

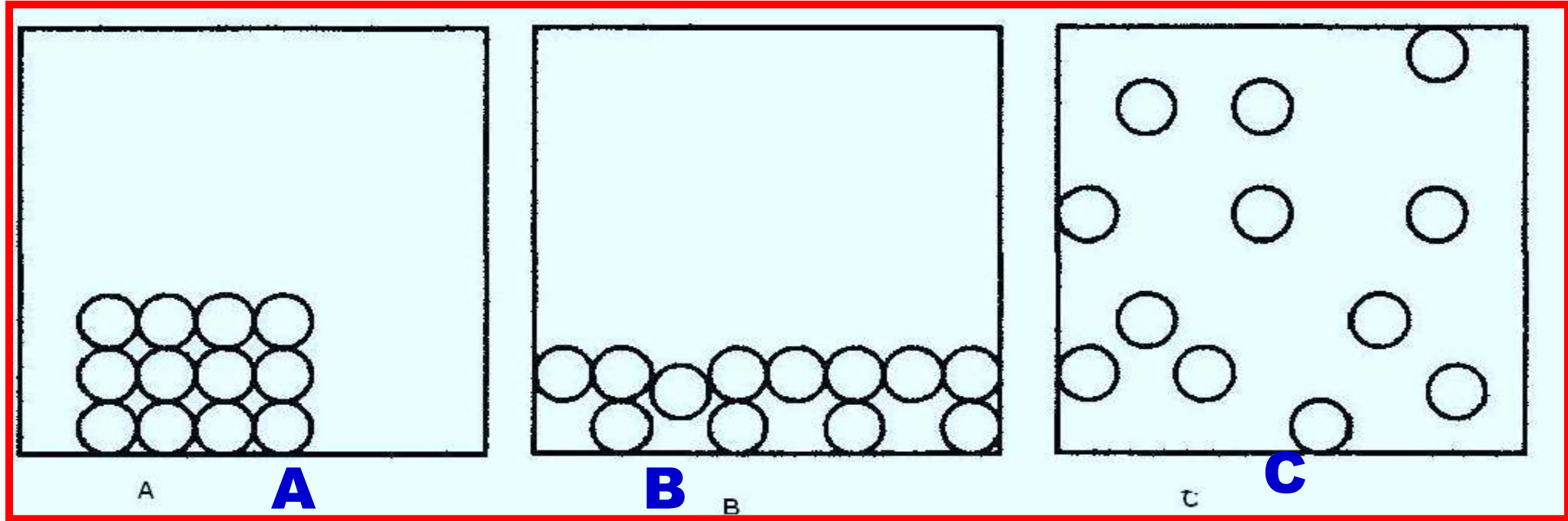
# Chemistry Bell Work, April 16 – April 19

KMT 1, States of Matter, Energy, Energy Transfer,  
Heat Flow, Solvent, Solute, Concentration,  
Diffusion, Kinetic Molecular Theory, How a  
Thermometer Works





**1. Which diagram represents the solid state, the liquid state and the gas state of matter. Explain your answer.**



**A: Solid - definite shape & volume.**  
Distance between the particles is negligible.

**B: Liquid - no definite shape but definite volume.**  
Particles close together and slide by each other.

**C: Gas - no definite shape, no definite volume.** Particles very far apart.



## 2. Describe the particle model of matter

- Matter is composed of particles which have mass and volume.
- These particles are atoms and molecules.

## 3. Describe atoms.

- During a chemical or physical change these particles can not be created or destroyed (COM).
- There are different types of atoms with different properties.
- Example: Aluminum and Copper.
  - They have different densities, which means when their volumes are the same their masses are different.
- These different types of atoms are called elements.

## 4. Describe molecules.

- Atoms can combine or group together and form molecules.



## Bell Work, Tuesday, 4/17/18 ( 5 questions)

### 1. Define energy.

Energy is a conserved substance-like quantity that is stored in various ways and transferred in various ways.

### 2. Describe the ways that energy is transferred.

- Heating – transfer of energy through the collisions of particles. The energy transferred is called heat or thermal energy.
  - When more particles collide, more heat is transferred.
- Working – transfer of energy when objects exert forces on each other; This energy is called work.
  - Forces are pushes and pulls.
- Radiating – transfer of energy by the emission or absorption of electro- magnetic energy such as light, radio waves, x-rays, magnetism. This energy is called radiation.

### 3. What does temperature measure?

The motion of particles. Faster particles = higher temperature, slower particles = lower temperature.

