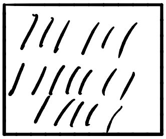
4/13/20

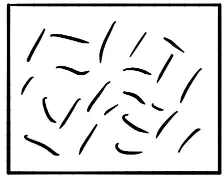
solid



Condensed (closely packed)

- most solids are crystalline (regular geometric order)
- low molecular motion
- constant shape
- constant volume

liquid



condensed

- fluid (shape depends on the container)
- moderate molecular motion
- variable shape
- constant volume

microscopic

macroscopic

gas

not condensed

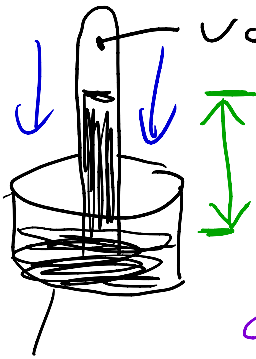
- fluid
- high molecular motion
- variable shape
- variable volume

Pressure is proportional to the height of a liquid.

Pressure

$$P = F/A$$

pressure = force / area



density

$$P = \frac{F}{A} = \frac{m \cdot g}{A} = \frac{\rho V g}{A}$$

$$F = m \cdot a$$

$$V = l \cdot w \cdot h = A \cdot h$$

(l · w = area)

$$P = \frac{\rho \cdot A \cdot h \cdot g}{A} = \rho \cdot h \cdot g$$

The height depends on the density of the liquid.

Units of Pressure

Metric: Pascal (Pa) = 1 N/m2

1 bar ≡ 100,000 Pa = 100 kPa

1 mm Hg | 1 in Hg = 25.4 mm Hg

1 mm Hg ≡ 1 torr

1 atmosphere (atm) = 760 torr
= 101,325 Pa

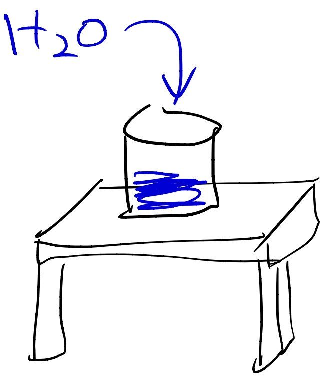
Ideal Gas Law

$PV = nRT$

Temperature represents an average of molecular energies.

$\left(\frac{N}{m^2}\right)(m^3) = N \cdot m = J$ (energy)

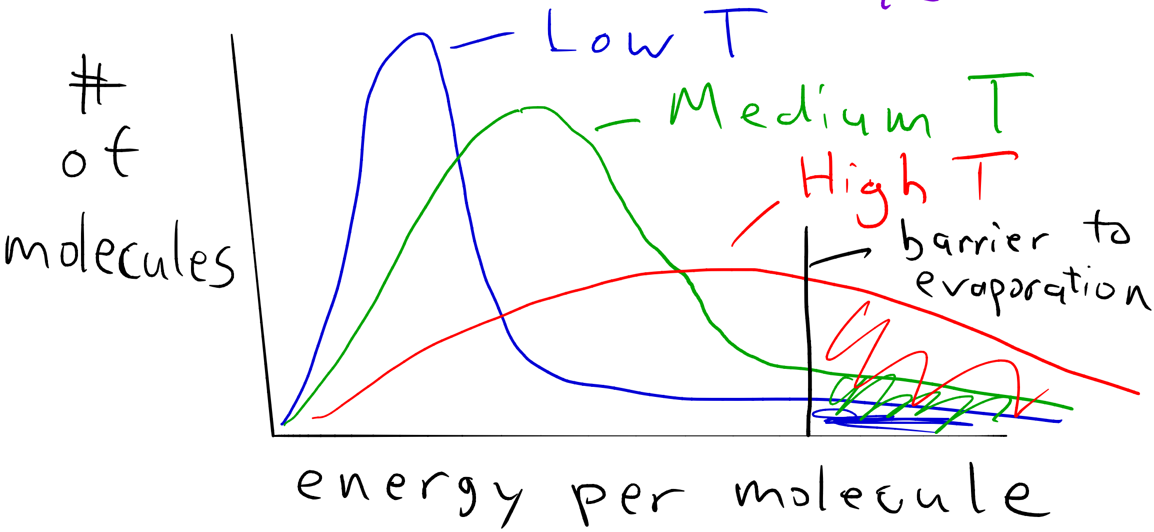
P V



why does water evaporate at room temperature (RT) if its normal boiling point is 100°C?

Molecular energy distribution

(Kinetic-molecular theory)



At any temperature, there will always be a fraction of molecules that are able to evaporate. This fraction increases with increasing temperature

⟶ Vapor pressure