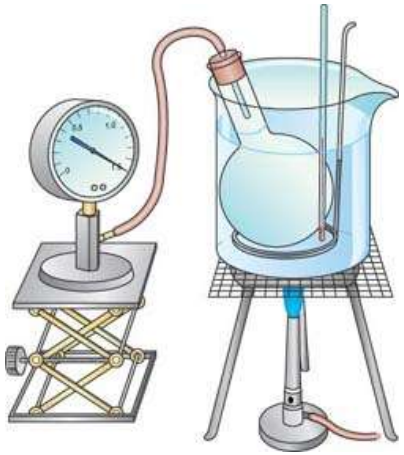
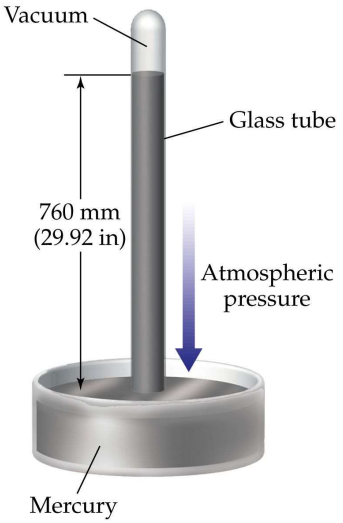
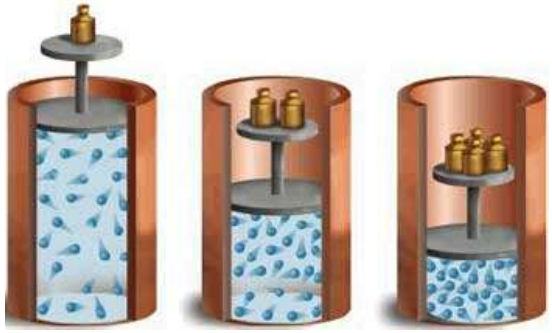


