Unit 10 - Kinetic Molecular Theory Notes

Kinetic Molecular Theory

- KMT describes the behavior of gases in terms of _____ in _____.
- It makes the following assumptions about gases:
  - Particle _____
  - Particle _____
  - Particle _____

  Gas in a _____ _____ (closed system)

A. Gases are composed of particles that:
  - Occupy virtually no _____
  - Are _____ apart from each other
  - Its volume is made up of mostly _____ _____

B. Gas molecules are in _____, _____, _____ straight-line motion

C. Collisions between gas molecules are _____.
  - No _____ of motion (i.e. _____ _____) is lost
  - No _____ is lost
  - The molecules are not _____

D. Gas particles do NOT _____ or _____ each other

E. All gases have the same _____ kinetic energy at a given _____
  - *Average KE of gas molecule is directly proportional to the Kelvin temperature of gas (K).*

Units

- Temperature ➪ _____
- Pressure ➪ _____, _____, _____ of _____
- Volume ➪ _____, _____, _____, _____

Gas Pressures

- When gas particles collide with the walls of their container, they exert _____ on the walls.
- Pressure is _____ per unit area
- Pressure exerted by particles in the atmosphere that surrounds Earth is called _____ pressure, or air pressure
  - Varies at _____ locations

Devices Used to Measure Pressure

- A _____ measures the pressure exerted by the _____
- The _____ of the mercury column measures the pressure exerted by the atmosphere.
- The _____ pressures occur at the _____ altitudes.
  - If you go up a mountain, atmospheric pressure _____
- Standard atmosphere (atm) supports a _____ mm column of _____
  - 1 _____ = 760 _____ _____
- SI unit for measuring pressure is _____ (_____)
- Equivalent pressure units:
  - 1 atm = 760 mm Hg = _____ psi = _____ kPa

How are number of particles and gas pressure related?

- The more often gas particles _____ with the walls of the container, the greater the _____.
  - More _____ _____ = More _____
- Pressure is directly _____ to the _____ of particles
  - _____ the number of gas particles in a basketball _____ the pressure

How are temperature and gas pressure related?

- At _____ temperatures, the gas particles have _____ kinetic energy.
  - Move faster and _____ with the walls of the container _____ often and with _____ force, so the pressure _____
- If _____ of container & particles of gases are NOT changed (stay constant):
  - Pressure of gas _____ with direct proportion to _____ (in Kelvin)

Summary:

Factors Affecting Gas Pressure

A. Amount of Gas
   1. ⇑ molecules = ⇑ collisions with walls = ⇑ pressure
   2. ⇓ molecules = ⇓ collisions with walls = ⇓ pressure

B. Volume
   1. ⇑ volume = ⇑ surface area = ⇓ collisions *per unit of area* = ⇓ pressure
   2. ⇓ volume = ⇓ surface area = ⇑ collisions *per unit of area* = ⇑ pressure

C. Temperature
   1. ⇑ temperature = ⇑ molecule speed = ⇑ frequent (and harder) collisions = ⇑ pressure
   2. ⇓ temperature = ⇓ molecule speed = ⇓ frequent (and softer) collisions = ⇓ pressure