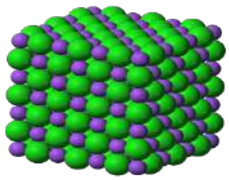
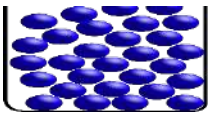
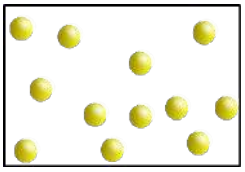
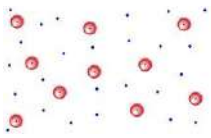
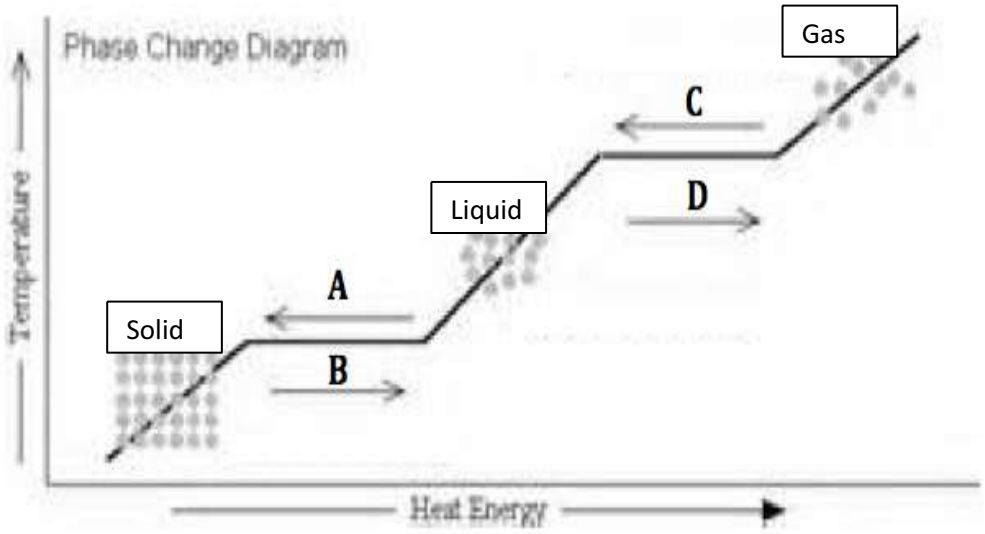
Mid Unit Study Guide
Structure and Properties of Matter

S8P1. Obtain, evaluate, and communicate information about the structure and properties of matter (Pure substances, Mixtures, State of Matter, Properties of Matter, and Changes of Matter).

1) Complete the following chart of a solid, liquid, gas, and plasma.

State of Matter	Shape and Volume	Particle Movement	Energy	Sketch of Particle Arrangement
Solid	**Definite volume and shape**	Vibrates in place	Very low	
Liquid	Definite volume, no definite shape	Slips and slides past each other (moves more quickly than a solid)	low	
Gas	No definite volume or shape	Moves freely to fill its container	High	
Plasma	No definite volume or shape	Very fast, many collisions between particles	Very high	

2) Label the "Phase Change Diagram" below with the following: gas, liquid, solid, melting point, boiling point, freezing point, condensation.



A. **Freezing point**
B. **Melting point**
C. **Condensation**
D. **Boiling point**

3) Name and describe each letter of the "Phase Change Diagram":

A – Freezing point = The temperature at which a substance will change from a liquid to a solid

B – Melting point = The temperature at which a substance will change solid to a liquid

C – Condensation = The temperature at which a substance will change from a gas to a liquid

D – Boiling point = The temperature at which a substance will change from a liquid to a gas

4) What do the horizontal lines on the "Phase Change Diagram" indicate about temperature during a phase change? **Temperature does NOT change during a phase change, heat that is added is used to allow the change to occur.**

5) If water freezes at 0 degrees Celsius, at what temperature does it melt? 0 degrees Celsius

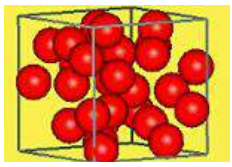
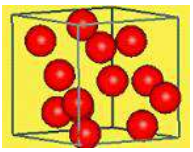
Object	Density (g/cm3)
Cork	0.2
Anchor	7.8
Water	1
Apple	0.9
Orange	0.84
Orange without peel	1.16

6) Use the chart above to compare each object's density to water. Be specific, will it sink or float in water? Why.

