Day 1: Structure of Matter (3ec)

#3 Structure of Matter: Each of the more than 100 elements of matter has distinct properties and a distinct atomic structure. All forms of matter are composed of one or more of the elements. As a basis for understanding this concept:

a. Students know the structure of the atom and know it is composed of protons, neutrons, and electrons.

b. Students know that compounds are formed by combining two or more different elements and that compounds have properties that are different from their constituent elements.

c. Students know atoms and molecules form solids by building up repeating patterns, such as the crystal structure of NaCl or long-chain polymers.

d. Students know the states of matter (solid, liquid, gas) depend on molecular motion.

e. Students know that in solids the atoms are closely locked in position and can only vibrate; in liquids the atoms and molecules are more loosely connected and can collide with and move past one another; and in gases the atoms and molecules are free to move independently, colliding frequently.

f. Students know how to use the periodic table to identify elements in simple compounds.

Draw a "cube of each" solid, liquid & gas and show how their atomic structure is different

3. Classify each phrase as a **S** (solid), **L** (liquid) and/or **G** (gas).

_____ molecular movement is the greatest

_____ takes shape of container

_____ weak bonds between molecules, may collide & move past one another

_____ spreads in all directions

_____ virtually no bonds between molecules, move independently

_____ molecule movement is smallest

_____ spreads in direction of gravity

_____ has mass

_____ has definite volume

_____ does not expand

_____ expands

_____ has shape of its own

_____ has no definite volume

_____ hard to deform

_____ takes up space

_____ atoms closely locked in position & vibrate

Definitions to know:

1. _____: the physical forms in which a substance can exist
2. _____: state in which matter has a definite shape & volume
3. _____: state which matter takes the shape of its container but has a definite volume
4. _____: state in which matter changes and has NO definite shape or volume
5. _____: the state which matter doesn't have a definite shape/volume and particles are broken apart
6. _____: the conversion of a substance from one physical form to another
7. _____: the change of state from a solid to a liquid
8. _____: the change of state from a liquid to a solid
9. _____: term used to describe a change in which energy is absorbed
10. _____: term used to describe a change in which energy is released or removed
11. _____: the change of state from a liquid to a gas; includes boiling and evaporation
12. _____: vaporization that occurs throughout a liquid
13. _____:vaporization that occurs at the surface of a liquid below its boiling point
14. _____:the change of state from a gas to a liquid
15. _____: the change of state from a solid directly into a gas

Brainpop notes: States of matter: 5 sentences what you learned:_____
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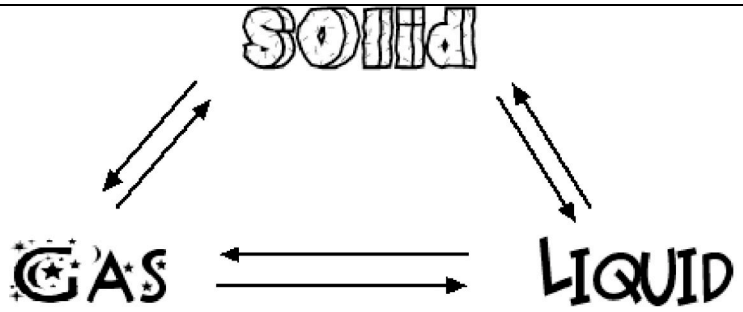
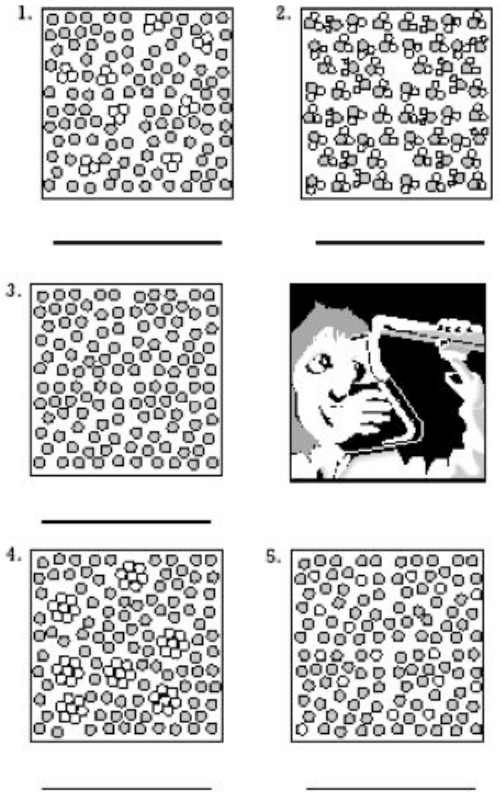
4. Label the arrows (changes of states). Use the following terms: condensation, evaporation, deposition, freezing, melting, sublimation.