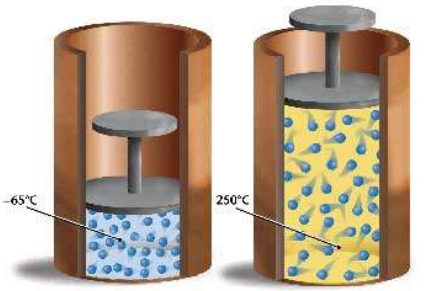


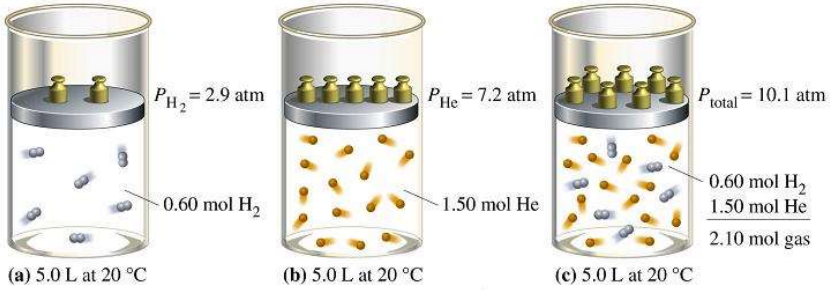
Chapter 5
Gases

Boyle's Law



Charles's Law

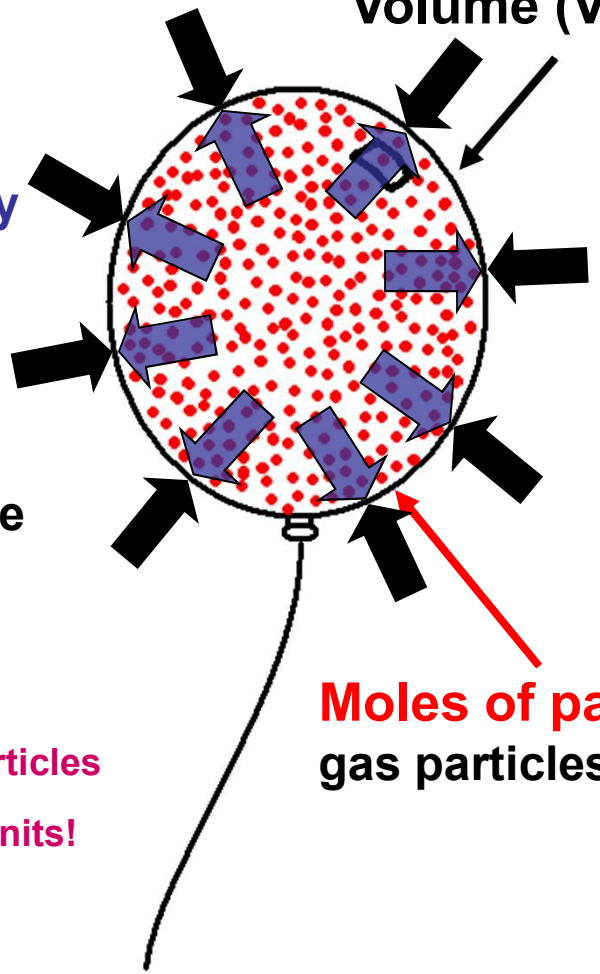




How To Characterize a Gas

Pressure (P): The force (per area) produced by moving particles when they collide with the container walls.

Volume (V): Amount of Space (Liters) the gas occupies.



...balanced by the pressure of the atmosphere (P_{atm})

Temperature (T):

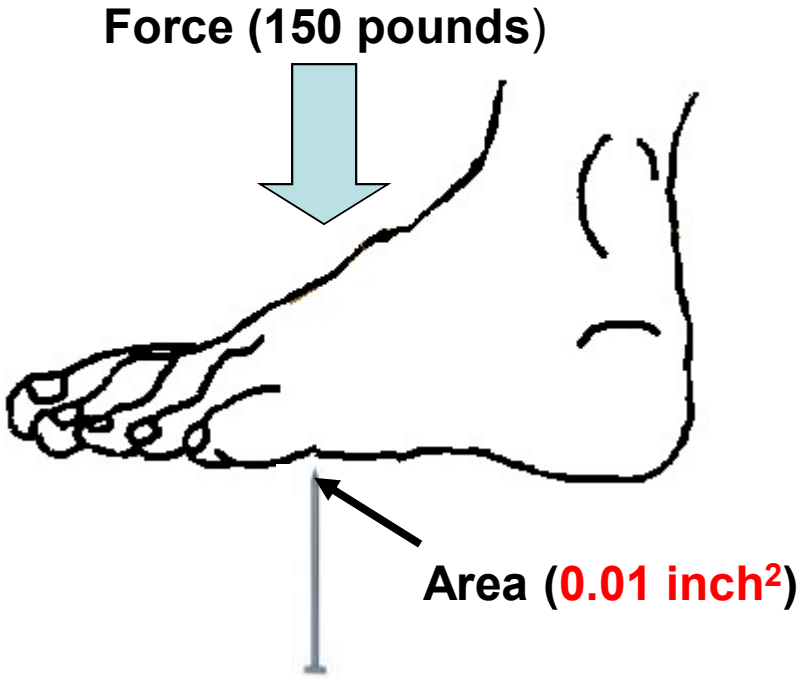
Measures kinetic energy of particles

Always used in Kelvin temp. units!

Moles of particles (n): Number of gas particles contained in the volume.

Pressure (...cont.)

