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

**STP**—standard temperature and pressure

\_\_\_\_\_ and \_\_\_\_\_

**SATP**—standard ambient temperature and pressure

\_\_\_\_\_ and \_\_\_\_\_

## Gases

- can be made of molecules or atoms
- can be real or *Ideal*
- real gases behave like Ideal gases under high T and low P conditions

Michael Mombourquette, Chemistry Professor at Queen's University at Kingston (1996-present)

A real gas has molecules that have a non-zero volume and have intermolecular forces that are also not zero. An ideal gas has molecules of zero size and zero intermolecular forces. If the real gas is low pressure and reasonably high temperature then it will behave like an ideal gas in that our measuring equipment will not be accurate enough to measure a difference. As the pressure gets higher or the temperature gets low enough, the differences between an ideal gas and a real gas become measurable.

**Hydrocarbons**--fossil fuels--can be gases, liquids (gasoline) or solids (waxes).

Formula	Name	State
CH <sub>4</sub>	_____	gas
C <sub>2</sub> H <sub>6</sub>	_____	gas
C <sub>3</sub> H <sub>8</sub>	_____	gas
C <sub>4</sub> H <sub>10</sub>	_____	gas
C <sub>5</sub> H <sub>12</sub>	_____	liquid
C <sub>8</sub> H <sub>18</sub>	_____	liquid
C <sub>18</sub> H <sub>38</sub>	_____	solid

Explain why there is a change from gas to solid.

**Your Task: Determine the mass of air in this room!**

- 1) **Collect data in a data table**
- 2) **Show all calculations with units.**