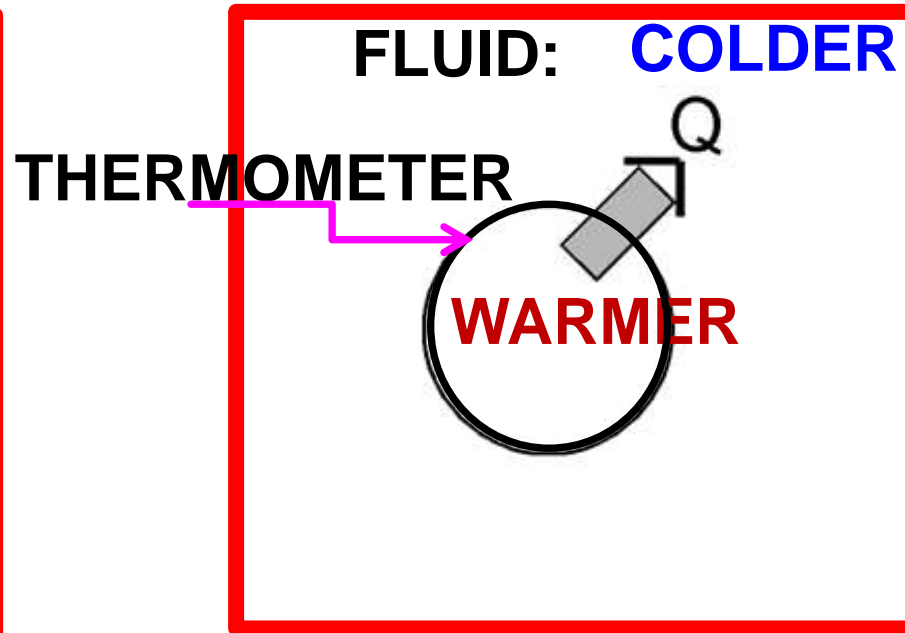
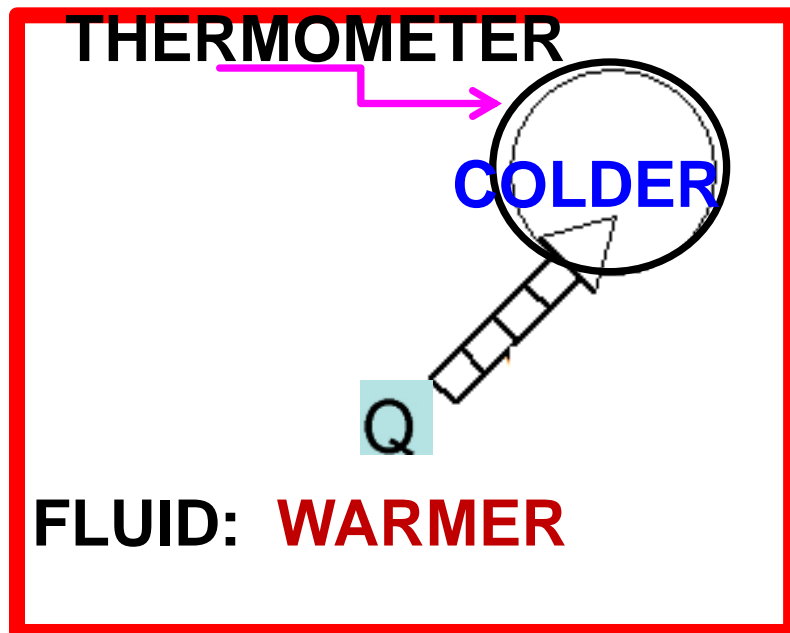
# Bell Work, Tuesday, 4/17/18

4. What is a fluid? Liquids and gasses. Water is a fluid.

5. Describe the ways that energy is transferred between the system and the surroundings.

- the circle is the thermometer (the system), the square is the fluid (the surroundings).
- “Heat flow,” heat always flows from:
  - hot to cold (high temp. to low temp.).

***Draw the diagrams***



**Q = heat**



## 1. Define:

Solute: the smaller quantity, being mixed or dissolved.

Solvent: the greater quantity that is doing the mixing or dissolving.

concentration: The ratio of solute dissolved in the solvent.

Higher concentration = increased ratio of solute in the solvent.

Lower concentration = decreased ratio of solute in the solvent  
(unusually increasing the amount of solvent with constant amount of solute.)