$$\text{Pressure} = \frac{\text{Force}}{\text{Area}}$$



Pressure = $\frac{\text{Force}}{\text{Area}}$

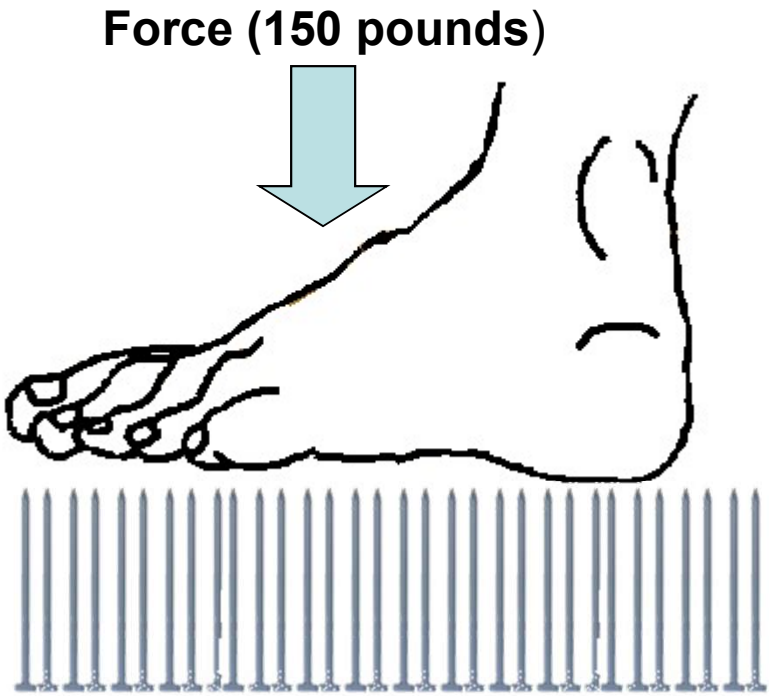
Pressure = $\frac{150\ \text{lbs}}{0.01\ \text{inch}^2}$

Pressure = 15000 lbs/inch²

Pressure = 15000 psi

Pressure (...cont.)