5. Different Substances

Label each box (1-5) below with the type of substance it BEST models: ***colloid, compound, element, solution or suspension***.

Next to the box, explain WHY you matched the substance with that particular box. Use Chapter 4, pages 82-97.

Definitions to Know!

1. _____:some clumps still, not fully mixed
2. _____:particles are all identical, but made of two substances
3. _____:all particles are identical and of the same substance
4. _____:large clumps of solute, not all mixed up

Solution: most mixed substance, no clumps

Brainpop notes: Properties of matter: 5 sentences what you learned:_____
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For each pair, explain the differences in their meanings:

1. exothermic/endothermic: Exothermic changes _____/ endothermic changes _____
2. Boyle's Law / Charles's Law:

_____states that when the pressure of a gas increases, its volume decreases.

_____states that when the temperature of a gas increases, its volume increases

3. Evaporation/boiling:

_____ is the change of a liquid to a gas at the surface of a liquid.

_____ is the change of a liquid to a gas throughout a liquid.

The Atom's Family: Please complete!

Brainpop notes: Atomic Model Review: 5 sentences what you learned:_____

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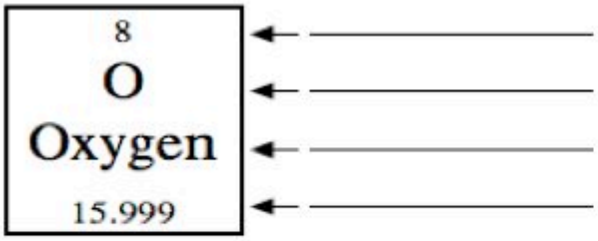
Use Chapters 3, 4, and 12 to answer the following questions. Please be sure to include the correct number and label the following parts: *nucleus, protons, neutrons, electrons.*

1. Draw the structure of a **carbon atom**.

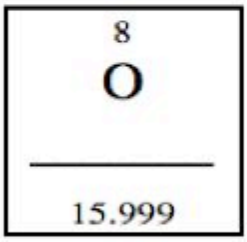
2. Draw a structure of a **salt compound.**

_____: positively charged particles in the nucleus
_____: neutral (no charge) particles in the nucleus
_____: negatively charged particles found in the electron cloud
_____:a pure substance composed of 2 or more elements that are chemically combined
_____: a pure substance that can't be separated or broken down into a simpler substance by chemical or physical means

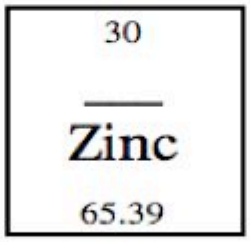


Atomic number equals the number of _____ or _____

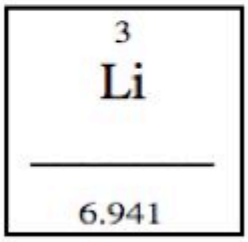
Atomic mass equals the number of _____ + _____



Atomic # = _____
Atomic Mass = _____
# of Protons = _____
# of Neutrons = _____
# of Electrons = _____



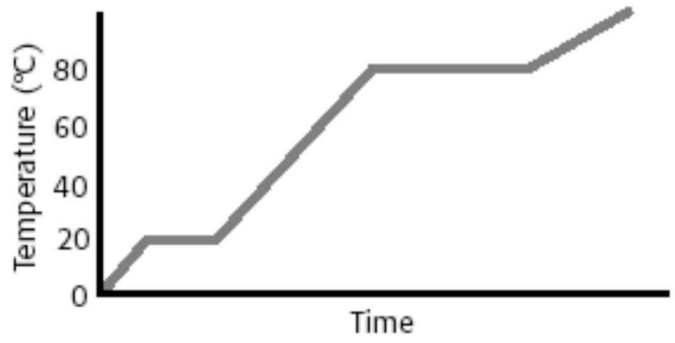
Atomic # = _____
Atomic Mass = _____
# of Protons = _____
# of Neutrons = _____
# of Electrons = _____