## 2. What is diffusion

- Diffusion is a term that refers the tendency of particles in a fluid (gases & liquids) to spread out and mix in with their surroundings.
- The solute moves from an area of high concentration (a bottle of perfume) to low concentration (a room with no perfume).

3. State an example of gas diffusion.

The odor of perfume spreading throughout a room.

4. What causes the mixing?

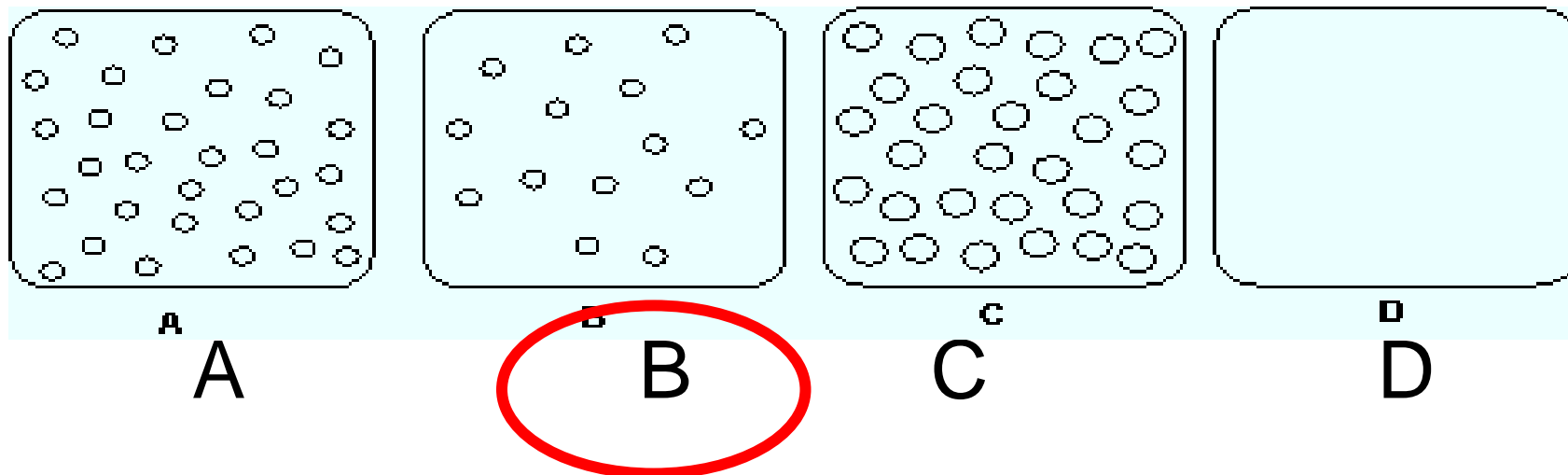
– The mixing is caused by the motion of the solvent particles.

5. State an example of liquid diffusion.

A drop of food coloring spreading out and mixing in with water.

6. Liquid A was allowed to evaporate completely to a gas in a sealed container. Which of the diagrams, B, C, or D below best represents the evaporated substance in the sealed container?

Draw the diagrams





### 1. Describe pressure.

Pressure is caused by particles hitting a surface.

Amount of pressure depends on force of impact (how hard) and the frequency (how often) of collisions with a container.

### 2. Define Kinetic Energy (KE)

Energy due to motion. Mathematically  $KE = \frac{1}{2} mv^2$  m = the mass of the particle, v= velocity of the particle.

### 3. State the kinetic molecular theory that accounts for the behavior of gases

Particles of a gas:

- a) are in constant motion (also true for liquids and solids).
- b) they do not “lose energy”; they maintain their speed.
- c) do not stick to other particles.
- d) The speed of the particles is related to their temperature.
- e) The pressure of a gas is related to the frequency (how often) and how hard the particles hit the sides of the container in which they are enclosed.



**4. Explain why the mercury or alcohol level in a thermometer rises when it is placed in a warmer fluid. (3-step process)**

- 1. Heat (energy) from the warmer fluid (the surroundings) is transferred to the liquid in the thermometer.**
- 2. This heat causes the alcohol molecules to move faster.**
- 3. The alcohol molecules move further apart (expand).**

**Result: alcohol rises in the tube.**

**5. Explain why the mercury or alcohol level in a thermometer falls when it is placed in a colder fluid. (3-step process).**

- 1. Heat (energy) from the warmer thermometer is transferred to the fluid (the surroundings).**
- 2. This heat loss from the thermometer causes the alcohol molecules to move slower.**
- 3. The alcohol molecules move closer together (contract).**

**Result: alcohol goes down in the tube.**