$$\text{Pressure} = \frac{\text{Force}}{\text{Area}}$$



1000 nails × 0.01 inch² = 10 inch²

Pressure = Force / Area

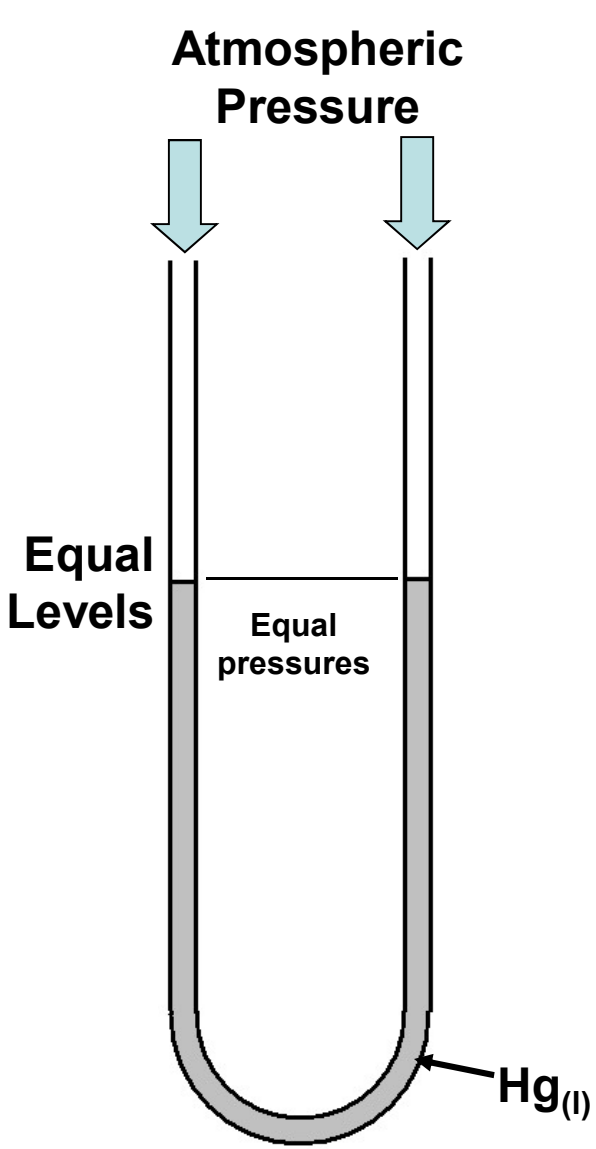
Pressure = 150 lbs / 10.0 inch²

Pressure = 15 lbs/inch²

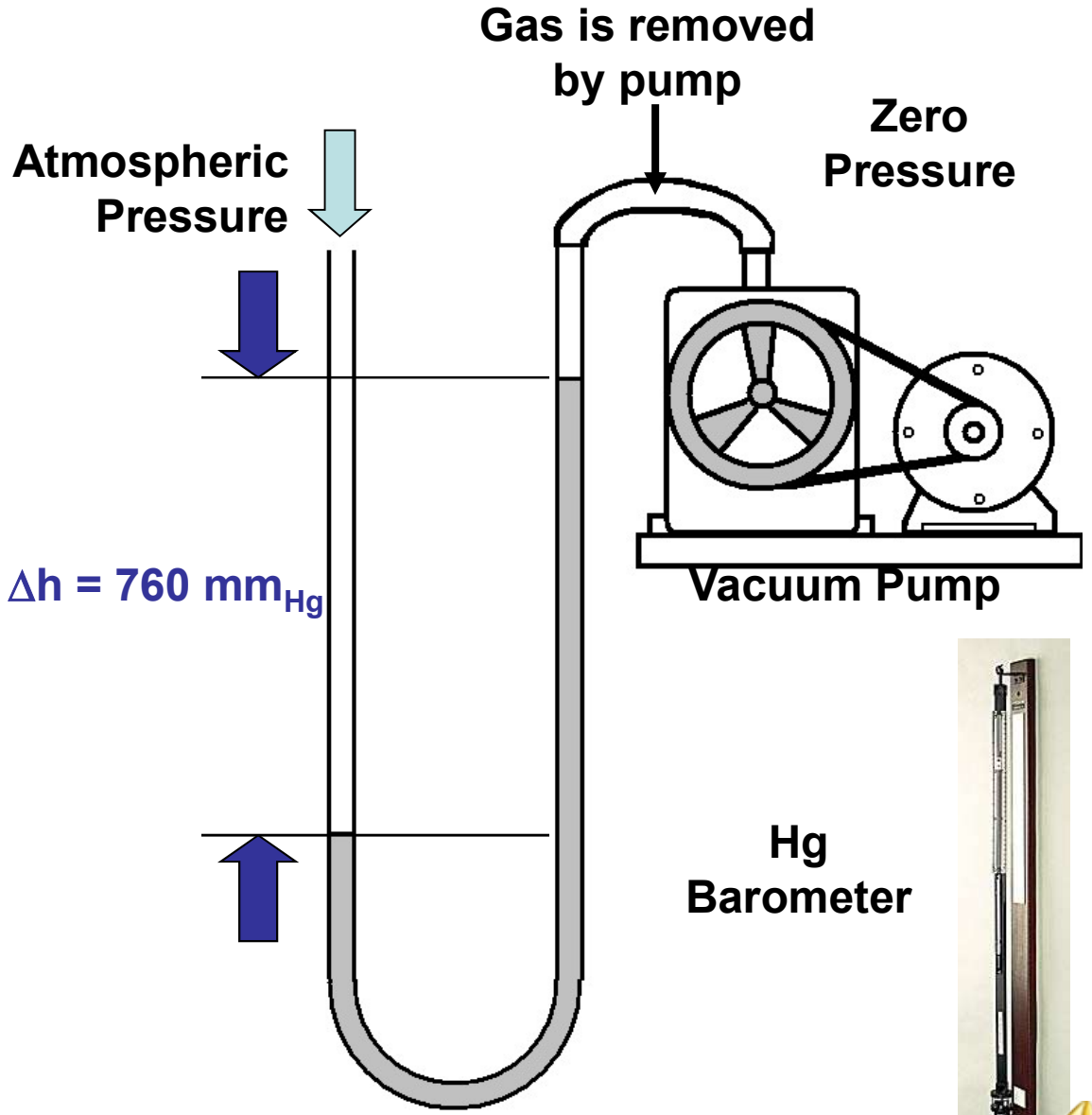
Pressure = 15 psi

The “Bed of Nails”

Pressure Measurement



Mercury Manometer



Hg Barometer

Atmospheric Pressure = 760 mm_{Hg}

Pressure Measurements: Units

- **p.s.i. : pounds per square inch**
- **mm_{Hg} : millimeters of mercury (torr)**
- **atm : atmospheres**
- **Pa : Pascals (Newton/m^2)**

- **Conversion Factors (*Know Red*):**
  - **1 atm = 760 mm_{Hg} (exactly)**
  - **1 atm = 14.6 p.s.i.**
  - **1 atm = 1.01325 $\times 10^5$ Pa**
  - **1 torr = 1 mm_{Hg}**