GASSES

PhET Gas Properties Simulation

http://phet.colorado.edu/en/simulation/gas-properties

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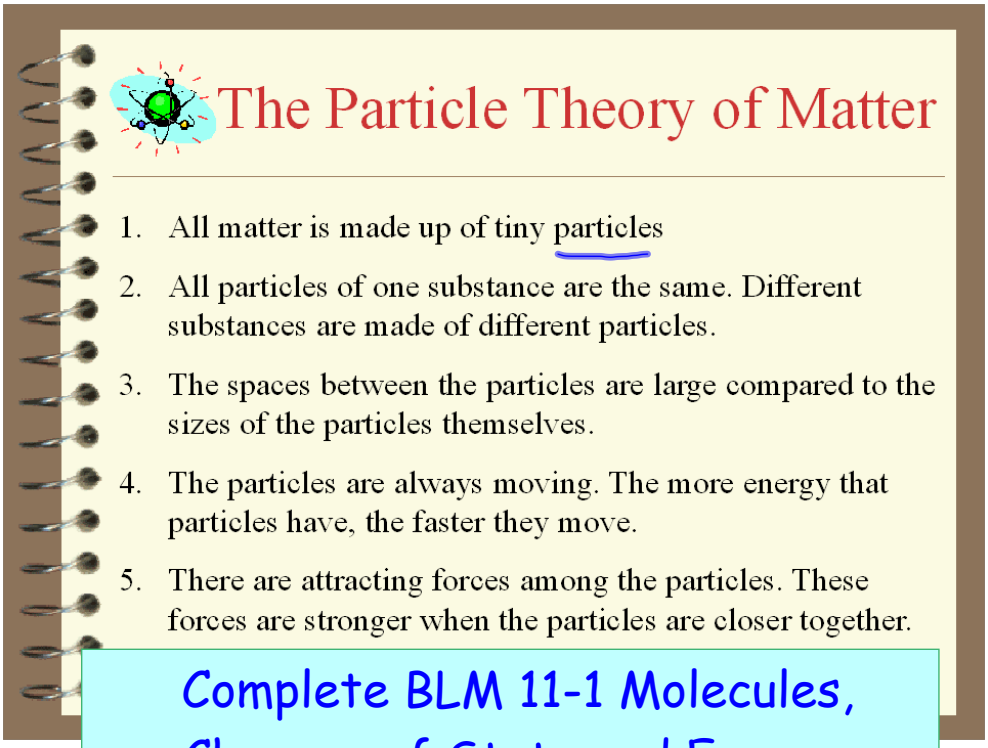
Remember: (do not need to copy)



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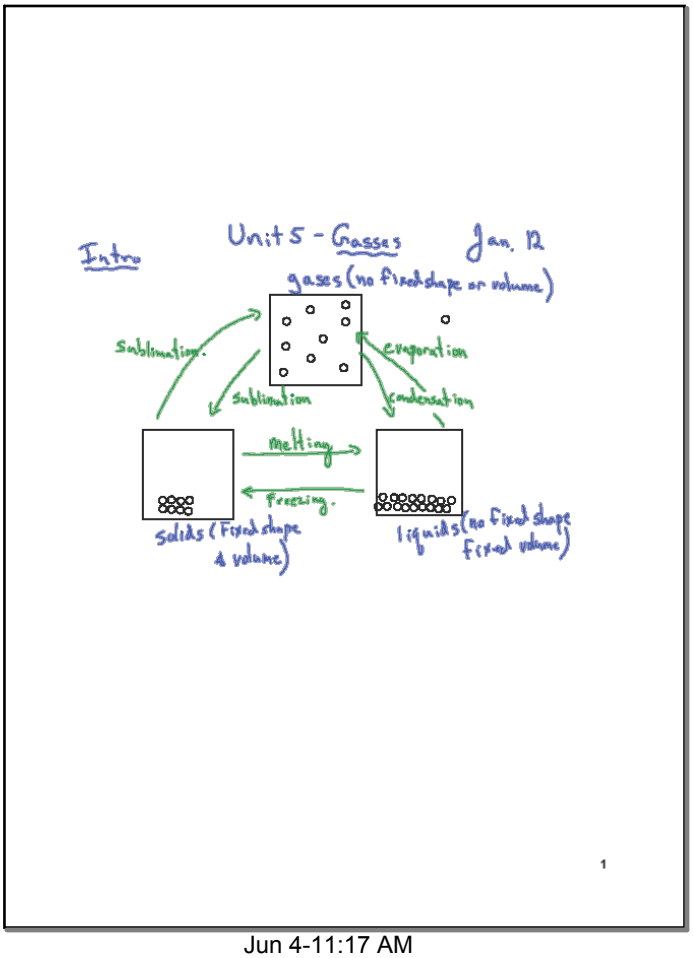