Atomic # = _____
Atomic Mass = _____
# of Protons = _____
# of Neutrons = _____
# of Electrons = _____

4. Counting Atoms: State the name & number of each element in the following compounds.

CH_4 *Carbon – 1* *Hydrogen – 4*	$FeBr_2$	$PbSO_3$
H_2SO_4	Na_2CO_3	$Zn(HCO_3)_2$

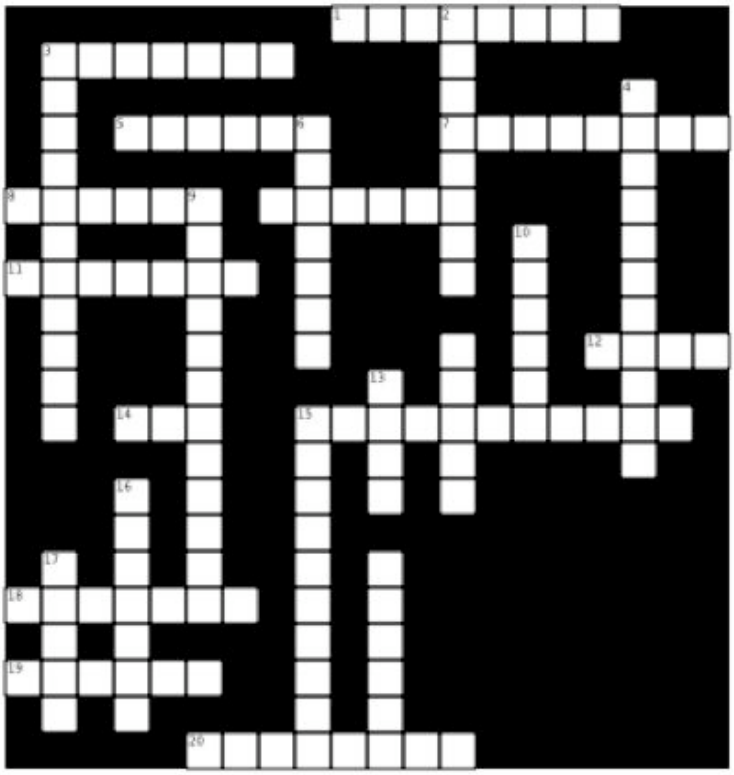


6. Examine the graph & answer the following questions.

a. What is the boiling point of the substance? What is the melting point?

b. Which state is present at 30°C?

c. How will the substance change if energy is added to the liquid at 20°C?



Across

1 the change in state from a liquid to a solid
3 a pure substance that cannot be broken down into simpler substances
5 the positively charged particles of the nucleus of an atom
7 a pure substance composed of two or more elements that are chemically combined
8 the number of protons in nucleus of an atom
11 the change in state from a solid to a liquid
12 the smallest particle into which an element can be divided and still retain all of the properties of that element
14 the state in which matter changes in both shape and volume
15 vaporization that occurs at the surface of a liquid
18 vaporization that occurs throughout a liquid
19 the state in which matter takes the shape of its container but has a definite volume
20 the negatively charged particles found in all atoms

Down

2 the region outside the nucleus where electrons are likely to be found
3 a change in which energy is absorbed
4 the change in state from a solid directly into a gas
6 the particles of the nucleus that have no charge
9 the change in state from a gas to a liquid
10 the state of matter that does not have a definite shape of volume and whose particles have broken apart
13 the sum of the protons and neutrons in an atom
15 a change in which energy is released or removed
16 the center of an atom that is made up of protons and neutrons
17 the state in which matter has a definite shape and volume

Brainpop notes: Atomic Model Review: 5 sentences what you learned:_____

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