Will sink = Anchor, Orange without peel More dense than water. Means there are more particles per area than water.

Will float = Cork, Apple, Orange. Less dense than water. Means there are less particles per area than water.

7) Draw and contrast the density of cold water molecules, room temperature water molecules, and hot water molecules. Which one would be most dense and which would be the least?

	Cold Water	Room Temp. Water	Hot Water
Draw Model			
Density	Most Dense	Medium Density	Least Dense

8) If you wanted a potato to float in water, what would you have to do? **Make the water more dense than the potato. You could do this by adding particles that will dissolve in the water, such salt.**

9) List examples of physical properties:

Malleable, ductile, shiny, hardness, brittle, freezing point, melting point, boiling point, texture

10) List examples of chemical properties:

Flammability, combustability, ability to rust or oxidize, ability to react, ability to form a precipitate.

11) If you have two unknown liquid substances that look and smell the same, which physical property would be best to identify the substance? **Density, melting points, freezing point, or boiling point, ect…**

12) List and describe the clues for a physical change:

Color change, size change, phase change, something dissolving, bending, crushing, mixing, can easily be changed back, nothing new is formed.

13) What is the difference between a physical property and physical change?

Properties determine if a change can occur. A change is the action that occurs when the changes happens.

14) List and describe clues for a chemical change.

Color change, fizzing, foaming, production of heat, sound, light, cannot easily be undone, something new is formed.

15) If a car has rusted or if an apple has turned brown, how do you know that it has undergone a chemical change?

It cannot easily be changed back to its original form. Rust is formed and Gases are formed.

16) What is the difference between a chemical property and chemical change?

Properties determine if a change can occur. A change is the action that occurs when the changes happens.

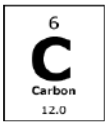
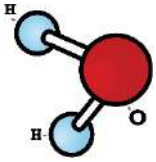
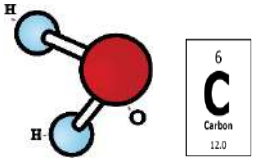
17) Give an example of two substances that are "reactive" to each other? How do you know that they are reactive? Iron and oxygen. When they are in contact with each other rust is formed.

18) Why is spoiled milk an example of a chemical change with a “precipitate”?

Solid clumps are formed in the liquid.

19) Why is cutting or breaking a substance like glass or paper a physical change and not a chemical change? **Nothing new is formed. Can be changed back.**

20) Complete the chart below:

	Description	Examples	Draw a Model
Element	**A pure substance that cannot be broken down into other substances by chemical or physical means.**	Anything on the periodic table. Gold, hydrogen, Nitrogen.	
Compound	A pure substance made of two or more elements chemically combined.	Not on the periodic table. Water (H_2O), Salt (NaCl), Carbon Dioxide (CO_2)	
Pure Substance	A pure substance consisting of a single kind of matter with specific properties.	Gold, hydrogen, Nitrogen. Water (H_2O), Salt(NaCl), Carbon Dioxide (CO_2)	
Mixture	Two or more pure substances that are mixed together buy no chemically combined.	Salt water, coke, orange juice, dirt, cereal, pizza	

21) Describe the difference between a pure substance and mixture.

A pure substance is made of only one type of matter and cannot be separated by physical means. A mixture is made of at least 2 different pure substances and can be separated by physical means.

22) Describe the difference between a heterogenous mixture and homogeneous mixture.

List examples of each. Heterogenous mixture - you CAN see the different parts that make it up. Homogeneous mixture – you can NOT see the different parts that make it up.

23) Compare a solution and a homogeneous mixture.

A solution is a liquid homogenous mixture.