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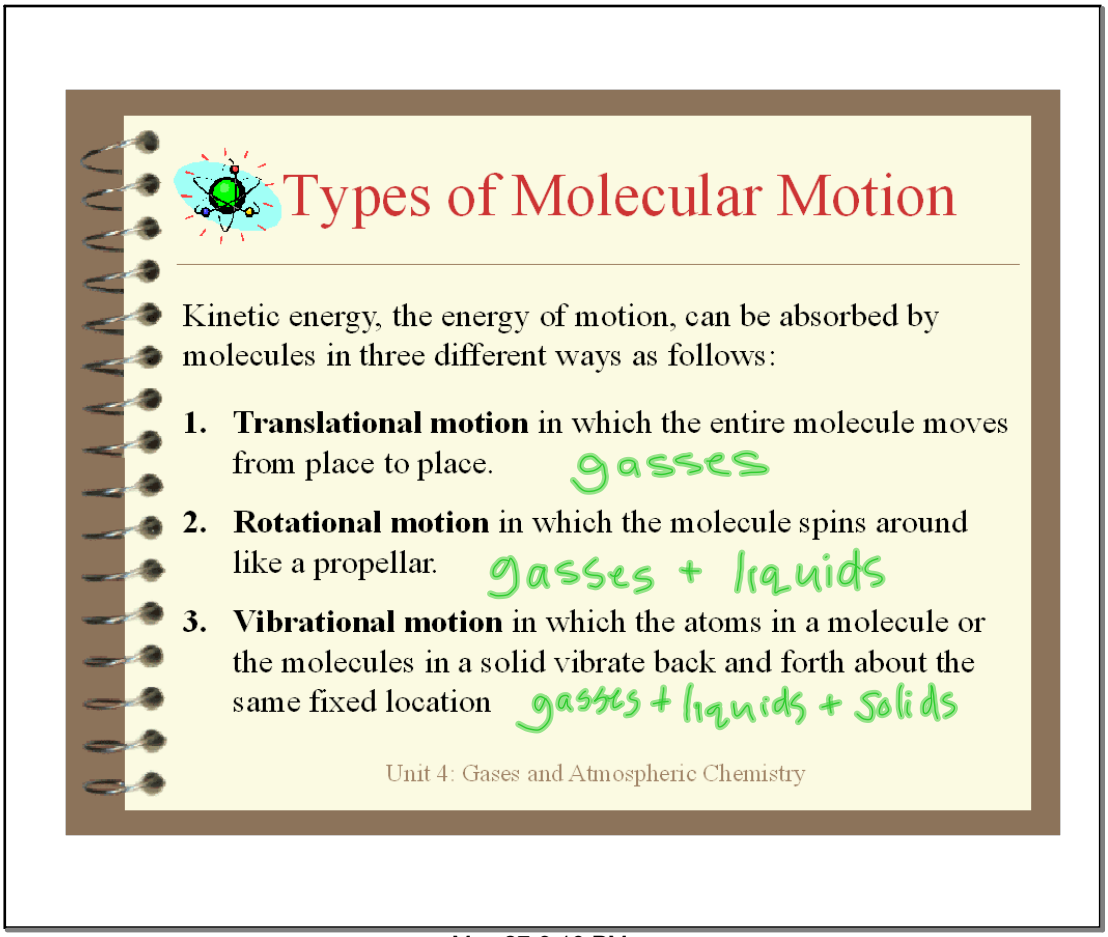

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Kinetic Molecular Theory of Gases

1. All matter is made up of tiny particles.
2. The particles are in constant motion. The higher the temperature, the more energy of motion (kinetic energy).
3. There are forces of attraction and repulsion between particles. The closer they approach each other, the stronger this attraction becomes. When particles come into contact, they repel each other strongly.
4. In the gaseous state, particles are far apart. The volume of the particles is very small compared to the volume that the gas occupies (assume zero volume).

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Kinetic Molecular Theory of Gases

5. The forces of attraction between gas particles are very small.
6. Particles are elastic. No energy is released or absorbed upon collision. Total energy before collision = total energy after collision. It is transferred.

Note: Gases exert pressure on the walls of their container as they collide with walls ~~of the container~~. The faster or the harder the collision (with the same number of particles) leads to higher pressure. The more often the collisions occur (more particles or particles move faster) leads to higher pressure.

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Ideal Gas

- The ideal gas is made up of tiny particles that occupy zero volume and have no forces of attraction between the particles.
- Most gases have some forces of attraction and occupy some volume. We neglect these forces and volume for our study of gases. We will, therefore, state the laws as applying to all gases.

Read pages 414-423.
Answer questions 1-13 on page 423. #1, 2, 4, 6, 7

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Pressure

mass x gravity
kg 9.8 N/kg

Pressure is force per unit area.

$$P = \frac{F}{A} = \frac{N}{m^2}$$

= Pascal (Pa)

Running Shoes vs. Heels

m g } F m g } F

A = bigger A = smaller

P = 21 kPa P = 50000 kPa

Since atmospheric pressure is approximately 100kPa
Standard atmospheric pressure is 101.3kPa

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Converting Units of Pressure

Use the following conversion units to change gas pressure units in BLM 11-2:

101.3 kPa = 760 mm Hg = 760.0 torr = 1.00 atm = 14.7 p.s.i.

100.0 kPa = 1.00 bar = 750.0 mm Hg = 14.5 p.s.i.

(You will be given these conversions on a quiz or test.)

Reference Pages: read pages 424-435. Answer questions 1-6 on page 435.

$20.0\ \text{kPa} \times \frac{760\ \text{mm Hg}}{101.3\ \text{kPa}} = \_\_\_\_\_\ \text{mm Hg}$

$0.83\ \text{atm} \times \frac{101.3\ \text{kPa}}{1.00\ \text{atm}} = \_\_\_\_\_\ \text{kPa}$

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