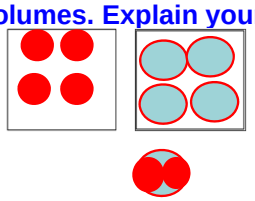
Bell Work, Oct 21 - 24, 2013

States of Matter, Kinetic Theory, Gas Laws

Bell Work, Monday, Oct 21, 2013

1. In the Mass and Volume experiment 10 g of the silver metal had a volume of 37 cm^3, whereas 10 g of the red metal had a volume of 14 cm^3. Draw a particle diagram that explains why the metals have different volumes. Explain your diagram.

Red metal



silver metal

The red metal has a more massive particle in a smaller volume than the silver metal.

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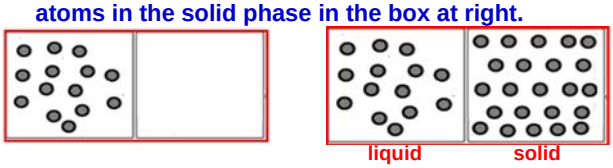
2. Draw the diagrams. If the box at left contains atoms of aluminum in the liquid phase, represent the same atoms in the solid phase in the box at right.



liquid solid

3. How would you represent the atoms of aluminum in the gaseous phase?

gas

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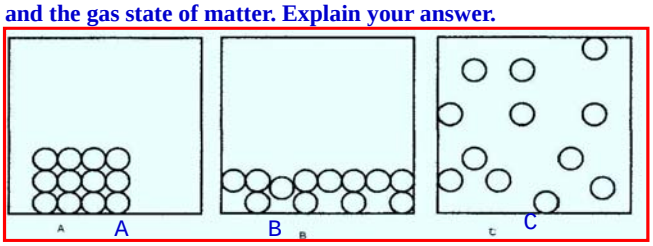
4. Which diagram represents the solid state, the liquid state and the gas state of matter. Explain your answer.



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

B: Liquid - no definite shape but definite volume. Particles slide by each other.

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

Bell Work, Tuesday, Oct 22, 2013

1. Describe the solid, liquid and gas.

	gas	liquid	solid
shape	Assumes the shape and volume of its container. Particles can move past one another.	assumes the shape of the part of the container which it occupies. Particles can move/slide past one another.	retains a fixed volume and shape rigid - particles locked into place.
compres-sible	Compressible, lots of free space between particles	not easily compressible, little free space between particles	not easily compressible, little free space between particles
Flows or moves	flows easily, particles can move past one another	flows easily, particles can move past one another	does not flow easily rigid - particles cannot move/slide past one another

Bell Work, Wednesday Oct 22, 2013

1. Matching: contracts, expands

When a liquid or gas is heated it expands

When a liquid or gas is cooled it contracts

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

Step 1: energy transfer (hot to cold or cold to hot?)

Step 2: speed

Step 3: hint: see #1

Resulting in:

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

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

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

Result: alcohol rises in the tube.

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

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

Result: alcohol goes down in the tube.

Bell Work, Thursday Oct 24, 2013

1. Define energy.

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

2. What is kinetic energy

Kinetic energy **is the energy of motion.**

3. What is thermal energy?

Thermal energy (Eth) is related to the motion of the particles and is measured by temperature.

4. How is energy transferred from one particle to another?

Energy is transferred from particle to particle via collisions among the particles.

5. Explain gas pressure

Pressure of gases is explained in terms of the collisions of the particles with the sides of the container.

Bell Work, Thursday, Oct 24, 2013

6. State the kinetic molecular theory that accounts for the behavior of gasses.

Particles of a gas:

a) **are in constant motion, moving in straight lines until they collide with another particle or a wall of the container in which they are enclosed.**
b) **experience elastic collisions; i.e., they do not eventually "run down".**
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 and impact of the collisions of the gas particles with the sides of the container in which they are enclosed.**